Nov./Dec. 1985, No. 55, $3.75

Fine WoodWorking

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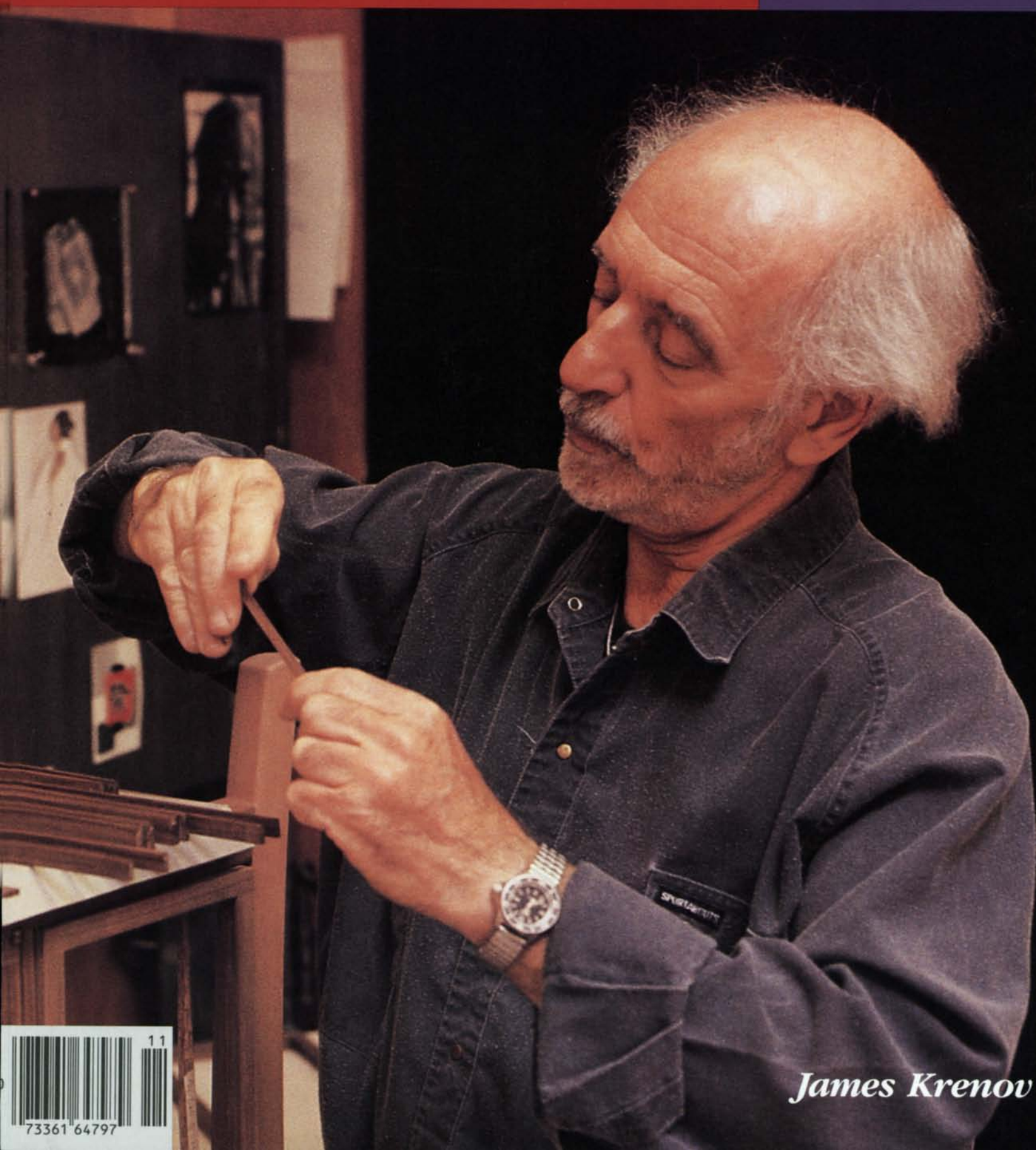
Plans:
- Newport Clock
- Sleds
- Panel Plane

Chip Carving

Jointer Set-Up



James Krenov

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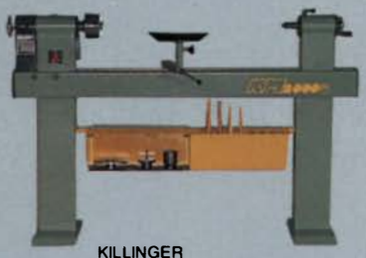

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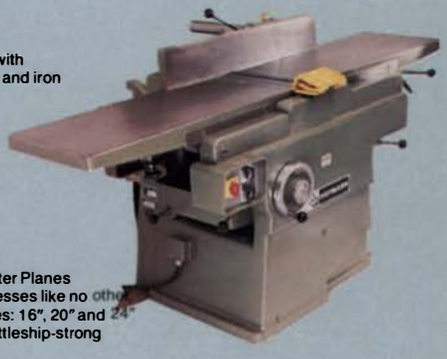

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Fine WoodWorking

November/December 1985, No. 55

The Taunton Press

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Cover: James Krenov, cabinetmaker, author, and educator, has influenced a generation of American woodworkers. Glenn Gordon visited Krenov, and his reflections on the man's work begin on p.42. Photo: John Shaw.

A round box capped by a snug-fitting lid is a satisfying lathe project. Richard Raffan explains the technique on p. 50.

Wrinkly burl veneers are delightful to look at but a nightmare to handle. On p. 88, Preston Wakeland and Ian Kirby tell how to tame them.

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Departments

Articles

To our readers:
This space is usually devoted to reader letters, but it seems appropriate to take a little of it to note, in passing, that this issue of *Fine Woodworking* marks our 10th year of publishing.

When we began, during the winter of 1975, we hoped to open a forum in which woodworkers of all persuasions could exchange useful technical talk, ideas about design and construction, and maybe a good yarn or two about the unabashed satisfaction of making something beautiful out of wood. Against the conventional publishing practice of the day, we proposed that this new magazine be written not by professional journalists, but by readers actively involved in the craft. We have succeeded chiefly because we had the good fortune to attract talented, knowledgeable woodworkers generous enough to share their experiences with others. For that, we are profoundly grateful.

That there has been a renaissance in woodworking during the past two decades is undeniable. Everywhere we travel, we commonly see woodworking of an uncommon standard. Executed by amateur and professional alike, this work encompasses a rich variety of style, from rustic to radical, functional to fantastical. Underlying this diversity, however, is a shared concern for making something well. One of the most rewarding aspects of our work has been to pass along the efforts of woodworkers who are rescuing traditional techniques from oblivion, and those who have enriched that tradition with new methods and insights. Above all, we have learned that there is rarely just one right way to work wood.

It is customary for magazines to thank their readers on occasions like these. Our gratitude runs deeper than that, however, for our readers are also our writers, our sources, our inspiration and our editorial advisers. For all that and more, we'd like to say thanks. —*The Editors*

Michael Dunbar's response to Calen Fitzgerald's question regarding a uniform stain for Windsor chairs (Q&A, *FWW* #53) spoke eloquently about traditions and about Dunbar's personal outlook on finishing Windsors. Unfortunately, it did not answer Fitzgerald's question. I have run into the same problem—a client requests a "natural" finish, preferably an oil, on a Windsor, but neither the client nor I wish to be distracted from the chair's lines by the rainbow of different woods. The answer lies in a lacquer-based penetrating dye stain, applied by spraying. I use stains made by Mohawk Finishing Products, Rt. 30 North, Amsterdam, N.Y. 12010, using a regular spray gun for the seat and, to achieve finer control, an airbrush for everything else. The stain dries almost on contact, and thus is not affected by the different hardnesses and porosities of the woods. I finish with 3 to 5 coats of tung oil (also from Mohawk).

I think this finish is more durable than paint, since the inevitable dents and scratches show up far less in the stained surface than they would in a painted one. I respect Dunbar's obvious expertise and experience with Windsors, but I think he is being somewhat shortsighted in refusing to allow anything but a painted finish.... Modern finishing technology can give emphasis to the lines of the chair by making the wood tones more uniform, while still allowing the wood to show through. It is an excellent combination and one which falls well within the original concept of the Windsor chair.
—*Mac Campbell, Harvey Station, N.B.*

The article [by Aldren Watson and Theodora Poulos] on turning without a lathe (*FWW* #54) is an exercise in frustration. One could make a spring-pole lathe in the same time it would take to make the lathebox, and get a nice-looking leg in much less time than Mr. Watson's beaver method. They don't call them "turnings" for nothing. Aren't you guys supposed to be showing people how to do things the most efficient way? The person responsible for this article should be made to go lumbering with a fretsaw. —*Allan Breed, York, Me.*

Mark Berry's article (*FWW* #54) on the rare quilted mahogany was enjoyable but contained a minor error. Chiquibul (not Chicibul) is not located in Honduras but in western Belize, formerly British Honduras. The Chiquibul valley is part of an extensive forest preserve and contains some of the best remaining stands of tropical hardwoods in the country. The forest reserve is currently administered by Mr. Green from the small village of Augustine.

Figured mahogany of any kind is difficult to find and the large-quilt mahagony featured in the article is rare indeed. Plain mahogany is readily available in Belize, at prices lower than those usually paid for our most inexpensive woods. It is used as a general purpose wood in the construction industry. —*William G. Adams, Richmond, Ky.*

Fine Woodworking reached a new literary high with Poetry and Pun in the article on Celts and "Tates" (*FWW* #53). About 15 minutes after finishing the article I realized, "He who has a tates is lost." Double reversal sounds a little impossible, but I will still try one or two. Always looking for interesting tricks and puzzles. —*Eugene Mechler, Bridgton, Me.*

Further on Ed Stolfa's question in *FWW* #54 on growth-ring orientation: I have had edge-glued panels cup regardless of the orientation of the growth rings. Another woodworker mentioned that he found the fault lay in his tablesaw's blade-to-table orientation. Regardless of how accurately set the blade seems to be, it is easily a hair off true 90°. He flips alternating boards to neutralize the tiny error. I've followed his example, to my great satisfaction. —*M.F. Marti, Monroe, Ore.*

I called Delta in Memphis to see if I could find a fence part for my 4-in. jointer-planer of 1950's vintage. Sure enough, they could supply it. The price? $100! The original cost of the jointer was about $50 without motor or stand. Needless to say, I didn't buy the part and will seek an alternate solution. I'm not sure what's worse—not being able to get parts or paying exorbitant prices for them. They might just as well have not been able to supply it. —*R.T. Bonelli, Bristol, Ind.*

First, I would like to thank you for taking the time to shop test our Williams and Hussey Molder Planer (*FWW* #52). Everyone learns something from these tests, including us.

I feel the article was fairly accurate with the exception of the "power feed being disappointing." As you are aware, we shipped you a hand-feed machine, along with a power-infeed attachment to convert the machine to a power infeed and outfeed. At the time we were using two rubber feed rolls. Very shortly afterwards we changed to a serrated-steel infeed roll and rubber outfeed roll, which corrected any slippage that might have occured. I feel we should have been contacted when your author was having problems with the feed. We have a toll-free number, and a trained staff of people to answer any questions or problems that may arise.

As for the operator's manual being "the worst I've seen with a woodworking machine," I have to agree it's not up to par. We've been [planning to improve it] for years but thanks to the article, we have decided not to wait any longer.
—*Allan L. Foster, vice president*
Williams & Hussey Machine Co., Milford, N.H.

I found out last night that my friend and woodworking mentor, Emil Milan, had died. I guess as my circle of friends gets larger

and older I should expect more of them to die. I knew Emil was sick, and stubborn about seeing doctors, so his death came as less of a shock than another's might, but what a loss.

If a measure of one's life is determined by how many will miss him, then Emil's life was full, rich and successful, because as an artist, teacher and mentor, he influenced and guided people all over the world. One of the most impressive things about Emil as a teacher, was his ability to communicate his skills and techniques. Literally everyone in his classes walked away with a sense of what woodworking, design and carving was about, and, more importantly, a piece they had made themselves. The sense of accomplishment was astounding.

He was an unusually mild man, considering how people would badger him for information or work. Once I brought my daughter, when she was two, to his shop on the day before Christmas. Like a lot of people, we were there looking for last-minute presents. He was working in his freezing-cold, falling-down barn, surrounded by years of sawdust, and half-completed sculptures, bowls and birds. He was trying to finish an order for a customer standing on the icy floor dressed in city clothes, an order that was probably placed six months before. Emil was carving away, talking philosophy, his breath and cigar smoke mingling in the freezing air, his leather apron stretched over his paunch, and a smile on his bearded face. At that moment, I couldn't help looking down at Emily in my arms and wondering if this was the image she would carry of Santa Claus for the rest of her life.

During the last year and a half that we were neighbors, before I moved away, Emil became an anchor for me. My marriage, my business, and seemingly, my life, were falling apart around me. His tumbledown house at the end of a desolate dirt road became a refuge. His friendship allowed me a place to talk, drink some homemade wine, smoke cigars and speculate about building boats and sailing away to warm places, while the world outside was cold in so many ways.

He was a good listener, a stubborn old man, my mentor in two careers, and he was my friend and I will miss him. I hope that if there is another world for Emil, it is one filled with exotic woods, exotic ladies, wild mushrooms, Havana cigars and good friends. *—Andrew J. Willner, Maplewood, N.J.*

I really enjoy your magazine, although I'm trying to do woodworking on a very low budget. Girvan Milligan's top in issue #53 reminded me of something I've been doing with hole-saw discs. With the price of some woods approaching outrageous, it's a shame to see any of it go to waste. I found that the central disc left by a hole-saw, if accurately aligned, can be used as the body of a small thumb-turned top, when a $\frac{3}{16}$-in. dowel-piece is forced through it. It can then be fit in a drill-chuck or lathe, and sanded to be splinter-free. The only problem is that it can't be made from a disc cut through, or near, a knot, as that puts it off balance.

—Donald Lee Pelton, Colorado Springs, Colo.

I was pleased to see Seth Stem's article on leather and wood (*FWW* #53), but given the time and effort that is put into upholstered furniture, I would like to suggest one change. Foam yellows and crumbles with age. A much better material for seat upholstery is a thick felt, either of wool or synthetic fiber. It can be layered and trimmed to the desired shape and thickness, loosely basted together and then glued in place. Alternatively, for a more pliant cushion, polyester batting can be

shaped and layered in the same way. These materials will allow upholstered furniture to attain old age with the form and grace it deserves. —*Faye T. Bresler, Menlo Park, Calif.*

I must take strenuous exception to part of Dick Boak's advice on gluing on guitar bridges (*FWW* #53, p. 16). While his advice on choice of glues and his caution to scrape off the finish to ensure a wood-to-wood joint are beyond reproach, his advocacy of a toothing iron to "rough up" the gluing surfaces and "allow the fibers to interlock" is way off base.

The wood fibers of a guitar's top and bridge run at right angles to each other, so no true "interlocking" is possible. The fact that roughened bridges will chisel off with spruce fibers attached, while the unroughened bridges break clean at the glue line, is no indication of a stronger joint. Rather, it indicates that when the glue joint begins to fail and the bridge must be removed and reglued (as happens to most guitars eventually), there will be a sacrifice of precious top wood in a critical area of the guitar. For gluing (or regluing) a bridge, therefore, I recommend a perfectly smooth and very carefully mated pair of gluing surfaces. Use as many deep-throated clamps (four or five at least) as you can fit inside the guitar's sound hole to evenly distribute clamping pressure. This will provide a strong joint, and may save several tedious (and/or expensive) hours spent reconstructing the top some years down the line, when the bridge must be reglued.

—*Jim Rosenstock, Oxon Hill, Md.*

I enjoyed Ben Erickson's article (*FWW* #53), but I noticed he's not wearing a dust mask. Though he's not making much dust in the photos, he and your readers should know that it's very dangerous to work redwood without either good ventilation or a dust mask. Permanent lung damage can result. After spending several nights in the emergency room almost unable to breathe, taking medicines every day for two years and having to avoid ever working redwood again, I wish I had started wearing a dust mask sooner. Now I always wear a single-cartridge-type respirator. Though it's bulkier than a dust mask, it's more effective and more comfortable.

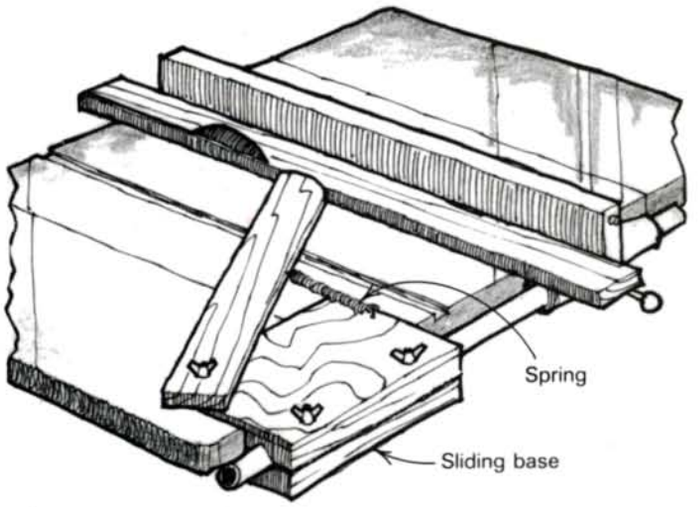
—*Alexander Brennen, Berkeley, Calif.*

I was particularly interested in Steven Mackintosh's article on room screens (*FWW* #52). I've been building screens for several years with a hinge similar to Tim Mackaness' but simpler, and with a cleaner look. Instead of routing a mortise in each stile for the knuckle dowel to fit into, I heat to red hot a $\frac{3}{16}$-in. rod bent at a right angle, determine the proper location for the hole and plunge the heated rod about ¼ in. into the stile above and below the knuckle. I then use a ¼-in. drill bit, also bent at a right angle and mounted in a handle, to clean the char left by the heated rod. This eliminates the need for unsightly plugs used to lock in the knuckle dowels.

Of course, now you're wondering how I mount the knuckle in the stile. That's the easy part! Drill the two vertical holes in the knuckle and cut four short pieces of ¼-in. birch dowel. Place a lightweight ¼-in.-diameter coil spring in the knuckle hole with a short ¼-in. dowel on either end and compress with fingers. With a little wax for lubrication, the dowels should snap into the stile holes leaving a very clean looking hinge. Watch out though! Make sure all your dimensions are correct before assembly because the only way to dismantle this hinge is with a sharp chisel. —*Eric Bishop, Chico, Calif.*

edited and drawn by Jim Richey

Improved featherboard



I finally got tired of the clumsy business of clamping a featherboard to the saw table, and then tediously reclamping it each time to adjust it to the width of a new workpiece. This simple solution took less than an hour to make and works perfectly.

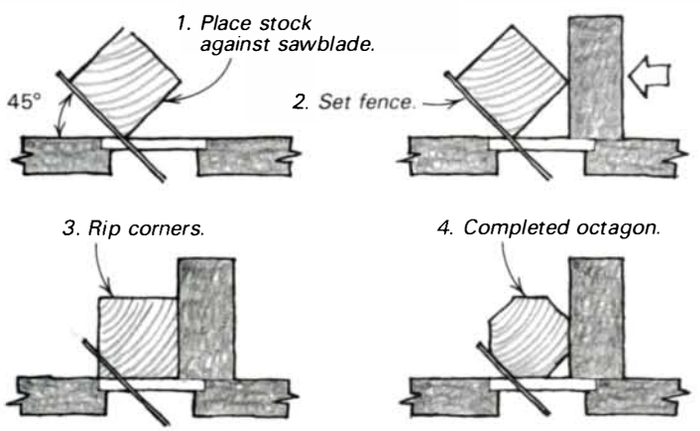
It consists of two parts, a featherboard and a sliding base assembly. Custom-fit the sliding base to your front fence rail so that it can move anywhere along the front edge of the saw table and be locked in place with wingnuts or wedges. My sliding assembly is made to fit the T-slots of the Rockwell Unifence arrangement (the one in the drawing is shown on the more usual Unisaw rails). The featherboard pivots on a bolt and is kept in tension against the workpiece by a spring.

—Arthur Kay, Tucson, Ariz.

No-hassle octagon ripping

After spending a week making a marking gauge for laying out octagons on any size stock, I had a flash of inspiration. This method, which requires no gauge, will allow you to rip perfect octagonal cylinders.

First determine the size you want the finished octagon to be, then rip your stock to a perfect square. Make a new wooden insert for your tablesaw and, with the saw blade tilted to 45°, bring the blade up through the new insert to the maximum depth of cut. Retract the blade to the depth needed to cut the corners off the square stock. A precise kerf line should now be visible fore and aft of the blade in the tablesaw insert.

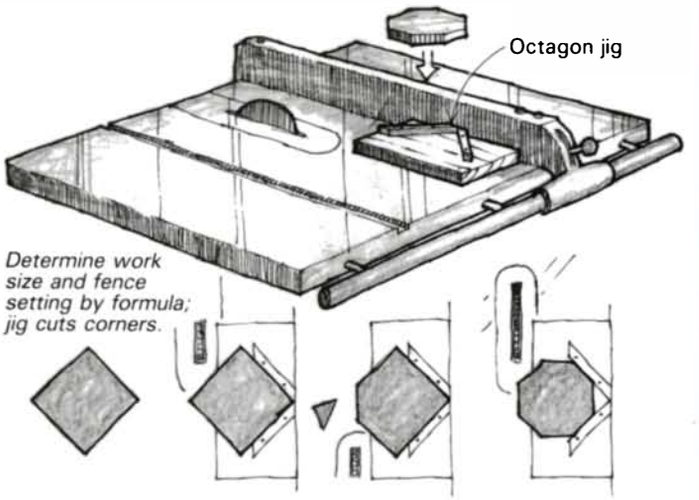


Now lay your square stock against the blade with the corner of the stock right on the kerf line in the insert. Bring the rip fence up to the stock so that it just touches the corner (as shown in the sketch) and lock. Lay the stock flat on the table against the rip fence and rip off the corners to produce a perfect octagon.

—L.A.D. Colvin, Satellite Beach, Fla.

Octagon formulas and jig

The special jig and the formulas below will enable you to cut an octagon with each side equal to a predetermined length. The jig is a piece of plywood with two fences screwed to the top at 45° to the edge.

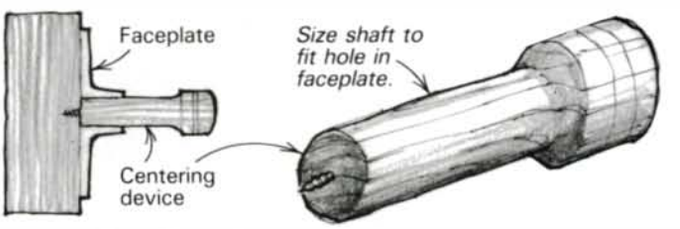


To use the jig, first determine the desired length of one side of the finished octagon *O*. Calculate the square size *S* needed from the formula $S = 2.414O$, and cut a square *S* inches on each side. Now calculate the rip fence distance *R* from the formula $R = 2.914O$, and set the rip fence at this distance. Place the square in the jig and rip off all four corners in turn to produce a perfect octagon.

Example: 3 = desired length of one side of octagon. $S = 2.414 \times 3$, or $S = 7.242$. $R = 2.914 \times 3$, or $R = 8.742$.

—Rafik Eskandarian, Fresno, Calif.

Faceplate centering device



This simple little device will help locate a faceplate over the center of a workpiece. To use, first center-punch the workpiece. Then screw the centering device into the workpiece through the center hole of the faceplate to hold it in position while you drill the pilot holes for the fastening screws.

—W.I. Newcomb, Arlington, Va.

Quick tip: When my router table isn't in use, I keep a 35mm film canister over the bit. It protects the cutting edges, keeps airborne dust from falling into the motor and reminds me to keep junk off the table. *—L.D. Fredrick, Aspen, Colo.*

Recipe for razor-sharp carving tools

During my 50 years of carving I have collected some 280 edge tools which, for the kind of carving I do, must be kept sharp enough to shave with. To prepare the edge, I use three grades of progressively finer India stones. But the real trick is to strop the edge to a mirror finish. For this you'll need a couple of pieces of sole leather from the local shoe shop and an abrasive product called Cloverleaf Abrasive Compound, which was originally manufactured for grinding engine valves on Model T Fords. It is a smooth-cutting abrasive suspended in a Vaseline-like jelly. Cloverleaf is still manufactured today in seven different abrasive grades and can be bought in most auto

supply stores. You will need two grades—I use one up from finest and two down from coarsest.

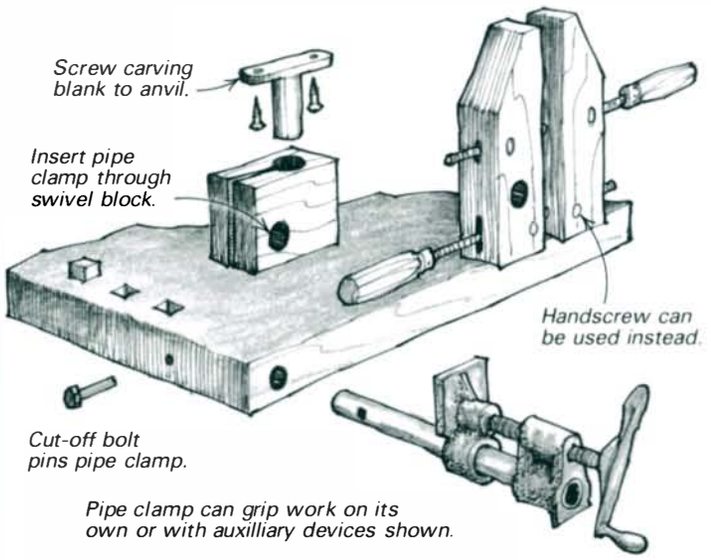
First soak the pieces of sole leather in light lubricating oil. Then rub about a teaspoon of the finer abrasive into the smooth side of one piece and a like amount of the coarser abrasive into the rough side of the other piece. Bend the leather into the profile of the cutting edge and strop both the inside and outside of the carving gouge to produce an incredibly sharp edge. *—Ford Green, San Antonio, Tex.*

Toolrest height stop

When you need to maintain one height setting for your lathe's toolrest, but have to constantly change its angle (as when faceplate turning) tighten a small hose-clamp on the toolrest's shank. This will prevent it from slipping down as you adjust it.

—Brian P. Mitchell, Somerset, Colo.

Woodcarver's clamping system



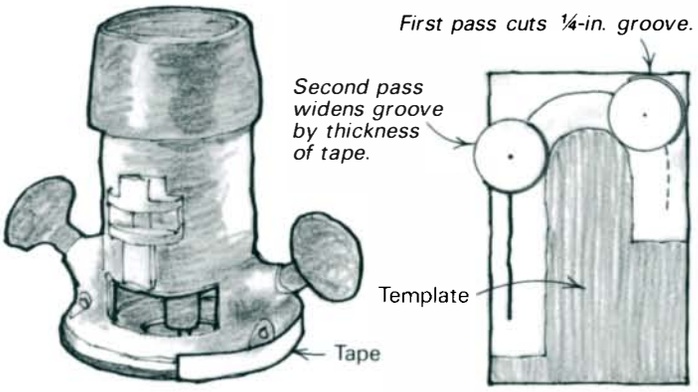
I originally designed this clamping system for holding half-size duck carving blanks. With a couple of additions, the system is quite versatile and can be used for many other woodworking jobs as well. The basis is a standard pipe-clamp head mounted on a stubby pipe, about 8 in. long. Drill a pipe-sized hole into the edge of your bench near the corner. If your benchtop is not thick enough to provide a strong lip above the hole, glue a block to the underside of the top to make the total thickness 2 in. or so. Now drill a ½-in. hole from the edge of the benchtop through the pipe and install a sawed-off ½-in. bolt to pin the pipe.

The clamp will serve quite well alone or with a bench dog as a light-duty vise. But two easy-to-build additions increase its uses. One addition, shown in the sketch, is a swiveling block and anvil for carving in the round. Insert the pipe clamp through the hole in the swiveling block before pinning the clamp into the bench. Then, work mounted on the anvil can be turned and swiveled to virtually any angle before the pipe clamp is tightened to lock it in place.

The second addition is simply a standard handscrew drilled so it can be slipped over the pipe. The clamping system can be set up or removed from the bench in just seconds.

—Wallace C. Auger, Fairfield, Conn.

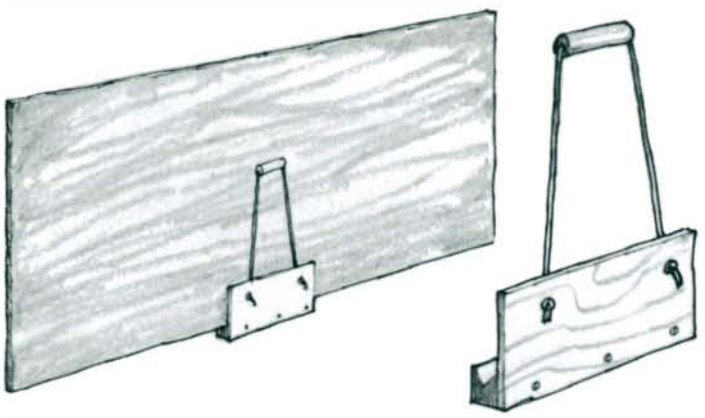
Routing tambour grooves



I recently built a set of display cases that had tamboured doors with ¼-in. thick edges. I wanted the grooves in which they ran to be 1/32-in. wider so the tambour wouldn't bind. To accomplish this I applied iron-on veneer edging tape around half the radius of my router base. To cut the groove I ran the router base along a template using a ¼-in. straight bit. On the first pass I kept the router's original base against the template. On the second pass I rotated the router so the taped portion of the base bore against the pattern, thereby adding about 1/32 in. to the groove width. *—Andrew Dey, Wallingford, Conn.*

Quick tip: When tablesawing, I was always looking for my metal ruler to measure one thing or another, until I epoxied a magnetic door catch to it. Now it's always right there, stuck to the side of the saw. The door catch makes a convenient handle, too, for moving the ruler around, so much so that I went back to my shopmade device even after I'd gone and bought a commercial version. *—Dustin Davis, Frostburg, Md.*

Plywood carrying handle



Anyone who has single-handedly maneuvered a full sheet of plywood or sheetrock through a congested worksite or a doorway will appreciate this easily made gadget. The lifter is nothing more than a foot-long V-grooved block screwed to a scrap of ¼-in. plywood. Adjust the length of the sash cord so the carrier is a few inches off the ground with your arm fully extended. To use, reach over the plywood sheet to hook the lifter under the lower edge into the center of the sheet. Lift and carry with one hand—the other hand remains free to open doors. *—G.O. Hoffmann, Cheshire, Conn.*

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

The strength of Queen Anne legs

I like Queen Anne legs, but I'm a little concerned about how strong those slender legs are. Would four of these cabriole legs support a 44-in.-wide, 6-ft.-long mahogany dining-room table, which will open out to 9 ft., that I am planning to build? Also, what mechanism would be best for extending the table? ***—John Turbek, Lexington, Ky.***

Norm Vandal replies: Four Queen Anne legs can certainly support your table. The legs have long been used to support highboys, which weigh more than your table will. I'm more worried about design. The largest Queen Anne tables were swing-leg, drop-leaf types, which never approached the dimensions you've given. Your table would have to have table slides fixed to the underside of the two main sections, which, when pulled apart, could support a third, and perhaps a fourth leaf. These slides are commercially available from The Woodworkers Store, 21801 Industrial Blvd., Rogers, Minn. 55374, and work well. Opening the table this way, however, will separate the two halves of the apron, and this would negate the visual appeal of the scrollwork that is so fundamental to the designs of Queen Anne tables and to the bases of lowboys and highboys. The apron creates the illusion, both real and imaginary, of adding support to the table. Your opened-up skirt would appear weak and insufficient.

Instead of building one Queen Anne table, you might consider making two smaller ones that could be placed together for special occasions when you need a lot of room. Or, jump into the future a bit to the Federal period, when dining tables as large as yours were more common. These tables were made in two or three sections. The two-section table would be made of two half-round "demi-lune" tables with leaves at the back that can be raised and supported by swing-out legs. A three-part table would have two "demi-lune" ends without leaves and a matching center drop-leaf-style table. The drop-leaf table, which would naturally be the same height as the demi-lunes, could be used with both leaves open, with one leaf open, or with both side leaves down. When not in use, the demi-lunes are placed against the wall as side tables. These tables are a forest of legs, as many as 16, but they were obviously created to fill a void in table designs not filled by the Queen Anne or Chippendale forms. If you still want Queen Anne legs, I recommend you bandsaw them from 3-in. squares and keep the design of the leg somewhat straight for maximum strength. Make sure the square portion at the top of the legs is large enough to safely accommodate the mortises needed to house the apron tenons. I would think about 1⅞ in. should be sufficient.

[Norm Vandal makes period furniture in Roxbury, Vt.]

Lumber from lilac

I'd like to bandsaw some small boards out of lilac, but the wood seems so reactive I wonder if it's worth the trouble. ***—Mike Boehm, Madison, Wisc.***

R. Bruce Hoadley replies: I have always liked lilac. Its sapwood is usually a creamy white or ivory, but the heartwood varies in shades of lavender. The wood is very dense and extremely fine-textured, making it perfect for carving fine details or sanding to an ultra-smooth surface. On the other hand, its irregular stem forms, density and dimensional instability make it a real challenge to dry without defects. The best thing to do is to pick out the straightest, best-looking pieces and discard the crooks, knots and other junk right away. Cut the pieces to a uniform width and if possible to uniform lengths, so that you can build well-organized miniature lumber piles with uniform stickers. In cutting, remember that any cuts including the pith will probably check badly, and sections near the pith will usually have a sharp center cup. End-coat the pieces with varnish or paint, and weight the pile to prevent excessive warping, but be sure not to block off air circulation. Dry the wood slowly until the material reaches equilibrium, which can be checked by a weight record. When the weight of the wood doesn't change for a couple of weeks, the wood should be dry enough to use.

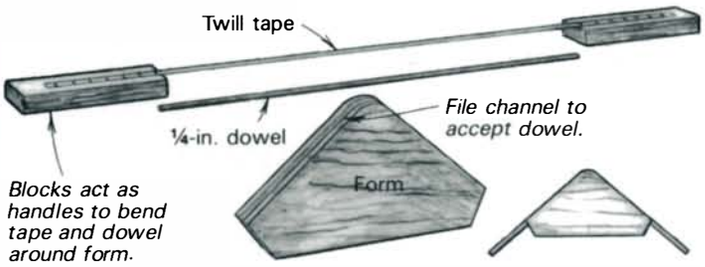
There is no end to the interesting woods you can find among little-used species of trees, shrubs and vines. Every woody stem is worth investigating. I've found interesting wood in shadbush, yellowwood, all fruit trees, holly, yew, bayberry, dogwood, laurel, rhododendron, and even wisteria. Catalpa is a tree with great potential for home conversion, since it cuts easily and seasons with minimal defects.

[R. Bruce Hoadley is a professor of wood technology at the University of Massachusetts at Amherst.]

Bending around a short radius

I'm an orthodontist and want to make an oversized toothbrush for health demonstrations. I am using ¼-in. hardwood dowels for the bristles, but am having trouble steam bending them on a short radius (to represent worn bristles on the outer row) without breaking them. Do you have a better way? ***—Kent Shacklett, Tulsa, Okla.***

Seth Stem replies: You can reduce the chance of breakage by using a backing strip to compress the wood fibers while you are bending the steamed wood. For small stock or rounded shapes like your ¼-in. dowels, rig up a backing strip from ½-in.-wide twill tape (a non-stretching fabric strip available in yard goods stores) which will conform to the dowel's contour. Cut the dowels to length, then staple or glue the twill tape to 2¾-in. by ¾-in. by 8-in. pine scraps, as shown in the sketch, so the dowel just fits between the pine pieces. Make a wooden



form of the radius you desire and use a round rasp to cut a channel for the dowel. After steaming or boiling the dowels in hot water for 10 minutes, bend the dowels over the form with the twill tape strap on the outside. The pine acts as handles, and the strap will keep the dowel in compression. Clamp the dowel in place until it dries. You should be able to bend ¼-in. dowels to at least a 1-in. radius with this system. With production chair making, each of the curved parts are bent individually using methods similar to this. Since you need many identical bent pieces, you might try making a larger form and using six backing strips between two strips of plywood to bend six dowels at once. If possible, use oak dowels (available from Cryder Creek Wood Shop, Box 19, Whitesville, N.Y. 14897), or Woodworker's Supply of New Mexico, 5604 Alameda N.E., Albuquerque, N.M. 87113). Oak has long fibers and bends well. Most dowels you buy in hardware stores are birch and are composed of short fibers that separate readily.

[Seth Stem teaches furniture design and construction at the Rhode Island School of Design in Providence, R.I.]

Translucent wood turnings

After turning a small bowl from semi-dry Norfolk pine, I soaked it for 15 minutes in Danish oil. It absorbed about ½ cup of oil, and when I put it back on the lathe and scraped

Drawings: Lee Hov

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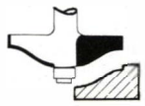

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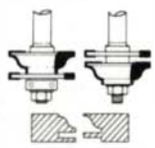

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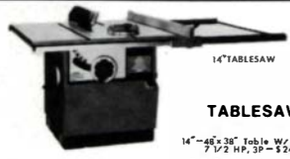

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the sides to about 3/16 in. thick, the bowl became translucent and the light brought out colors I hadn't noticed before. What happened to the wood? ***—Stockton Webb, Hawaii.***

Richard Raffan replies: In my experience light will glow through any pale timber if it's cut thin enough. Obviously, the thinner the section, the greater the amount of light that will pass through. Darker woods transmit less light than light woods and black, purple or red woods tend to transmit none at all. Unseasoned (green) wood will transmit four or five times the amount of light than the same species when dry. Frequently I have used light to judge the thickness of a bowl. Dry wood appears thin at about 1 mm. With green wood, a wall that appears 2 mm thick is really 5 mm or 6 mm thick, a great help when you're trying to impress a group during a demonstration. It sounds as if the oil absorbed in the cell structure of your bowl amplifies the light passing through, just the way water does in green wood.

[Richard Raffan is a professional woodturner in Mittagong, N.S.W., Australia. He is the author of *Turning Wood with Richard Raffan*, 1985, Taunton Press.]

Stop plug cutters from burning

I have had a problem with Greenlee plug cutters burning out. I've sent them back to the factory to be reworked, but the problem persists, even at the factory-recommended speed of 2,000 RPM. Any suggestions?

—Dale E. Grossnickle, Smithsburg, Md.

Steve Eckard replies: Unlike metalworking, there are no set speeds or feeds in woodworking. Each species of wood varies in texture and density and even pieces within the same species vary. Therefore, it is difficult to say what RPM is right for a particular application. Normally, a tool burns when it is just spinning in the wood rather than cutting. This is usually caused by the tool turning too fast or the wood not being fed into the tool fast enough. When the tool gets hot enough to burn the wood, it loses its temper and quickly dulls. If you feel your rate of feed is right for the job at hand, my suggestion to eliminate the burning is to maintain your rate of feed, while decreasing the RPM until the burning stops.

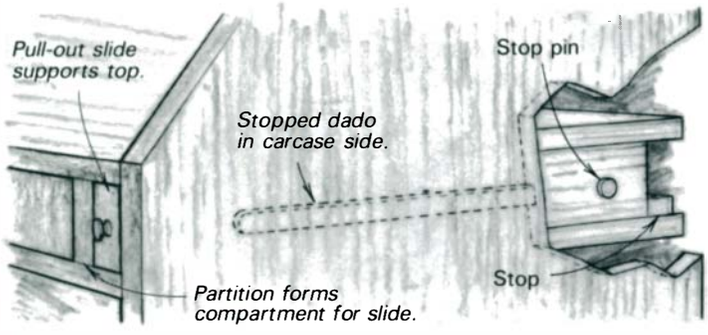
[Steve Eckard is a sales representative for Forrest City Tool Co. in Hickory, N.C., which manufactures the Greenlee cutter.]

Lid supports for slant-top desk

I'm making a Governor Winthrop slant-top desk. How do I keep the lid-bearing pieces from coming all the way out?

—Lewis Shipman, Venice, Fla.

Phil Lowe replies: The lid of a slant-top desk is held by a support or slide, that fits into a narrow compartment formed by the case end and a partition. To prevent the slide from being



pulled all the way out, you cut a stopped dado from the back of the case end to about 3 in. from the front edge. The slide itself has a hole drilled in it to receive a pin. The hole and pin should be positioned so that the pin will run in the dado. Ideally, when the pin strikes the end of the dado, the end of the slide should be about 2 in. short of the edge of the opened top. When the slide is fully extended and the pin is at the end of the dado, there should be about 4 in. of slide still inside the case to support the weight of anyone leaning on the lid. A stop block screwed to the drawer runners prevents the slide from being pushed in beyond the front of the case. With this construction, once you remove the case back and detach the stop block, you can remove the slide from the rear for any finishing or adjustments that might be needed.

[Philip C. Lowe operates a cabinet shop in Beverly, Mass., and teaches cabinetmaking at North Bennet Street School, Boston.]

Thoughts on plane design

Most Western planes have about 30% to 35% of the sole ahead of the cutter, but I would think it makes more sense to have more sole in front of the blade than behind, as do the Japanese planes. Does the cutter location make a difference?

—David V. Nicholson, Vancouver, B.C.

Allan Boardman replies: Plane designs are the result of intentional and inadvertent compromises—evolutionary developments that reflect concerns for manufacturing processes, performance, appearance, cost, adjustability and user comfort. The overall length of the sole seems to be a much more important factor than the placement of the cutter. It's generally understood that a short plane will tend to ride up and down on the bumps, while a long plane will span irregularities and only shave the high spots.

The placement of the iron is determined by the need to mount knobs, handles, and support and adjusting mechanisms on the plane body. For shorter smooth-type planes, these factors more or less force the throat to be where it is. In my opinion, the larger planes are simply scaled up with approximately the same proportions as the smaller ones, with little consideration of how performance might be affected by repositioning the iron fore or aft. For flattening a crooked or bumpy board, for example, it would seem logical to locate the cutter at the plane's midpoint, eliminating the tendency of the plane to cut more efficiently at either the beginning or the end of the stroke.

The Japanese pull stroke may be the principal reason that the cutting edge is so far aft on these planes. In the pull stroke, the lead hand (right hand for a right-handed person) grasps the forward portion of the plane body and applies most of the force and guidance. The other hand usually aids the pulling motion and is positioned behind the cutting iron. The stock out front is needed to give you a grip on the plane. Whether it's Oriental cleverness or serendipity, the planes work well without much support aft of the blade. Typically, the soles of Japanese smooth planes are relieved behind the edge to reduce the contact between the plane and the work surface. I suspect the reasons behind the cutter placement are more cultural than technical.

[Allan Boardman is an amateur woodworker in Woodland Hills, Calif., and a maker of planes.]

Reader Exchange

...Information about companies or corporations offering scholarships and grants for students majoring in furniture design.

—Paul Moench, Point Pleasant Beach, N.J.

...Owner's manual for bandsaw (model SB101) manufactured by Raymond Tools, Minneapolis, Minn.

—Peter Carll, Weymouth, Mass.

...A copy of the out-of print book *The Design and Practice of Joinery* by John Eastwick-Field and John Stillman.

—B.A. Cartwright, Milwaukee, Wisc.

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

Periodicals Update

We receive a vast number of woodworking and wood-related periodicals. Many of these are small, specialist publications not readily available on newsstands, so from time to time, we like to let you know about them.

Shavings is a lively, informative bimonthly magazine put out by The Center for Wooden Boats in Seattle. This newsprint, tabloid-style magazine covers wooden boats and boatbuilding, mainly on the West Coast, as well as workshops and happenings at the center. *Shavings* is part of the Center's yearly membership package, which costs a tax-deductible $8 if you're on fixed income, $15 if you're not, or as much as you can spare if you're feeling flush. For information write the Center, 1010 Valley St., Seattle, Wash. 98109.

American Lutherie is the product of another worthy nonprofit organization, the Guild of American Luthiers. This quarterly magazine carries articles from the arcane to the obvious on all manner of stringed instrument making and repair. Indispensable for anyone interested in the subject. It and other useful benefits come with the $25 yearly membership, available from the Guild, 8222 South Park Ave., Tacoma, Wash. 98408.

The Tools and Trades History Society was founded a couple of years ago to spread information about the history and development of hand tools and their use. Its quarterly journal, **Tools and Trades**, does just that. Like most small journals, it's not for the casually interested, but the articles are thorough and should be of interest to the serious tool and handwork fancier. For information, write the Society, 275 Sandridge Lane, Bromham, Chippenham, Wiltshire SN15 2JW, England.

Timberbeast, or to give it its full title, *The Columbia River and Pacific Northwest Timberbeast, The Journal of Logging Archaeology*, is the passion of William Roy, its editor and publisher. Roy, a model railroader and logging enthusiast, began this quarterly magazine about four years ago as a newsletter for others who shared his interests. The Spring 1985 issue, for example, features retired logger Mike Bollinger's reminiscences of logging camp cookhouses; reprints from the now defunct *Timberman*, the logging industry standard from the 1880s to the 1950s; Roy's article about the Clyde Decker Log Loader, complete with detailed drawings for the modelers in the audience, and much more. A subscription to this pleasant mix of nostalgia and layman's archaeology costs $10 per year from Roy, P.O. Box 3695, Eugene, Ore. 97403.

The **Poor Man's Sawdust Plansletter** is a low-budget, brass-tacks quarterly compilation of you-build-em projects. The first issue (Spring, 1985) contains a mixed bag: an embossing press, midget cement mixer, colonial hutch table, a caster scooter, and so on. Style is early *Popular Mechanics*; designs are, well, basic. Publisher J.S. Blackwell also offers plans separately. *Plansletter* is $18.95 yearly; plans catalog $2; both from Poor Man's Publications, Rt. 216, Box 23, Highland, Md. 20777.

Those who track design trends might want to check out **Tools**, a tabloid format, newsprint bimonthly stocked with lots of photos, short articles and exhibition reviews. Published in Denmark, the premier English language edition features mostly high-end industrial-design furniture. *Tools* costs $30 per year from Designlab ApS, Maglekildevej l, Dk-1853 Copenhagen V, Denmark.

If antiques are your passion, **Maine Antique Digest**, a monthly 200-plus-page newspaper, covers the field nationally and internationally, across the various periods and styles, the arts and the crafts. $29 per year from 71 Main St., P.O. Box 645, Waldoboro, Maine 04572.

Since its founding in 1966, the Western Forestry Center, in Portland, Ore., has been making the forest accessible and understandable to the general public. Housed in three magnificent timber buildings in Portland's Washington Park, the center presents exhibitions, demonstrations, workshops, seminars and fairs. **Forest World**, the Center's handsome new full-color quarterly magazine, covers forest- and wood-related activities around the world, as well as providing a window on the Center's activities. The first issue took a look at the recovery of the Mt. St. Helen's ecosystem, smoke jumping, wildlife management in Kenya, the work of furnituremaker John Economaki and violinmaker Paul Schuback. A very nice magazine along the lines of *Smithsonian*. A subscription comes with either a $15 individual or a $25 family membership in the Center, or on its own for $10. Contact the Center, 4033 S.W. Canyon Rd., Portland, Ore. 97221.

Wood Machining News comes out bimonthly from the Wood Machining Institute in Berkeley, Calif. The institute's director and newsletter editor, Dr. Ryszard Szymani, was wood processing specialist at the University of California Cooperative Extension Service. The newsletter follows technical and scientific developments in cutting tools and equipment around the world. At $35 per year, it's priced for the serious student of the subject. For information, write the Institute, P.O. Box 476, Berkeley, Calif. 94701.

If your taste or talent runs to sculpture, you might find **International Sculpture** useful. A handsome bimonthly publication of the International Sculpture Center, this magazine offers listings of competitions, grants, workshops and other events in addition to features on sculpture, sculptors and related subjects. It comes with a $35-per-year membership in the Center, 1050 Potomac St. NW, Washington, D.C. 20007.

—Roger Holmes

The Technique of Marquetry by Marie Campkin. *Batsford, London (1985); distributed by David & Charles, Inc., North Pomfret, Vt. 05053. $9.95, paperback; 120 pp.*

All the basic information needed to begin marquetry work is available in this book (originally published in 1969 as *Introducing Marquetry*). The material is presented in a straight-forward way, taking the beginner through various aspects of the craft. The intended emphasis appears to be on basic and beginner.

Marquetry has a glorious and fascinating history, and contemporary craftspeople can draw significant inspiration from that past. The field of marquetry has garnered a reputation of being little more than a hobby, and this book provides no inspiration for practitioners (beginner or otherwise) who might aspire to more. To illustrate the point one only has to look at the photos of marquetry examples the author has chosen. The pictures all too often look as if they came from paint-by-number kits.

If you are interested in beginning marquetry work, you might take a look at this book. However, I would more strongly recommend W.A. Lincoln's *The Art and Practice of Marquetry* (*FWW* #3, p. 9). *—Silas Kopf*

Roger Holmes is an associate editor of Fine Woodworking. *Silas Kopf is a professional marquetarian in Northampton, Mass. He wrote about perspective in marquetry in* FWW #53.

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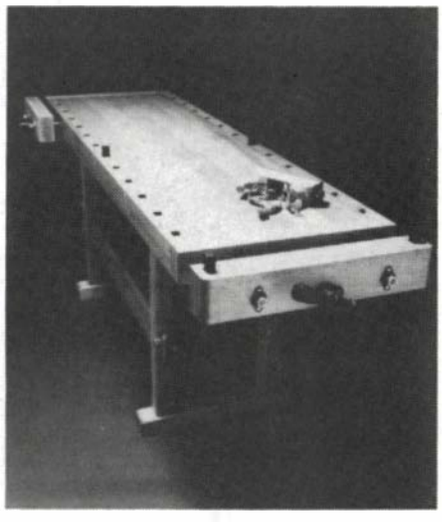

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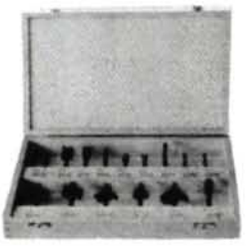

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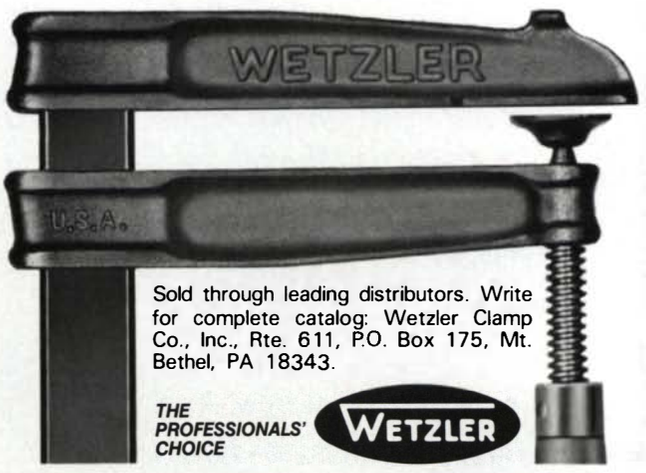

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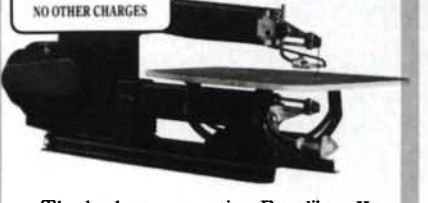

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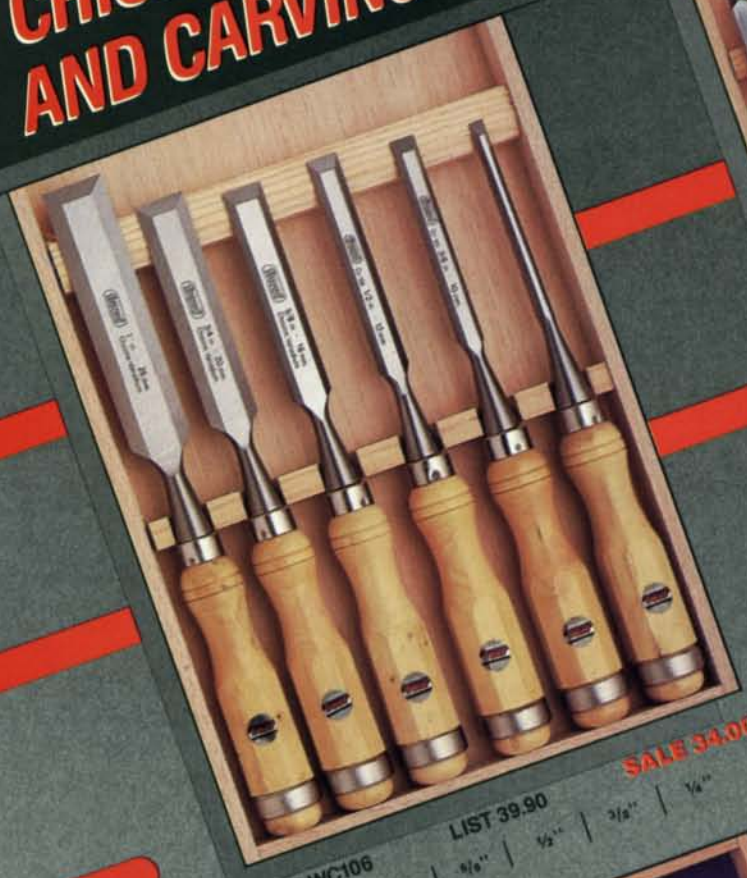

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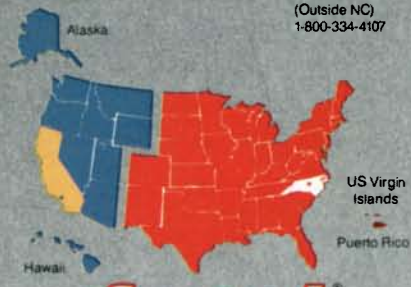

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No. 7272	72"	24.55	22.25 Ea.

JORGENSEN CLAMPS (Med Duty)

No. 3712	12"	5.90	5.35 Ea.
No. 3724	24"	7.30	6.60 Ea.
No. 3730	30"	8.20	7.40 Ea.
No. 3736	36"	8.85	7.95 Ea.

JORGENSEN HAND SCREWS

No. 3/0	3"	$8.45	7.60 Ea
No. 0	4 1/2"	9.90	8.90 Ea.
No. 1	6"	11.30	10.15 Ea.
No. 2	8 1/2"	13.45	12.15 Ea.

JORGENSEN BAR CLAMPS (5" Reach)

No. 4512	12" Open	17.45	15.70 Ea.
No. 4524	24" Open	20.85	18.85 Ea.
No. 4530	30" Open	21.90	19.65 Ea.
No. 4536	36" Open	22.90	20.60 Ea.

JORGENSEN & PONY CLAMPS

No. 3325	3 Way Edging	5.75 5.10 Ea
No. 1623	3" Hold Down	7.50 6.30 Ea
No. 3202HT	2" Spring	2.15 1.90 Ea

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6 Pc. Carving Set	59.50
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RYOBI TOOLS

B7075	3X21 Belt Sander	$115.95
B7200A	4X24 Belt Sander	164.95
BD1020R	3/8" Cordless Screw driver	94.95
E3800A	Drywall Screwdriver	78.95
JSE–60	Electronic Jigsaw	122.95
L–120U	3 5/8" Planer	88.95
L1323A	1/4" Planer	139.95
LS–35	Finishing Sander	59.95
L–580	6 1/8" Planer	249.95
R–150	1 HP Plunge Router	85.95
R–330	2 HP Router	137.95
R–500	3 HP Plunge Router	159.95
S500A	3x5 1/2 Finishing Sander	40.95
TR–30	Laminate Trimmer	99.95
TS–251U	10" Miter Saw w/ Freud LU85M10 Blade	229.95

MILWAUKEE TOOLS

0228–1	3/8" VSR Drill	$ 93.95
0234–1	1/2" VSR Drill	113.95
0375–1	3/8" Rev. Angle Drill	117.95
1107–1	1/2" VSR D Handle	144.95
5660	1 1/2 HP Router	184.50
5680	2 HP Router	219.75
5935	4"x24" Sander	214.90
6014	1/2 Sheet Sander	124.95
6255	Vr. Sp. Jigsaw	139.95
6287	H.D. Jigsaw	224.50
6305	6 1/4" Cordless Saw	134.95
6367	7 1/4" Circ. Saw	129.95
6507	Sawzall w/case	139.95
6539–1	Cordless Screwdriver	61.95
6543–1	1/4" Screwdriver	155.50
6749–1	Magnum Screwdriver	139.95
6750–1	H.D. Drywall Screw driver	99.95
6753–1	Drywall Screwdriver	83.95

DELTA (ROCKWELL) POWER TOOLS

11–072	32" Radial Drill	$399.95
22–651	13" Planer	1294.50
28–243	14" Band Saw	535.00
28–283	3/4 HP Bandsaw	674.95
31–730C	Belt and Disc Sander	1350.00
33–150	Sawbuck w/ carbide blade	529.00
33–990	10" Radial Arm Saw	474.50
34–010S	Miter Saw w/carbide blade	219.95
34–410	10" Contractors Saw	799.95
34–710	10" Super Saw	449.95
37–220C	6" Jointer	1250.00
37–255	6" Jointer	495.00
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40–601	Electronic Scroll Saw	948.50
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46–140	11" Lathe	425.00

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No.	Size	Teeth	Use	Price
LU72M10	10"	40	General	$34.50
LU73M10	10"	60	Cut–off	38.00
LU73M12	12"	72	Cut–off	76.90
LU78M10	10"	80	Plastic	83.50
LU82M10	10"	60	Cut–off	44.95
LU82M12	12"	72	Cut–off	85.95
LU84M11	10"	50	Comb.	38.50
LU85M10	10"	80	Cut–Off	63.50
LM72M10	10"	24	Ripping	36.95
DS306	6" Dado			94.75
DS308	8" Dado			107.70

SUN GOLD SANDING SHEETS

9X11 Aluminum Oxide C Weight

Grit	Pk of 100
150, 120, 100	$21.95
80	23.70
60	28.90
50	32.05
40	38.30

9x11 Non–Loading Silicon Carbide

Grit	A WEIGHT	Pack of 100
400, 360, 320, 280, 240, 220, 180, 150, 120		$19.60

BLACK AND DECKER INDUSTRIAL TOOLS

1165	3/8" Angle Drill	$119.50
1179	3/8" Var. Sp. Drill	74.95*
1180	3/8" VSR Holgun®	105.00
1575	3/8" VSR Scrudrill®	119.50
3051	7 1/4" Wormdriver Saw	148.95
3091	10" Miter Saw	199.95
3103	2 sp. Cut Sawkit	109.95**
3105	Var. Sp. Cut Sawkit	119.95
3107	Var. Sp. Orbital Cut	129.25
3265	Laminate Trimmer	145.65
3310	1 1/2 HP Router	145.00
3370–10	3 1/4" Planer	129.95
4010	Palm Sander	49.95*
4247	4 1/2" Disc Sander/ Grinder	69.95*
6750	Heat Gun	69.75

*** $5.00 Mail In Rebate**
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HITACHI TOOLS

B600–A	14 1/2" Band Saw	$1445.00
CJ65VA	Electronic Jigsaw	149.95
CR10V	Reciprocating Saw	118.50
C6DA	6 1/4" Circular Saw	128.75
C7SA	7 1/2" Circular Saw	68.95
C10FA	10" Miter Saw w/ vise ext.	268.75
C10FB	10" Miter Saw	194.50
C12Y	12" Table Saw	1245.00
D10VC	3/8" Rev. Drill	55.00
DRC–10	Cordless screwdriver	89.95
F1000A	Planer/Jointer	1275.00
F20A	3 1/4" Planer	97.95
P50	6 5/8" Planer	299.95
P100F	12" Planer	965.00
SB–110	4x24 Belt Sander w/dust bag	178.75
SO–110A	1/2 Sheet Sander	119.95
SB–75	3x21 Belt Sander–2 Sp. w/dust bag	128.75
SB8T	3x24 Belt Sander 2 Sp–wdust bag	165.00
TR–6	Laminate Trimmer	88.95
TR–8	1 HP Plunge Router	126.95
TR–12	3 HP Plunge Router	167.50
W6V	Screwdriver	99.95

SUNGOLD X – WEIGHT SANDING BELTS Sold in packs of 10 only Outlasts regular belts 2 to 1

Size	Grit	10 Belts	50 Belts
3"x21"	120	$.98 ea	$.84 ea
	100	1.00 ea	.86 ea
	80	1.05 ea	.92 ea
	60	1.07 ea	.94 ea
	50	1.10 ea	.96 ea
	40	1.20 ea	.93 ea
3"x24"	120	100 1.22 ea	.97 ea
	80	1.26 ea	1.12 ea
	60	1.31 ea	1.15 ea
	50	1.34 ea	1.18 ea
	40	1.68 ea	1.46 ea
4"x24"	120	100 1.73 ea	1.51 ea
	80	1.78 ea	1.64 ea
	60	1.85 ea	1.70 ea
	50	1.89 ea	1.76 ea
	40		

PORTER CABLE

100	7/8 HP Router	$87.45
167	Block Plane	85.95
309	Laminate Trimmer	79.95
314	4 1/2" Trim Saw	114.95
330	Palm Finish Sander	55.50
337	3x21 Belt Sander w/bag	114.90
360	3x24 Belt Sander w/bag	178.95
362	4x24 Belt Sander w/bag	188.95
505	Finishing Sander	103.95
518	3 HP Electronic Router	324.80
690	1 1/2 HP Router	128.95
695	1 1/2 HP Router/ Shaper	189.95
696	Router/Shaper table only	104.95
3151	7 1/4" Circ. Saw	103.95
7548	Orb. Jig Saw	133.95
7648	Orb Jig Saw	133.95
9627	2 Sp Tiger Saw Kit	119.95

Watco Danish Oil Natural, Medium, Dark, Black, or Colors $5.70 Qt. $17.65 Gal

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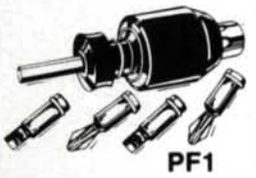

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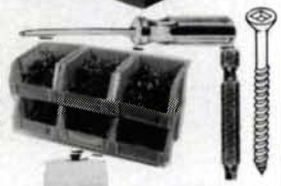
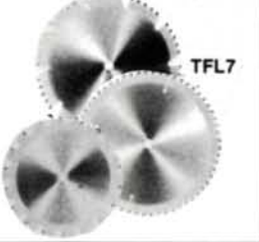


SQ. RECESS SCREW KIT Six bin unit with 600 #8 woodscrews from 1" to 3", plus screwdriver and power drill bit.
SCDKS $19.95

BLADE SHARPENER $119.95 YYBS
Blade Holder **$29.95 YYBSBH**

RYOBI 10" MITER SAW W/ FREE FREUD LU85M10 CUT-OFF BLADE! Includes vise assembly, extensions and dust bag.
$229.95 ppd

TS-251U



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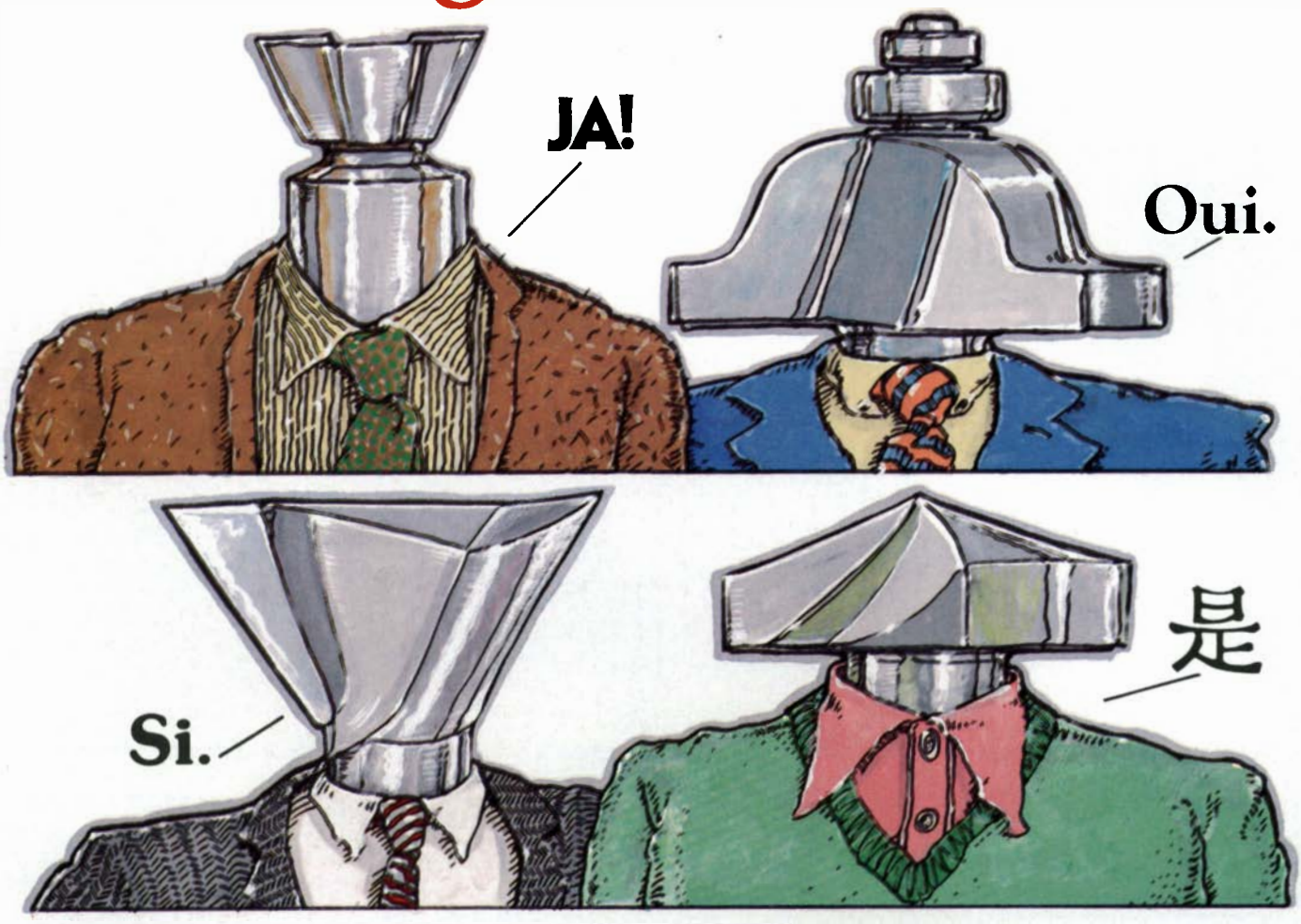
TFL7

When you order router bits, is something lost in the translation?



Maybe your supplier speaks very fluent "discount." But how conversant is he in "quality?" Sound more like "double talk?"

You know that cost counts when you buy router bits—and DML is the last to deny that fact. But a sharp buyer always looks for the best bit for his money. So wait a moment before you plunk down your dollar. Realistically, do you know your seller and his wares? Are his prices *always* the best? Is he always promoting some sort of lowball bargain? Don't you wonder... why?

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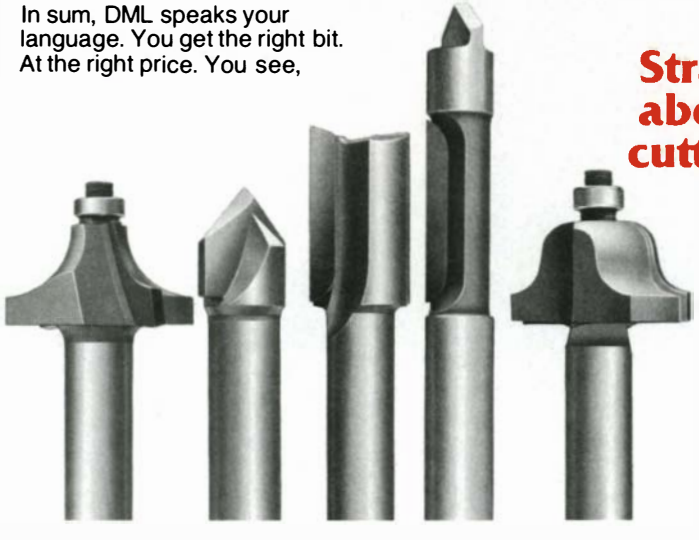

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- Extra long table for your production requirements. Slotted table ends at cutterhead assure low noise operation. Dovetailed sliding ways. Depth of cut shown by scales at infeed table.
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- Heavy cast iron base with chip chute.
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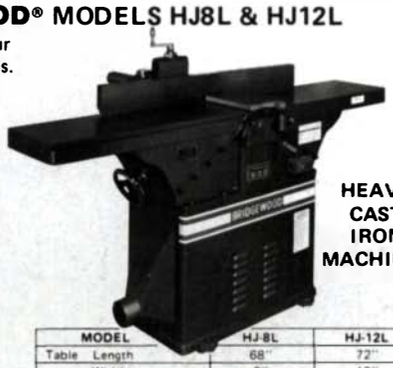

HEAVY CAST IRON MACHINES

MODEL	HJ-8L	HJ-12L
Table Length	68"	72"
Width	8"	12"
Thickness	2-1/4"	2-5/8"
Height (from floor)	33"	33"
Cutting Capacity Width	8"	12"
Depth	1/2"	1/2"
Rabbeting	3/4" x 5/8"	3/4" x 5/8"
Cutter Head No. of knives	3	3
Diameter	3-1/2"	4-1/4"
Speed	5,000 RPM	5,000 RPM
Electric motor	2HP, 220V, 1PH	3HP, 220V, 1PH
Fence Length	35-1/4"	44"
Height	3-1/2"	4-1/4"
Tilts	45°	45°
Overall Dimensions Length	68"	72"
Width	26"	30"
Height	46"	46"

HJ12L — $1995
HJ8L — $1195
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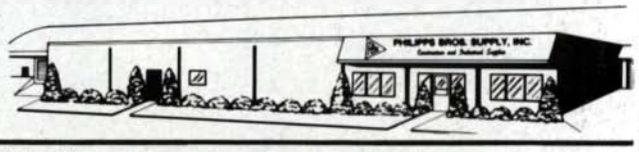

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7¼" CIRCULAR SAW, #1651
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SPECIAL $90.00

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- Captive templet
- Raised index pointer
- Large sub-base
- 1/4" Collet
- Two wrenches

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1¾ H.P. ROUTER, #1604 LIST $199.00
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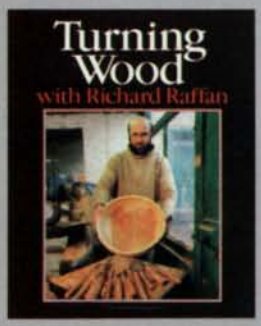

New

Turning Wood with Richard Raffan by Richard Raffan

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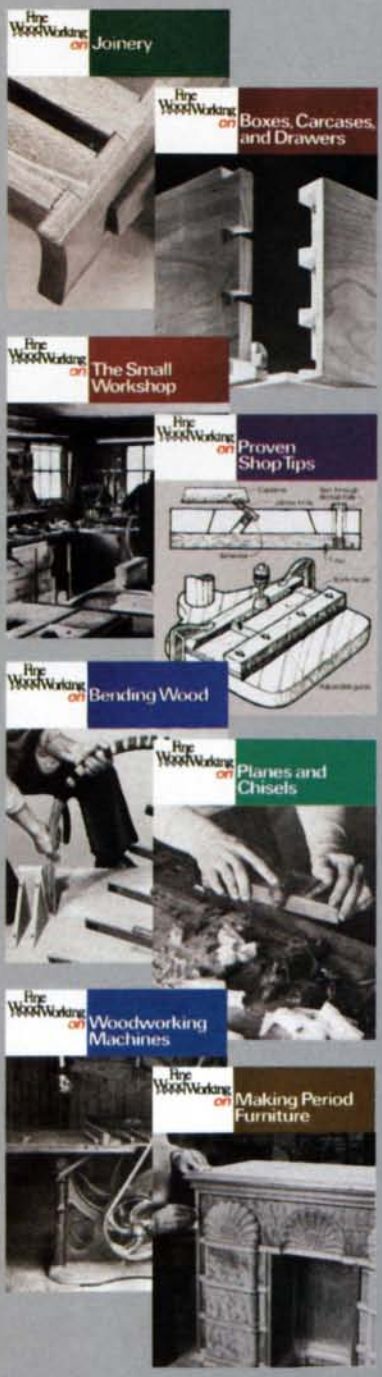

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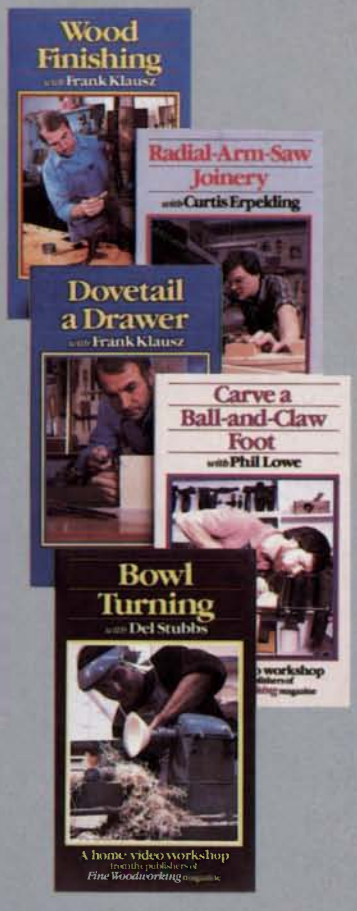

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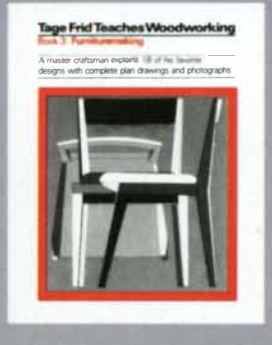
New
Book 3: Tage Frid Teaches Furnituremaking



In his first two books, *Joinery* and *Shaping, Veneering, Finishing*, master craftsman Tage Frid covers virtually all the techniques you need to know to make fine furniture. Now, in the long-awaited conclusion to his three-volume woodworking series, Frid shows you how to use these techniques to make some marvelous furniture of his own design.

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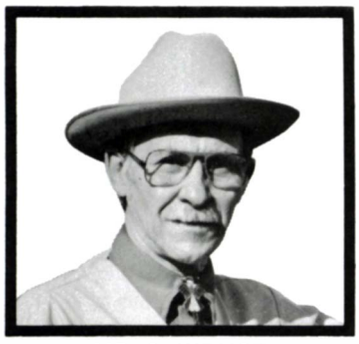

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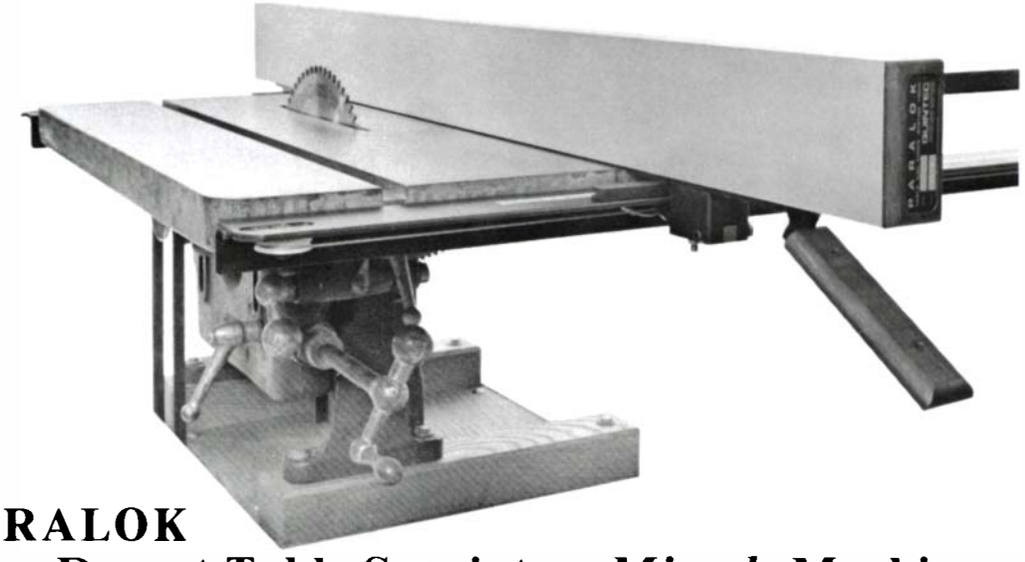

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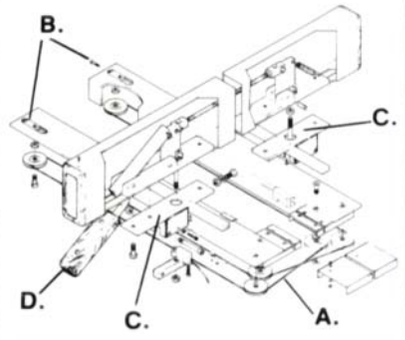

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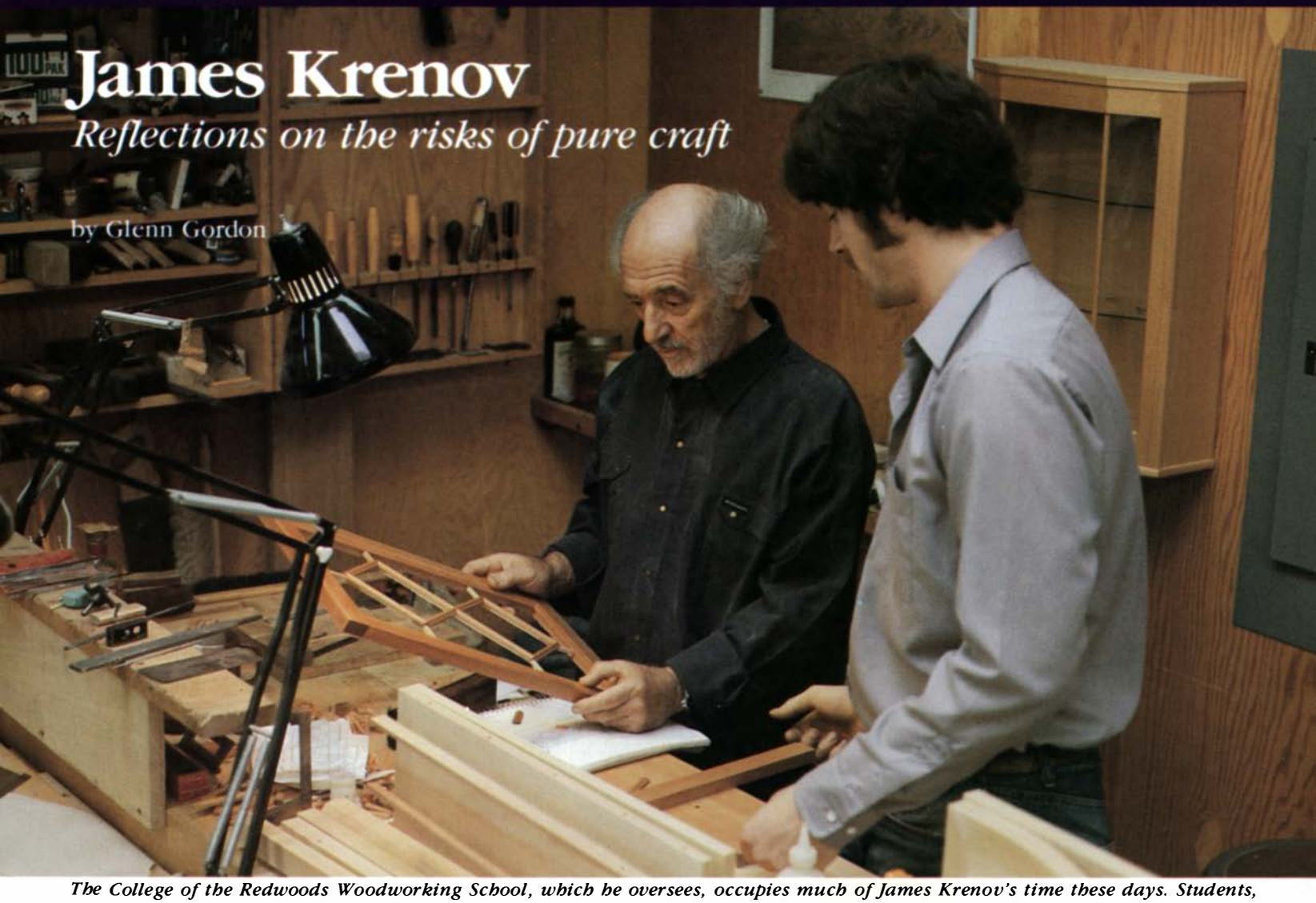
James Krenov

Reflections on the risks of pure craft

by Glenn Gordon



The College of the Redwoods Woodworking School, which he oversees, occupies much of James Krenov's time these days. Students, attracted from all over the world, study for one or two years. Above, Krenov confers with student Austin Meinert.

One day in the early 1970s, while I was looking through a paperback on the crafts of modern Sweden, I came across a picture of a music stand made of lemonwood. Something about it, stirring in the slight tension of the curves of the legs, made me stop. The lines held something, a sense of memory. It was elusive, but in the form worked into the legs, I felt the craftsman had caught it; the wood seemed literally to be dreaming of the tree it used to be.

Incredible as that feeling was, the music stand wore it with unassuming grace. Nothing about it was forced. The execution of the piece was clearly exquisite, but without pushing itself at you. Work like that, I thought, isn't born from the convulsions of ego alone. I looked for the name of the craftsman. The caption said, James Krenov. It was the first I had ever heard of him.

Times change. A few years have gone by, and now, a woodworker has to have been living under a rock not to have heard of Krenov. Since the publication of the first of his four books in 1976, countless craftsmen have read him. The voice he gives to an instinct to work wood in a certain way has become, by now, unmistakable. As a writer, he manages to touch the nerve that gives impulse to the longing for excellence, and many are the readers who respond in the way that a tuning fork, when struck, is made to hum. Some, though, find themselves torn—from trying to take what Krenov says to heart and still make some kind of living for themselves in wood. Others, frankly, are put off by his aesthetic prejudices, or find his moral tone too shrill. Regardless of your view, though, you know about him. The word, "Krenovian," has come to be used to describe particular qualities of line, contour, detail—even of temperament. A buzzword, maybe, but the lexicon must have been missing something.

The forms that emerge in Krenov's work have a quality of the inevitable, of having always been there, as though they just grew. It isn't considered pragmatic, in the 1980s, to discuss wood in the language of druids. But in the face of work so closely fused to the nature of its material, I am made to believe in the transfiguration of objects. In its stillness, we continue to call a piece of Krenov's a cabinet, and that's what it is—a cabinet, flatly noted. But in its influence on feelings and for what it sets off in the mind, it takes on the magic of a talisman. A cabinet is only pieces of dismantled trees. Krenov makes me conscious that they were alive.

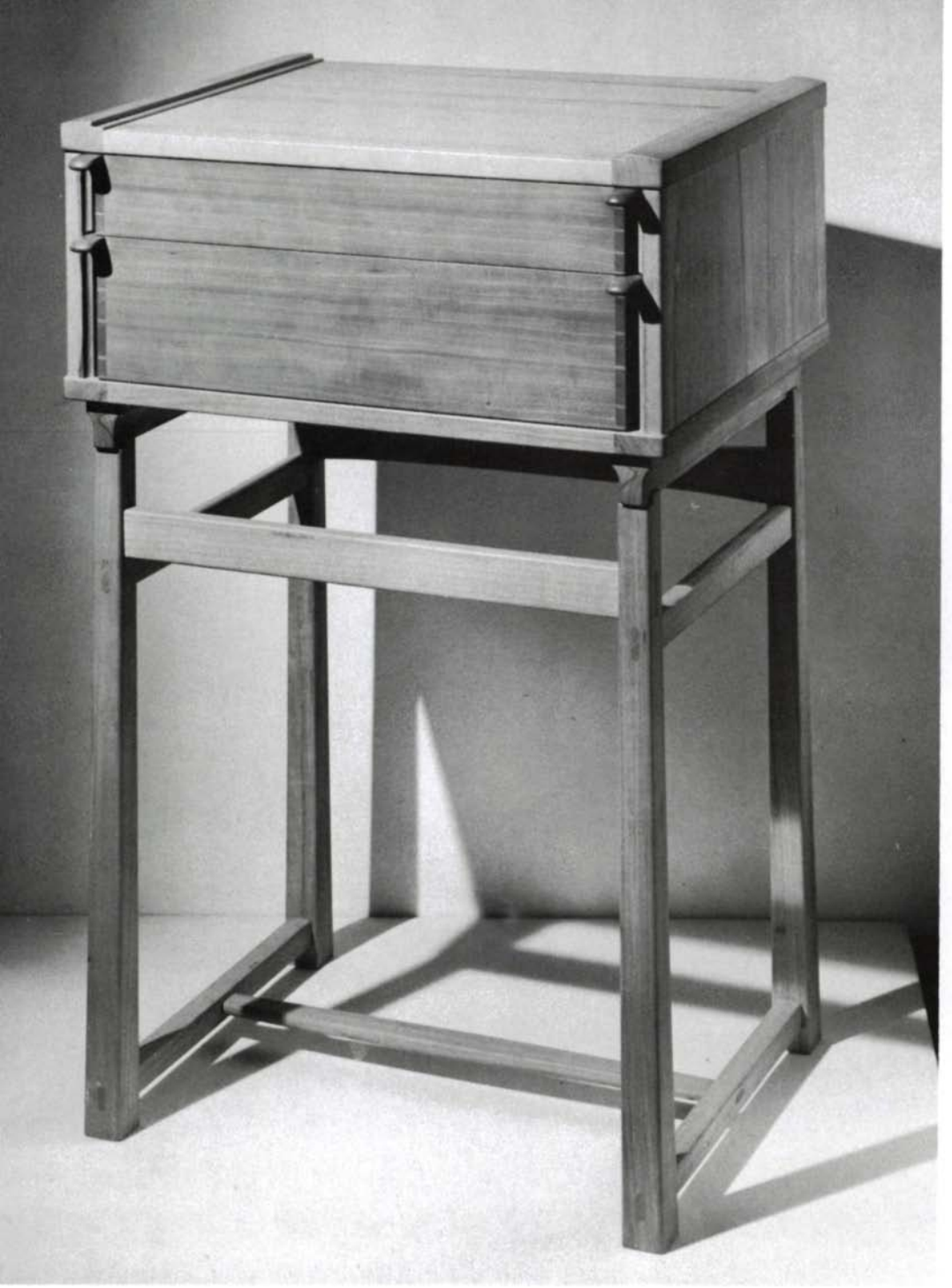
A critic, in my book, is little more than a dog in search of a hydrant. Lao-Tzu observes that, "He who speaks, does not know...He who knows, does not speak." I believe him, but notice that he had to say it; I realize I risk being mistaken for a critic when I say that for my purposes, Krenov's work is sometimes disturbingly small if looked at only as furniture. Because of its diminutive scale it sometimes has an air of something too much worried over, too nervous with the kind of fuss that makes more sense to me in the work of a miniaturist or a luth-

Photo above: Nick Wilson; photos right: Mark Gordon; other photos: Bengt Carlen

Krenov, with no loss of vigor, continues to explore the interplay of space, light, and structure—he is still experimenting, still growing. This cabinet, only recently completed, declares his continuing restlessness and his refusal to let himself get too comfortable. The name he's given this piece amounts to a suggestion to the viewer on how to deal with it. He calls it "Walkaround." With it, Krenov calls into question the idea of frontality—the iconic convention of a cabinet with its back to the wall. "Walkaround" has no "front" or "back" to speak of; it says there's more than one side to every story.

The cabinet is made from two flitch-cut, 2-in. planks of the same log of French walnut. As seen in the photo at upper right, there are a pair of veneered doors at the center (the veneers are $\frac{3}{32}$ in. thick, used directly as they come off the bandsaw) when the doors are open, a similarly veneered panel is seen fixed in the rear. The drawers are of bird's-eye maple; the door handles, latches, and consoles (shelf supports) are of secupira.

Walking around to the other side, however, the viewer discovers that Krenov has playfully reversed the terms: there are glass doors on both sides of the stationary panel, allowing access to the glassed-in outrigger parts of the showcase. The secupira "sticks" that support the glass shelves are slightly sprung to pressure the shelves against the sides of the central cabinet. The sprung, stave-like legs effectively express a feeling of being braced for the load they have to carry—four slender buttresses, twigs almost, but working together with no sign of strain or threat of snapping.



The stance of this piece, a silver chest on stand, conveys the sense of a strong footing at the ground. The load from above is delivered downward through the expanding taper of the legs. Working up, the eye is presented with a rising succession of facts, from the disposition of the stretchers to the coved crossbars flared to meet the weight of the case above. Nothing here has escaped Krenov's attention. The details are meticulously considered but that, by itself, is an academic virtue if a piece has no vitality. This one is wide awake. Krenov has done six or seven versions of it, some with three drawers, some with two. This is one of the earliest, and, from looking at them only in photographs, its proportions seem more effective than those of the later ones, which stand a little higher.

ier. Because many of his pieces are only as large as they are, they are imperiled, in my mind, by their own delicacy.

On the other hand, a thing is what it is, and if you believe that things ask to be taken on their own terms, I wouldn't argue that Krenov should be building shipping crates. There is a distinction made in Japanese aesthetics between things that are said to have the quality of being ripe and those that are said to have the quality of being raw. For the sake of comparison, George Nakashima's work would be considered raw, and Krenov's, ripe. Krenov, also, is aware of limits. Early in his career, he made a decision to concentrate on small-scale work and he has done it at a pitch that metamorphoses a cabinet into a reliquary, or an ark, for the shelter of the idea of woodworking purely for itself.

Without asking that it be built any rougher, when I look at Krenov's work it leaves me wondering what the actual use is, in our time, of furniture so extremely heightened in its workmanship. I have no interest in diminishing the drive that compels work such as Krenov's, but I do have an interest in asking where that drive is going. What and who is the work made for? And what are the consequences, in a hyped-up economy, for those who try to survive by doing it professionally?

Sooner or later, a modern craftsman finds himself staring into the face of questions like these. They have dogged me since I first started working through my ideas about furniture about 15 years ago. I don't know if answers to them exist. Here, all I propose is to offer some interpretation of the questions. To establish an initial basis of understanding, I will start with a look at some observations on the nature of craft made earlier in this century by a thinker named Soetsu Yanagi. Later, I will try to align this understanding with my impressions of Krenov, from time spent in conversation with him and his students at his school in Fort Bragg, California, during visits to see them last year.

In the study of aesthetics in Japan, Soetsu Yanagi was a thinker comparable to John Ruskin, and later, William Morris, in England. His advocacy of the elemental in craft, and of craft's need of a fundamental humility, was a strong influence in a revival of interest in the folk-crafts of Japan that began in about 1910, and still continues. In his book, *The Unknown Craftsman*, Yanagi

Krenov consulted with some serious chess players before he embarked on this chess board. His solution is clean, straightforward, and strictly without misplaced flamboyance. Ascetic as the game of chess itself, the table's structural procedures spell themselves out in the spare, disciplined logic of chess moves. The joints are exposed, and let you know exactly what is happening, but without crowding the field of strategy, the chess board itself. Each square of the board is a distinctly separate segment, and each member of the surrounding frame is worked as an obviously separate piece of wood, which underscores the essential purpose of a chess piece—it can move. Both of the woods used for the legs and frames (the first is secupira, the second, doussié, a Krenov favorite) are dense but porous, with end grain like bamboo and a fibrous, all-over marking that gives the surfaces the look of a coarse tweed.

concerns himself with the nature of the beautiful. He contends, with insistent eloquence, that the highest sublimity man ever achieves with his hands is almost invariably in work wrought in the humblest anonymity. Yanagi's own most profound experiences of the beautiful were inspired by objects of craft made very much in the course of everyday life, without artistic calculation—things made without second thought, rapidly in great numbers, and cheap in cost. Many were tea and rice bowls, with glazes often crackled and uneven, and forms not flawless, but irregular. They were made, for the most part, by a faceless peasantry, people far too poor to be worried about personal aesthetic identities. By any measure of ours, they led lives of oppressive poverty, but they were lives rooted in cultures where there was nothing to threaten the place the artisan had in the scheme of things.

Necessity was the mother of Yanagi's unknown craftsmen, and the crucible of "objects born, not made." Work made under the enforced humility of poverty could not presume to dominate nature. Yanagi was convinced that the modern crafts, for all their higher sophistication, were distracted from the primal integrity which gives the peasant crafts their spiritual vitality. The strains of market competition put pressure on contemporary craftsmen to disdain nature in favor of artifice, which, as far as Yanagi was concerned, hurt their work. He didn't go so far as to say that we should look around for ways to become impoverished, or start to make objects that look deliberately rustic or sloppy, in some hopeless affectation of the primitive (making what David Pye delights in calling "hairy cloth and gritty pots"), but Yanagi did say that he thought we were lost. The designer-crafts of our own time, ejected from the Garden, were not utterly barren of all grace, but to Yanagi, they bore the wound of separation. In contrast to the anonymous work of earlier times, he called ours the product of an Age of Names, or Age of Attribution—signature work.

The furniture most of us are making, as designer-craftsmen, usually doesn't have too much to do with Yanagi's idea of objects made for the simplest filling of need—unless it is the need to proclaim ourselves. But, says Yanagi, it is the object, the thing-in-

itself, that speaks, not whoever happened to make it.

I think there is a vestige of Yanagi's aesthetic and ethical values in James Krenov's approach to furniture. Obviously, whether or not he literally engraves his initials into it, Krenov's is signature work with a big S. The connection is not free of irony, but the values are there, in the preference in his work for quiet, or a little modesty, and in his relative unconcern for radically spectacular form. Krenov's mastery, while it seeks to be there, still tries to deny itself. In that sense, his work asks that you look at it, and at the wood, instead of at him, and at least attempts to free itself of the modern's consuming egotism.

The first time I was in Fort Bragg, my eye fell on one of the pieces Krenov has in his house. Very hesitantly, with exaggerated reverence, I began to approach it for closer look. Sensing that I was being conspicuously pious about it, Krenov said, "C'mon, go ahead, touch it...it doesn't glow in the dark." He has yet to demand to be acknowledged as the Author of the King James Version. Most of his students, once past the first terrors of His Judgement, just call him Jim.

If the desire for sublimity is what drives an artist to make art, while the impulse of a craftsman is to make a thing well, but to make it mostly for the satisfaction of utility, then what Krenov does is art more than it is craft. In Krenov's shop, a piece grows hardly more quickly than the rings of trees. The main concern is not to bring a job in under the bid, but to express feelings, with the greatest possible emotional precision. Still, Krenov shrinks from being called an artist. I think it is because to him the word "artist" implies involvement with an avant-garde intent on setting the world on its head, and Krenov really isn't interested in exploding all known conceptions of furniture. He is too much immersed in the processes of working wood. Seeing himself as a link in a furnituremaking tradition that didn't start, and won't end, with himself, Krenov is absorbed with doing work of a caliber that he feels the tradition demands of him, and encouraging his students to do the same. My impression is that he would just as soon let the question of Art take care of itself so he can get back to work at his bench.

As completely new as Krenov's work is to most of us in North America, he didn't just spring up, an unprecedented innovator, from out of nowhere. He has a lineage. There's a long Northern European woodworking tradition, almost canonical in its purism. Earlier in this century, a leader in sustaining that tradition in Sweden was Carl Malmsten. Dedicated to reinvigorating the values he saw in the folk-arts of Sweden, Malmsten founded both a school and a cottage industry to promote Swedish craft. It was as a student at Malmsten's school, from 1956 to 1958, that Krenov learned the classic techniques of cabinetmaking.

Malmsten's designs are still in production, and in the Malmsten catalog Krenov's genesis as a designer, and the seeds of what have come to be called Krenovian forms, can be seen in the outlines of Malmsten's showcases, desks, and cabinets. "Originals?" asks Krenov, "what's original?...if you look back far enough..." The point is that Krenov's work expands on an inheritance, to which Krenov brings his extraordinary gifts for interpretation: a lyric sense of line, an eye for color and finely balanced proportions, and a genius for improvisation. (Malmsten always went strictly by the drawing—Krenov works mainly by the seat of his pants.)

The greatest number of Krenov's pieces are cabinets; after that, smallish tables and stands; and then, cases and boxes, mostly for collections of rare objects. I asked Krenov why he never made dining tables, or beds, or (what I was most curious about) chairs—furniture types that have interested me most in my own work, because of their intimacy with the human condition: we have to eat, we have to sleep, and we have to sit. Krenov's answer was honest enough, if just a shade evasive on the problems of working larger kinds of furniture with an approach as fastidious as his own. He said that he prefers to limit himself to what he does best, believing that there are craftsmen around who are better at doing the larger work, and that's that. About chairs, he says, with discouraging conclusiveness: "The best chairs have already been done...by Hans Wegner, and by Esherick." (I happen to like Krenov's taste in chairs, but the fact that an excellent chair might already exist is no reason not to build one equally good. After all, there were also superb cabinets around, but Krenov still built his.)

In conversation, Krenov is reluctant to critique the work of his contemporaries. Underneath the surface, you know pretty well where he stands, but even his students find it difficult to pin him down for an aesthetic assessment of their own work. On matters of taste, strong feelings come up, and egos can get bruised. Krenov is no stranger to the problem. On the strength of convictions strongly stated in his books, he's found his way into some nasty cockfights.

To know Krenov's mind on questions of aesthetics, the place to look is in Krenov's own work. There, what he thinks can be felt, by running a hand over the traces left by his tools on the coopered surface of a door, or by seeing the way the light races along a chamfer, or by touching the carving of a little pull. Imprinting the wood with a sense of the tool's immediacy, his aesthetic confesses the process by which a thing gets made. As with his use of through-joinery, the directness of it reads as honesty, at least it does to those who see things in terms of the Arts and Crafts ethic.

The traces left by a plane give poignancy to the nakedness of surface, opening it to the sense of touch. Certain woods, such as pear, can be planed to a finish and left fresh, without sanding. The only direct means to the revelation of a surface—and the tool closest to Krenov's heart—is the wooden plane. "Instruments," he calls them, and it's clear that he means, "...for the release of music." When I first saw them, Krenov's planes looked to me like the lumpy implements of Early Man, blunt shapes, the bodies roughly carved or left coarse from the bandsaw, scored or crosshatched for grip. The fact is, they are extemely sensitive and effective tools, no less sophisticated than the deceptively crude-looking planes the Japanese use. Other than all the planes and small knives he makes for himself, the rest of Krenov's tools are surprisingly few, and very simple and ordinary. He's worked out an economy of means and seems to have no great obsession with collecting them. Krenov's appetite for wood—prime lumber—is another story. Last January, a group of us drove down to Palo Alto, 200 miles south of Fort Bragg, to select wood for Krenov's students. A container had just arrived by ship from Stockholm, bought from a timber merchant Krenov used to deal with during his years in Sweden.

Observing the encounter of James Krenov with a load of lumber was worth the trip. As soon as he saw the lumber, he turned into a hummingbird. He began hovering in excitement among the tons of precariously stacked planks. I was afraid he'd break a wing. Paying no attention to his 65 years, Krenov whizzed and darted around. He threw himself into the work: unpiling and restacking planks weighing 200 pounds, seizing this, rejecting that, scrubbing at them with a block plane, all the while delivering a running commentary on each of their virtues and defects.

If Krenov had to choose a favorite wood, he says it would be pear, for its tranquility, its color, and its response to planes. The first lumber we sorted through was pear from Austria and France, steamed and unsteamed, 2 in. and 3 in. thick, sawn through-and-through. The paler, unsteamed pear is sometimes described in lumber lists as "pear, unsteamed, ivory." I envy the student who works it. Next in the load was doussié, from Cameroon; then French walnut and cherry, and then elm, ash, maple, oak, hornbeam, beech and birch, from all over Europe. The lumber in the container was of mixed quality, some of it quite good, cut from close to the heart, but some was slash-cut (from out near the edges of trees), fast-waning and off in color, and most of that Krenov passed over.

The school Krenov directs in Fort Bragg is now in the fifth year of its existence. Its founding was the result of a tenacious effort by a group of the Mendocino region's woodworkers to provide a permanent base for Krenov in this country. It isn't a huge institution: 22 students are accepted into the program each year; a few remain for a second year. The program is an intensive nine-month course covering all the major points of Krenov's technique, during which most of the students build several pieces of furniture and a number of planes.

The desire to learn from Krenov firsthand draws students from all over the world. In the class just concluding were two students from New Zealand, two from London, one from Norway, one from Hawaii (who chain-milled and brought native woods, including some very remarkable curly koa), two from Alaska (one a fur trapper, the other the builder of the trussed log bridge described in *FWW* #33, pp. 78-81), plus students from around the rest of the United States. The diversity of their backgrounds and the lengths to which some of them have gone to get to the school says something for Krenov's powers for arousing the will to pure workmanship.

The air is charged with Krenov, but the mood of the school is actually pretty loose. It isn't a tyranny. The students are generally good humored and relaxed. A certain amount, not all, of student work bears a resemblance to Krenov's, some of it very closely, which makes it tempting to criticize as merely the work of Krenovian clones, but I think this too conveniently misunderstands it. It's plain to see that some of the students regard the imitation of a master as the price of becoming one oneself, but I also saw work being done that looks nothing at all like what one would associate with Krenov. As long as Krenov feels it is done with sensitivity and skill he doesn't knock it, but it is clear, from the overall look of things, that Krenov isn't running an art school consecrated to the worship of Design. As independent a spirit as Krenov is, he is still the exponent of an essentially conservative furniture tradition. He teaches a craft which has definite and settled criteria in his mind. There is room for experiment, but at heart, the school is committed to a classic way of cabinetmaking, not to the search for a profound originality, or to the idea of Design as an activity poised at the edge of the breaking wave of innovation.

Krenov's compassion for the life of craft is evinced in all that he tries to give his students. Outsiders, dreamers, poets, monks, druids—his students find, briefly, the sanctuary a rare orchid finds in a greenhouse. I can't help but wonder, though, about what happens when the year's sweet interlude in Fort Bragg is at an end, and Krenov's students hit the street.

It's a raw question. I feel slightly wistful even asking it. Some of the students say they don't seriously expect to make a living producing work as uncompromised as Krenov's. They have the talent, but more than half of those I spoke with are reluctant to attach much professional ambition to it. They are there purely for the sake of studying under Krenov. More than a few, though, mean to survive as craftsmen on terms Krenov would recognize as his own. Given a few breaks, enough to preserve the obsession with integrity—who knows?—they might be able to patch together what Krenov likes to call "a modest living." No less obsessed myself, I am no one to say otherwise, but I hate to linger too long on the odds.

When it comes to money, Krenov says that all he wants for his time is "what a plumber gets." "Good luck," I say to myself. If it's any consolation to craftsmen miserable about not making enough money to get by, Krenov concedes that he hasn't survived all these years himself by pluck alone—he's had some help. It does nothing to diminish the beauty or the magnitude of Krenov's achievement to celebrate the name of his wife, Britta Krenov. A woman of great warmth, very large patience, and the staying power of a saint, Mrs. Krenov was for a long time the economic bulwark of Krenov's passion. She is shy of being made a fuss over, but in reality, Britta Krenov is nearly as much the

Its thoughts kept partially concealed, this ash showcase projects its dignity through a particularly handsome balance of glass and wood. Two eyes of glass look out from above, but below, the pair of heraldic panels of spalted maple gives mystery to what lies behind the lower portion of the doors. The striations in the olivewood handles play off the spalting in the maple, and the ash is brought into a close harmony. Effectively understated, with bookmatches as unconcerned with perfect symmetry as the left and right sides of a person's face.

The cabinet of pearwood, at left, is the first in a sequence of four similar ones. The others were done in pear, English brown oak, maple and secupira. The piece has a creaturely quality—people have likened it to a dancer, up on her toes. The carved elm cabinet, above, with its slab-like legs, is nearly an opposite. It isn't as tall as you might think—only about 4½ ft. high—but it is commanding, with the stance of a sentinel. The verticals are powerful and elemental—the legs expand in mass near the ground, trunklike, gather themselves in as they go upward, then flare out as the horns at the top, all within an unbroken continuity. The cabinet approaches the frontier separating furniture from sculpture, but remains furniture—function still has primacy.

creator of Krenov's contribution to woodworking as is Krenov himself. Without her, there might have been no Krenov, and personally at least, I'd be the poorer for it.

It is becoming increasingly difficult for a craftsman—Krenov and the rest of us—to know where he stands in contemporary life. In *The Unknown Craftsman*, Yanagi effectively pointed out that as a consequence of the Industrial Revolution the ancient basis of the crafts—necessity—has been eroded away. In the face of the remorseless onset of technology, the Arts and Crafts movement arose as a last great cry of protest against what was to be in fact an irrevocable change in the condition of man. Despite the profundity of the change, there remains in us a powerful compulsion to work with our hands. The emotion is so strong that in a few craftsmen it continues to translate into a drive to work wood for a living. The most viable form it takes is carpentry, still a going trade. What I contemplate here, however, is not the health of carpentry, but the fate of the classic trade of the cabinetmaker.

Interested in continuing to live through the workmanship of risk, the modern furnituremaker, in reaction to the crisis of an identity lost to industrialization, has had to cast around for something which will give a new legitimacy to the desire to build. Some of us have looked for it next door, in the art world. So, I think, begins the modern confusion of craft with art. The distinction between them has become so muddled that few people now are willing to say which is which. To the ruling taste, though, the crafts are the poor cousins of art. Established culture is inclined to attach much greater significance, not to mention money, to things called "art." Wondering if the grass is maybe greener in the art world, furnituremakers start to strut their stuff as "art."

In the utilitarian sense, art has never pretended it was useful. Furniture, supposedly, is. When it is posed as "art," it puts something of a strain on its connection to its own origins in the principle of utility. Slipping his moorings, a craftsman gravitating into the art world comes under its pressures to produce things that are not artless but extraordinary. Only from looking for a leg to stand on, his work drifts into a situation infected with exactly the self-consciousness that worries Yanagi as the inevitable consequence of the move to signature work. In his insistence on the primacy of craft, Krenov has put up a notable resistance to the idea of himself as an "artist." His work fights to escape falling prey to the excesses the art scenario seems to breed, but even he is not immune. None of us now building furniture, one lovingly considered piece at a time, really are.

As things stand now, the public has come to imagine woodworkers as a bunch of Gepettos, cheerfully at work on their Pinocchios. The public goes to galleries expecting to be awed by legendary feats of workmanship, or with an appetite for work of nothing less than staggering originality. A craftsman—particulary a younger craftsman—feels that he has to respond by showing work that makes a great display of virtuosity. There is a desperate novelty to the whole thing. Cursed with having to be clever, art-furniture has to jump through hoops, it can't allow itself the rest of things simply at rest, not if it hopes to capture the fancy of prospective buyers. The situation seems to demand that, in the pursuit of an even more exquisite vulgarity, craftsmen turn themselves into performing dogs. One of the things that I admire about Krenov is his concern for the craftsman's dignity, and his perception of the distortions that threaten to rob it of its composure.

Krenov has pointed out that the consummate craftsmen of our time are not necessarily professionals. It would be immodest to call myself "consummate," but I think he's right anyway, because as a professional I'm so chronically broke that I'm an amateur by default. Looking to make a buck or not, however, one thing is certain: as marginal artists, or as high-minded but low-tech holdouts, our work is no longer really answering to the broad base of social need—not in the way that the Windsor chair or the Shaker table once answered to it.

We are no longer constructing the relatively straightforward furniture of ordinary life. Modern hand-built furniture, whatever its aesthetic stripe, is built on a set of premises almost unrecognizable now to most consumers. The work of the fine craftsman is inherently and fundamentally disengaged from the values that drive the contemporary marketplace. It comes of the craftsman's disgust with mediocrity—he recoils from it, understandably. The unpleasant side-effect of his withdrawal is that his own work starts to lack a certain relevance to the world as the world now is. Unwoven from the warp and weft of the prevailing reality, the craftsman, conscious that his skill is not especially needed, is left demoralized, emotionally and economically estranged from the energy that streams in everyday life. There is a bitter truth to Bob Dylan's bottom line: "there's no success like failure, and failure's no success at all."

Krenov can't be blamed for any of this; he feels the crisis himself and tries to come to terms with it in his books. But the situation is paradoxical: work as fine as his inexorably raises the question of how it is to avoid its own extinction. While consumerism, driven by the engines of hype, is busy scaling new heights of delirium, the question of beauty is left to wander like some poor guy lost in the crowds at a trade show. From the point of view of survival, Krenov can't give us an answer, because there isn't one, unless its "just keep on truckin'."

Krenov's instinct is to work first from what moves in the currents of feeling and intuition. A few craftsmen will always be moved to approach wood and the work of furniture in the same way, inwardly, with absolute tenderness and rigor. As the work takes on the qualities of a closely meditated dance, the constraints of the equation of time with money are thrown aside. Krenov's disclaimers of art notwithstanding, the craft practiced at this level is not simply a trade, it has entered the arena of quixotic risk, i.e. art, assuming for itself art's conscious quest of the sublime.

In the understanding of Soetsu Yanagi, however, that very sublimity will more than likely elude the work of the signature craftsman because, in its self-absorption, the work is intolerant of imperatives that connect craft to life on Earth. If it is inessential to life, life will ignore it. Considered in that light, the furniture of the artist-craftsman is dangerously close to precious. Still, I keep making furniture by hand, but I suspect it's because I was born to tilt the windmills: To my eyes, the radiance of the work of James Krenov is too compelling to dismiss with criticism of its economic unreality. It embodies an integrity, an equilibrium of thought and feeling, that graces far too little of the work of our time. Laying aside quibbles of art or craft, I find it hopelessly beautiful. Krenov has suffused the stuff of wood with a poetics, a mute poetics, a sense of word made flesh...and said things with it whose beauty no critic can explain away. □

Glenn Gordon designs and builds furniture in Chicago. *He wishes to thank, among others, Michael Burns, Creighton Hoke, Alan Marks, Martin Puryear, and Joe Tracy for their thoughtful discussion of his questions. A show of work by James Krenov's students will be held at the Walnut Creek Civic Arts Gallery in Walnut Creek, Calif., from Nov. 13 to Dec. 24.*

Turning a Lidded Box

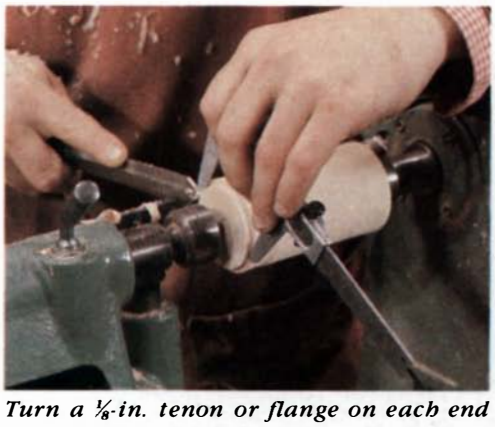
A centerwork project

by Richard Raffan

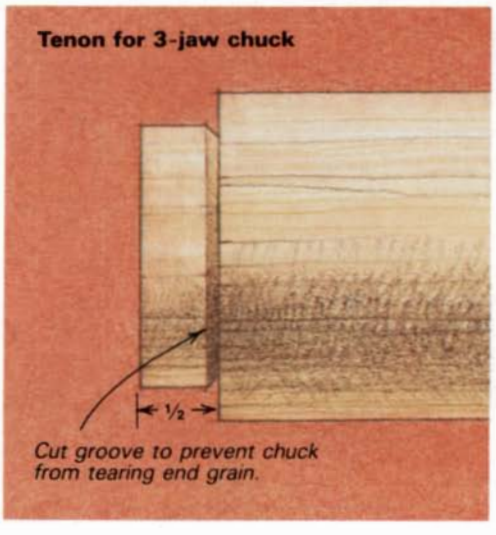
Lidded boxes may seem complicated, but the steps involved are really quite simple. Boxes demand more precise tool control than do bowls, and care, attention to detail, and a few tips on how to overcome all the little problems usually encountered make them readily achievable turning projects. Craftsmanship has less to do with the conception and birth of an object than with knowing when to be careful and what to do when things go wrong.

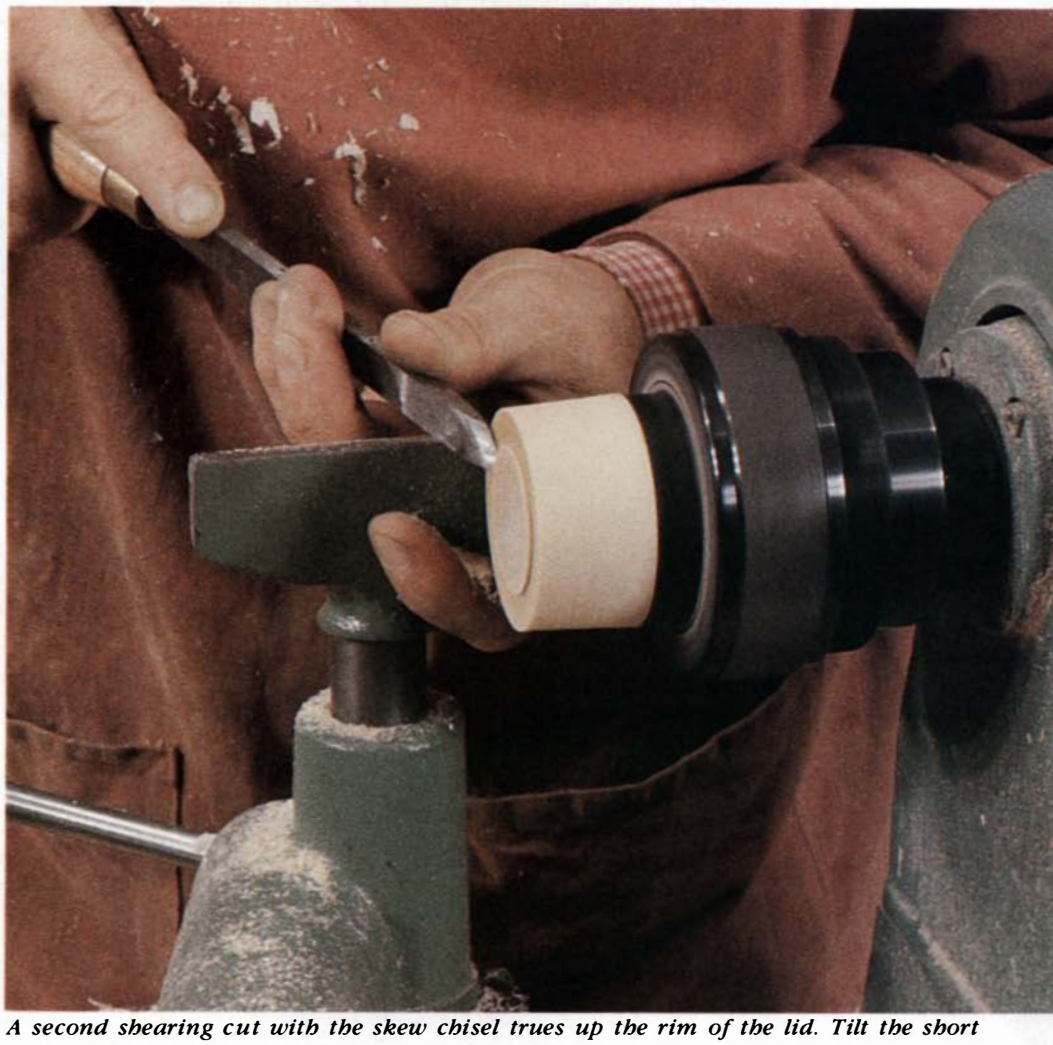
I've made boxes as large as 10 in. in diameter and 6 in. deep. These were turned on a faceplate with the grain running across the lid and base, but warping always spoiled the lid fit when the grain was aligned this way. Today, I make all my boxes with the grain running through from top to bottom. What little warping does occur is not much of a problem on a small box because the lid can be made thin enough to flex slightly without being too fragile. But I find warping is still a major problem in boxes over 3 in. in diameter, even with well-seasoned wood.

For turning boxes, I prefer what's known as a spigot chuck (available from Cryder Creek, Box 19, Whitesville, N.Y. 14897). This chuck grips a short tenon or flange turned on the end of the wood. A 3-jaw chuck may also be used for turning lidded boxes. I do not recommend screw chucks for boxes because they don't



Turn a ⅛-in. tenon or flange on each end of the cylinder to fit the spigot chuck. Hold the parting tool in one hand and the calipers in the other. Stop cutting when the calipers slip over the tenon.





A second shearing cut with the skew chisel trues up the rim of the lid. Tilt the short point of the skew away from the wood to avoid a catch.

grip well on end grain unless the thread penetrates the wood an inch or more. This wastes wood and develops leverage problems that do not arise when working closer to the headstock. Neither do I recommend expanding collet chucks for boxes. As they expand into a recess they act like mini log splitters and tend to weaken the wood. If a tool should catch, especially at the point farthest away from the chuck, it will likely lever the blank away from the chuck and split the wood.

To start, turn a cylinder between centers with the lathe running no faster than 1200 RPM to 1500 RPM. A 2-in.-dia. cylinder 4 in. long is a good size. With a parting tool, turn a tenon on each end to fit your chuck. The size of the tenon will depend on the type of chuck. A spigot chuck will grip a ⅛-in.-long tenon. A 3-jaw chuck needs a ½-in.-long tenon with a groove cut in the corner where it protrudes from the main cylinder. This will prevent end grain being pulled by the jaws as they clamp in to grip.

Mark off the lid and bandsaw the cylinder in two, giving you separate blanks for the lid and base. Mount the lid blank in the chuck and true it by making shearing cuts along the cylinder and across the end grain with a small skew chisel. Take the opportunity to practice tool technique. Choose the technique you find most difficult and practice now, while a catch is not too disastrous.

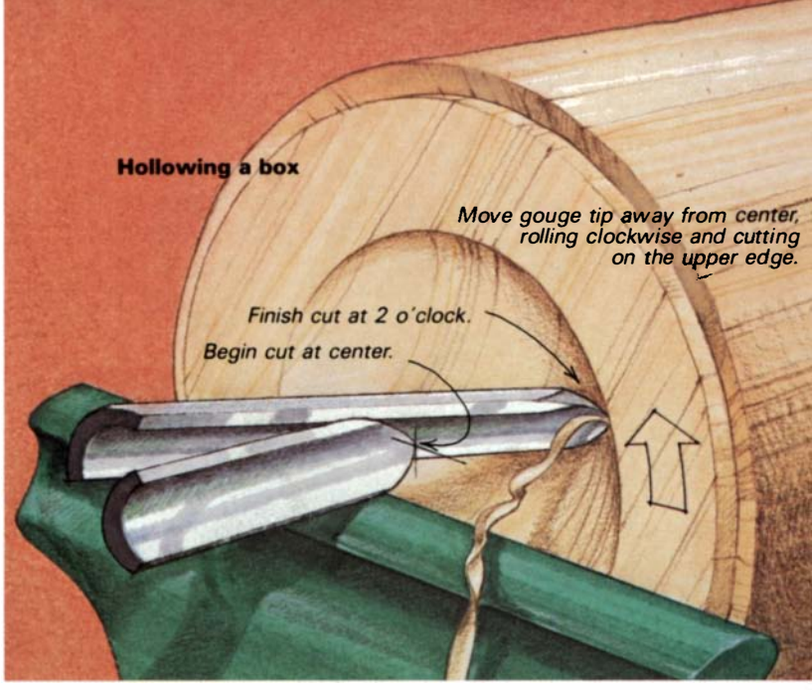
Once you have trued the end grain, take a final cut ⅜ in. in from the rim before hollowing the interior, as shown in the photo on the facing page. Undercut this surface slightly so it fits flush with the shoulder against which it will eventually rest. With very hard woods such as cocobolo, African blackwood or Mulga, the cleanest surface will probably come from a very delicate scrape cut.

Next, I rough out the domed inside of the lid with a ¼-in. or ½-in. shallow-flute fingernail gouge. I use an old trade technique, cutting away from the center to 2 o'clock, as shown in the drawing at right. Position the tool rest so that the gouge point is at the center of the stock and begin the cut with the gouge on its side, flute facing away from you. Push the tool in at the center about ⅛ in., then pull the handle toward you and simultaneously rotate the tool clockwise to keep the bevel rubbing and the edge cutting. (The tool really does cut upside down on the "wrong" side of center.) Hollow the lid with a series of cuts, starting at the center and working outward with each successive cut until the walls are about ⅜ in. thick. Finish shaping the inside with a heavy roundnose scraper, taking light cuts.

You must now consider how the lid fits and how the desired suction fit between lid and base (see box at right) can be achieved. Two points here: first, the suction comes from the two cylinders sliding apart. The finished flanges on the lid and base must not taper. If they do, you'll end up with a lid that fits tightly, but you'll never enjoy the gentle resistance of the suction as you remove it. Secondly, all parts of the lid that will contact the base must be turned as accurately and cleanly as possible so that they fit true on similarly turned parts on the base. Sanding must be kept to a minimum to avoid eccentricity as softer grain is worn away. Cut the fitting parts well enough so that only a quick dab with 180-grit sandpaper is required for a smooth surface.

With a square-end scraper, rough out the flange leaving about 1/32 in. more than your finished surface. Take a final cut with the scraper to finish the flange. Be sure to grind a sharp left corner on the scraper edge. Check the flange with inside calipers to ensure that you have a true cylinder (no taper). This is the first part of the perfect fit.

During this stage your tool may catch and knock the blank off



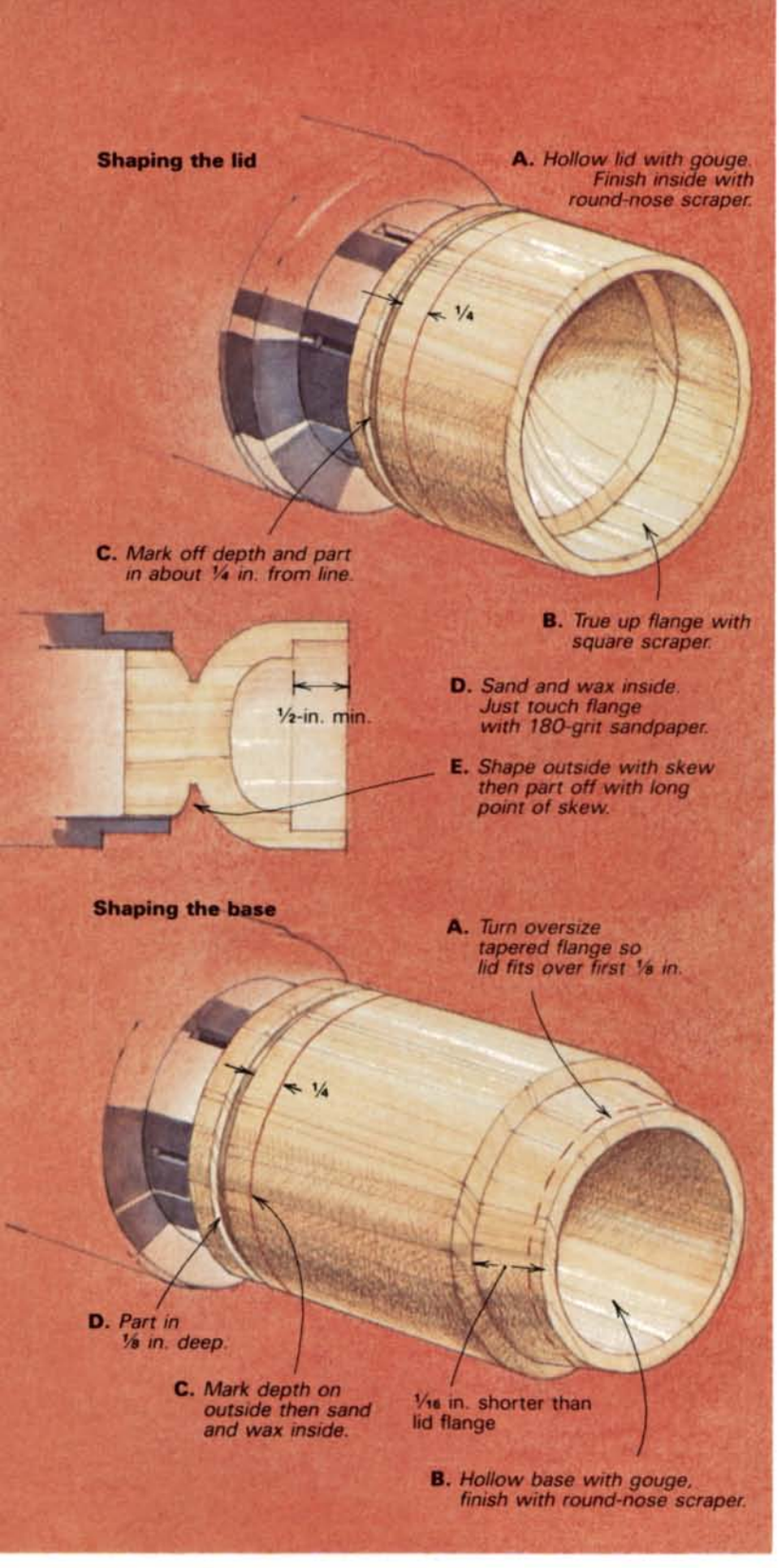
About box design

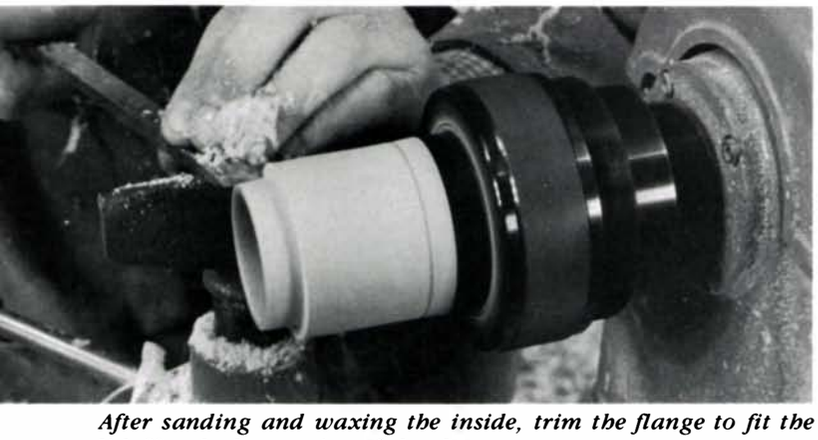
I like box lids to fit so they pull off easily against the resistance of a slight vacuum and fit against a cushion of air created as they slide over the base. I sometimes test the fit by lifting the box by its lid. It should take about two seconds for the base to slide off a perfectly fitted lid. I like the interior of the box to be a different shape from the exterior, so that it might surprise the inquisitive. The inside contour doesn't need to follow the outside.

To disguise any movement in the wood, I detail the line where the lid and base meet with a groove or a bead. A smooth join on a freshly completed box will be hard to detect, but later (usually only minutes), the slightest eccentricity or warping will leave one edge jutting over the other to mar the surface for a caressing hand. Detailing the join eliminates this problem.

The line of the join affects the visual balance of the box. Mostly, I prefer to locate it between one-third and one-half of the way from either the top or bottom, but if I don't care for its position once I've cut it, I'll add other bands or grooves to balance the form. —*R.R.*

Photo this page: Richard Brecknock





After sanding and waxing the inside, trim the flange to fit the lid. Use the long point of the skew as a scraper.

center. Don't worry. Remount it and true the inside dome of the lid, leaving the flange and rim until last. If you've cut the inside and still need to true the rim, don't use a shear cut because the grain will split away down the flange. Use a delicate scrape on the end grain.

Measure the depth of the lid and mark a pencil line on the outside. Sand and finish the domed inside of the lid. Be careful not to touch the flange, which should require only a dab of 180-grit sandpaper. I finish with soft beeswax.

To define the top of the lid, part in about ⅛ in. from the line on the headstock side. Rough out the exterior of the lid with a skew, then part off the lid with the point of the skew. You'll finish turning the lid later, when it's mounted on the base, but cut as much as possible now, while the blank is held firmly in a chuck.

Mount the base blank and true it with the skew. To rough-fit the lid, cut a tapered flange so that the lid fits just over the end. This is surprisingly easy to do by eye, but if you make the end too small, just extend the flange farther back into the blank. As the base revolves, fit the lid and apply just enough pressure for the lid to leave a burnish line. This line gives you the final flange diameter. Don't cut the rest of the flange to size yet. If you hollow the base first, you can afford a massive catch and get away with it. If you finish the lid fitting and then have a catch, you'll probably fail to get the base running true and will have to start over again.

Hollow the base with a ½-in. gouge followed by a roundnose scraper. Measure the depth and mark this on the cylinder, then sand and wax the inside. To mark off the bottom, part in ⅛ in. from the line on the headstock side. This gives you a ⅛ in. thickness for the base. (Make it ¼ in. if you're really nervous.) Don't part in deeper than ⅛ in. at this stage. You need to know where the bottom is when you finish turning the exterior, but you still need the support of the wood running into the chuck.

Using the long point of the skew as a scraper, cut away the flange taper so that the lid fits tightly. If at this stage you discover the flange slightly off center, it doesn't matter. Turn it true. If you've overcut it, you can cut the flange shoulder farther back into the base and, if necessary, cut some off the rim. Cut the flange about 1/16 in. shorter than that in the lid, and cut the shoulder at the bottom of the base flange cleanly. Ideally, the fit between lid and base will be tight enough to prevent the lid from spinning on the base when you remount the assembled box for final shaping of the lid.

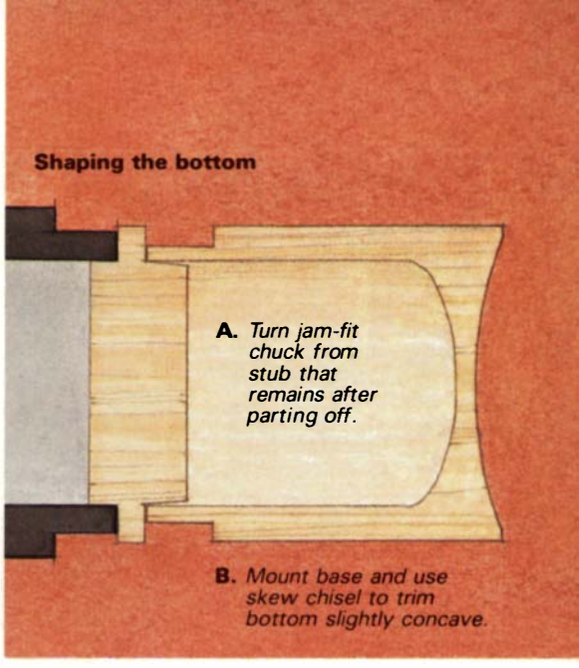
If you have a good suction fit, but not enough friction to prevent the lid from slipping and spinning on the base, try this: remove the lid and hold a lump of soft wax (beeswax is ideal) against the revolving flange so that a ring of viscous wax develops. Stop the lathe and mount the lid before the wax solidifies. You have only a few seconds to push the lid on but once there, the cooled wax will hold it fast unless you cause the lid to turn slower than the base by cutting or sanding too hard, in which case friction quickly melts the wax.

Turn the outside with a skew chisel. Depending on your skill and audaciousness at this stage, you can turn a delicate finial on the lid. This isn't difficult as long as you put no pressure against the axis. Arc the point of the skew down into the wood by pivoting the skew on the rest for maximum control. Don't merely push the skew forward into the wood.

Sand and finish the outside before fine fitting the lid. This is the stage that makes or breaks the quality of a lidded box—getting that suction fit just right. With practice and experience it can be done within a minute. Otherwise it takes time and patience.

Drawings: Joel Katzowitz

Fit the lid on the base and finish shaping the box with the skew chisel.



Proceed with caution. Too much enthusiasm at this stage and you could overcut and the lid will be loose. The best fit will come from a tool-cut surface with a minimum of sanding. I use the long point of my skew chisel as a scraper. This gives maximum control with minimum risk. After each delicate cut I can stop the lathe, try on the lid, and test the fit. Once it pulls off with reasonable ease, I sand the flange—a dab of 180-grit sandpaper is sufficient—and wax.

Once the lid fits satisfactorily, part off the base. Be careful to catch the box, not hold it, or the wood still attached to the chuck will spin a hole in the bottom.

On the stub that remains in the spigot chuck, turn a tapered jam-fit chuck, as shown in the drawing. Mount the base and true up the bottom with a skew chisel. I always turn the base slightly concave so that the box sits flat. I usually chamfer the corner between side and bottom using the long point of the skew. A sharp corner could easily be damaged or chipped. □

Richard Raffan is a professional woodturner in Mittagong, Australia, and author of the book, Turning Wood with Richard Raffan *(1985, Taunton Press). He has just finished work on a woodturning video, available next year from Taunton Press.*

Poured pewter inlay

by William Vick

I decorate my turned boxes with pewter inlays. Pewter, an alloy of tin, antimony, copper, and sometimes bismuth or lead, has a low melting point (420°F) and is easily poured into kerfs cut by lathe tools. One source for pewter is T.B. Hagstoz, 709 Sanson St., Philadelphia, Pa. 19106.

To inlay a flat lid, rough the outside to the final shape, then use a parting tool to cut kerfs at the desired locations. The kerfs should be at least ⅛ in. deep and slightly undercut. The undercut serves to anchor the pewter.

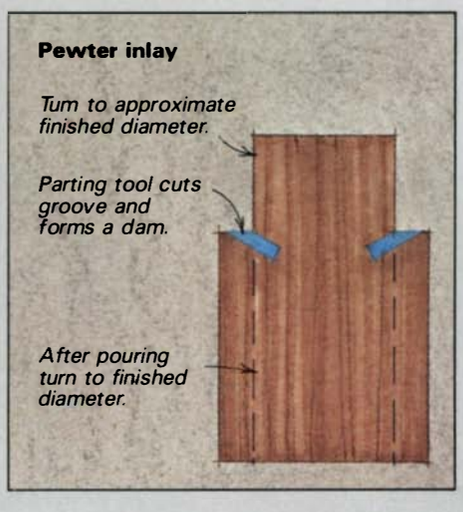
To inlay a band around the circumference, turn the area above the band close to the finished box diameter. Form the groove by cutting in at an angle with a parting tool, leaving a dam to contain the molten pewter.

To melt and pour the pewter you'll need a pouring ladle with a wooden or plastic handle (a ladle with a wooden handle and small spout is available from Dixie Gun Works, Union City, Tenn. 38261) and a propane torch. The box must be on a perfectly level, non-flammable surface. In a well-ventilated area, away from combustibles, put a small piece of pewter in the ladle and melt it by heating the base of the ladle with the torch. Once it melts, continue heating for about 30 seconds more. The metal must be hot enough to flow completely around the inlay cavity. Pour quickly and evenly. If the metal hardens before the cavity is completely filled, you'll end up with defects in the finished inlay.

When the pewter has cooled, mount the piece on the lathe and take light cuts with a sharp tool to trim the piece to final shape. Cut the pewter and the wood together. Because pewter is so soft, the cutting edge will not dull quickly. □

William Vick teaches woodworking at Mills Godwin High School in Richmond, Va.

Pewter bands were poured in place.



Holtzapffel Revised

A modern ornamental lathe

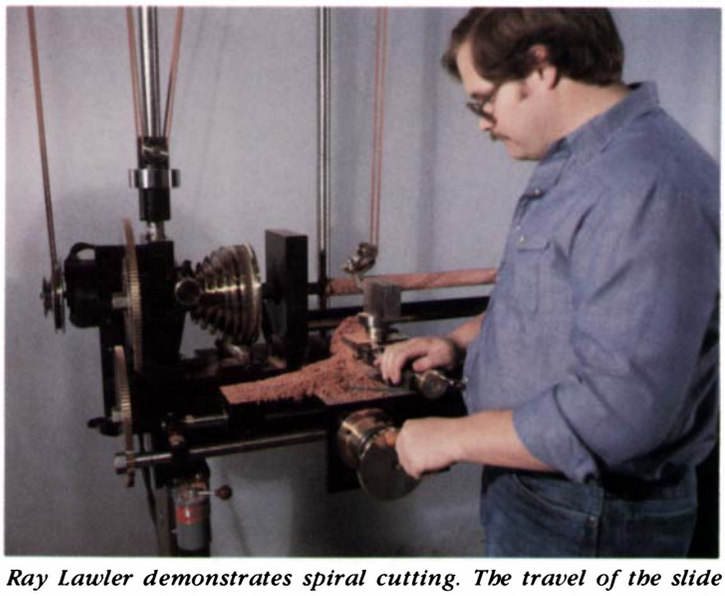
by Roger Holmes

Two hundred years ago John Jacob Holtzapffel, a German immigrant to England, built an extraordinary lathe for ornamental turning. Part wood lathe, part machinists' lathe, part router jig, this bewilderingly complex device was used commercially for security printing (to inscribe intricate patterns on plates for bank notes, for example) as well as for the elaborate decoration of items turned of ivory and some exotic woods by amateur enthusiasts. *Wealthy* amateur enthusiasts: in 1838 one of the more complex models cost as much as several houses.

About seven years ago Ray Lawler got bitten by the ornamental turning bug. He soon discovered that ornamental lathes were as pricey as they were scarce: only some 350 of the 3500 or so lathes made between 1795 and 1914 by Holtzapffel, his descendants and his imitators survive. So Lawler and his father, Calvin, decided to build their own in the machine shop of their Kansas City, Mo., gear company. Figuring there must be other would-be ornamental turners out there, they designed the machine for production in small batches. The Lawlers expect to have enough orders to make the first run of 20 machines, selling for about $8,000 each, sometime this winter.

I saw the prototype last May in Kansas City, and it's a beautiful machine. The warm glow of cast brass, the dull luster of precisely machined steel, the black enameled frame and massive mahogany legs evoke the machine's 19th-century ancestors. But the Lawler (as I suspect it will become known) is more than an elegant copy. For starters, it's much bigger than most of the originals: a hefty lead screw spans the full 36 in. between centers as opposed to Holtzapffel's 12-in. screw and 24-in. centers; the Lawler swings 14 in. over the bed, the Holtzapffel only 10 in. The Lawler also has a redesigned slide rest, cutting frames and pulley system, spiraling gears and other features to make it easier to set up and operate than the originals.

Lawrence Okrend



Ray Lawler demonstrates spiral cutting. The travel of the slide rest is controlled by the brass gears mounted on the headstock.

The Lawler benefits from technology unknown to the 19th century. The electric motor is obvious, less so are the linear ball bushings supporting the slide rest on round steel ways, which deflect only .005 in. under 250 lb. pressure. Nonetheless, Ray Lawler has a healthy respect for the machinists who handmade the old lathes. He figures it took one man several weeks to accurately bore the 800-plus indexing holes in the headstock pulley. With about two hours of programming and setup, Lawler's computer-controlled mill does the same job in 18 minutes.

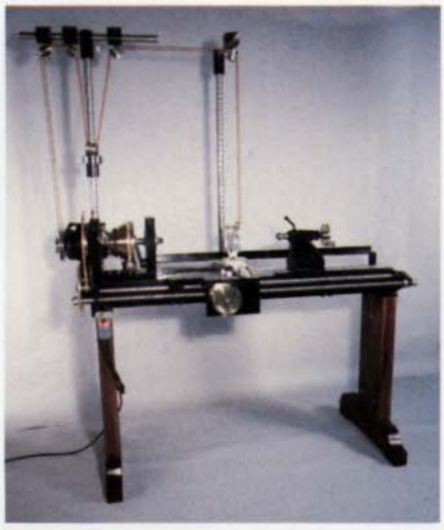
From screws to complicated fixtures, every part of the old machines fits one machine only; replacements had to be made, not bought. Lawler used as many stock parts as possible, so that if something needs fixing, you can buy it off your local machinery supplier's shelf. The machine also conforms to the critical gearing, threading and indexing specifications of the Holzapffel machines. As a result, Holtzapffel's exhaustive treatises on ornamental turning will be Lawler's operator's manuals. And for ordinary turning, the spindles accept standard Delta lathe accessories.

Ray Lawler did much of the design work on the lathe from pictures in books, but he's quick to spread the credit. He's consulted frequently with ornamental turners Frank Knox, Walter Balliet and Daniel Brush. Knox, a long-time enthusiast, has done a great deal to make ornamental turning known outside the tiny circle of lathe owners (*FWW* #4, pp. 46-49). Balliet, a retired tool-and-die maker, built his own machine, and Brush owns one of the most complete Holtzapffels in the world. An eager and talented staff at Lawler Gear wrestled with various technical problems, and all are anxious to help work bugs out in several months field testing before the first production run.

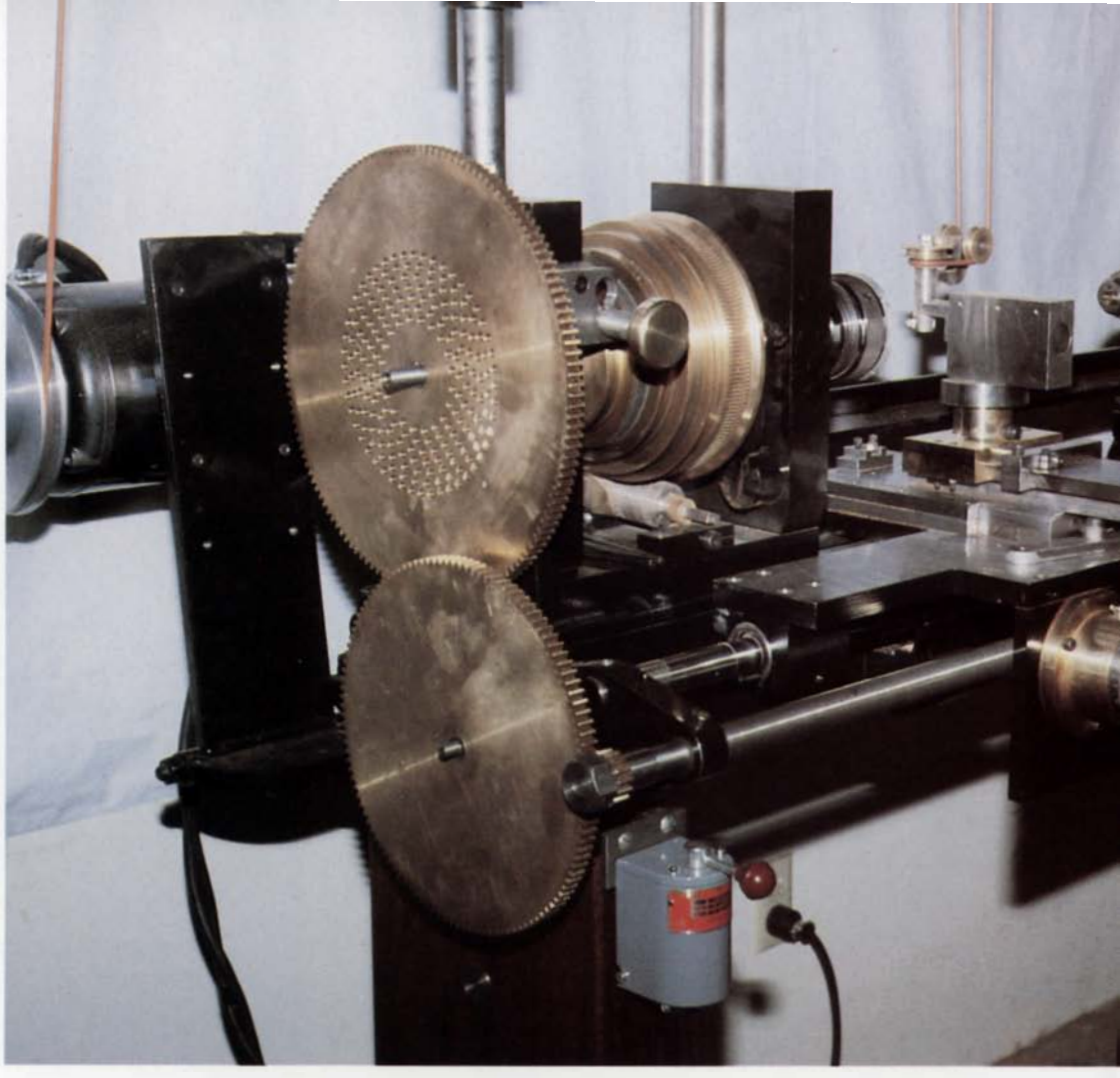
Because the old lathes are so scarce, it's difficult to estimate demand for the new ones, but being the only producers of ornamental lathes in the world is a healthy market position. Sales, though, seem to be icing on the cake for the Lawlers. "If we don't even sell a single machine," Ray told me, "we've had a lot of fun researching it. And we've got one to play with ourselves." □

Roger Holmes is an associate editor of Fine Woodworking. *For more information contact Lawler Gear Corp., 10220 E. 65th St., Kansas City, Mo. 64133.*

Lawrence Okrend



Lawler's new ornamental lathe is larger and more convenient to operate than its 18th- and 19th-century ancestors. An electric motor, rather than foot-powered treadle, drives the headstock as well as the overhead counterweighted pulleys which operate cutting frames mounted on a slide rest on the lathe bed. Brass gears mounted on the headstock (right) drive the work and the slide rest for spiraling. Hundreds of indexing holes in the gears and brass pulleys position work for making a staggering variety of patterns with the machine's cutting frames.

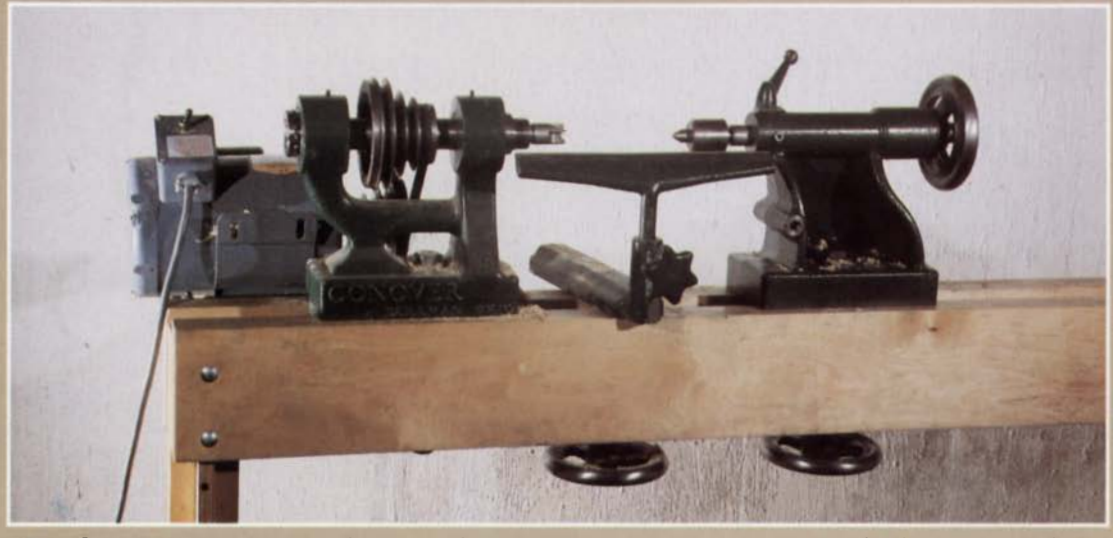


Buy the parts, build the bed

by David Sloan

If you've always wanted an extra-long-bed lathe, or one that knocks down for easy hauling to craft shows, this new lathe, designed and built by Conover Woodcraft Specialties (18125 Madison Rd., Parkman, Ohio 44080) is just the thing. For $895, Conover gives you a cast-iron headstock, tailstock, motor bracket and tool-rest assembly (he sells the parts separately, too) designed to mount on a wooden bed. The bed can be long, short, or any style you like, because you build it yourself.

The headstock can swing 16-in.-dia. stock over the bed—larger if you build a gap bed. There's no outboard spindle, but you can slide the headstock out to the end of the bed for turning tabletops and the like, although you'll need to move the motor mount and rig up an outboard support for the tool rest. The hefty 1¼-in.-dia. spindle is fitted with a 4-step pulley. Mounting an additional 4-step pulley on the motor shaft will give you a range of speeds from 600 RPM to 2300 RPM.

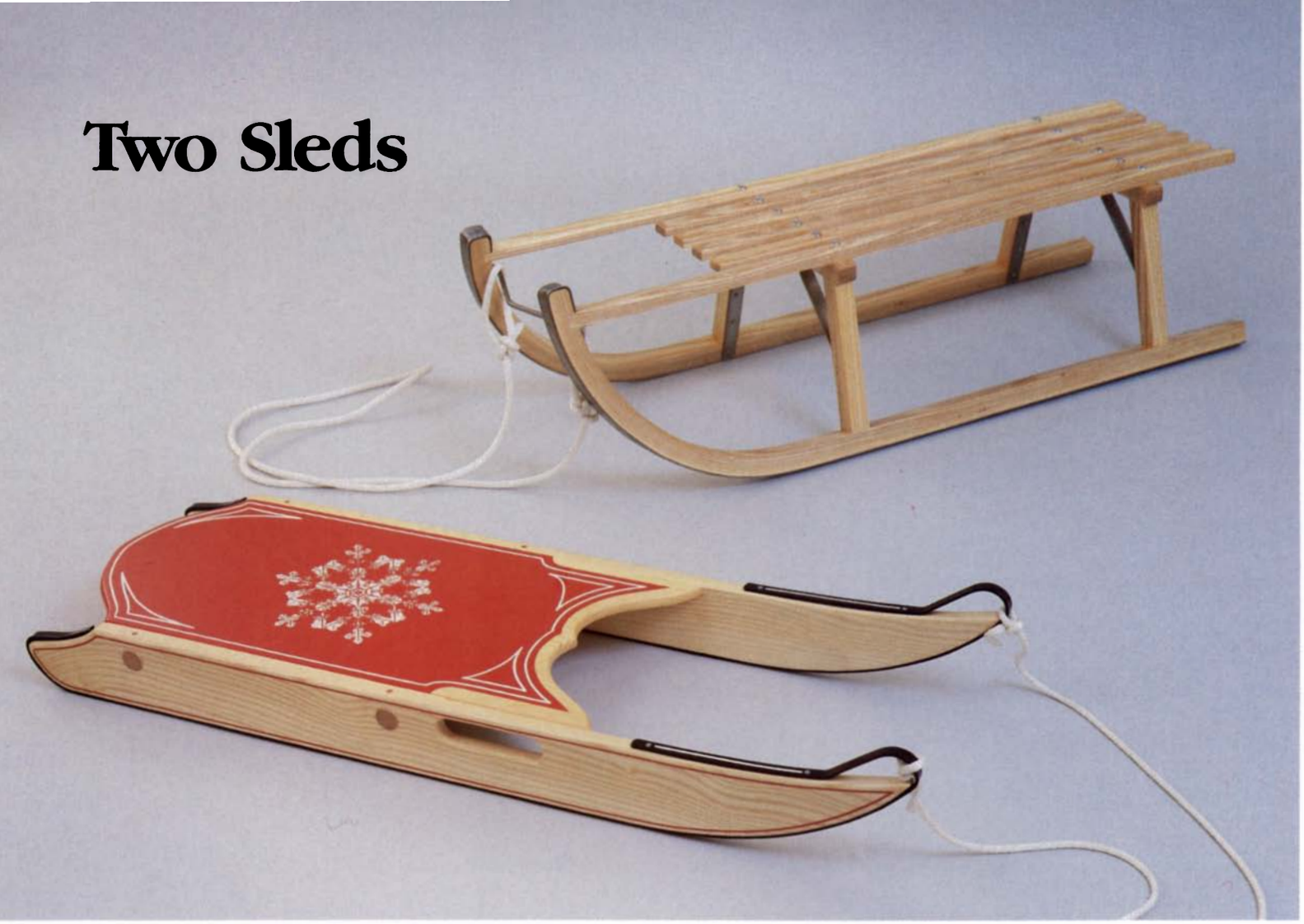


With Conover's new headstock, tailstock and accessories, you can custom-build your own lathe. Instructions for making the plywood bed shown here are given in the manual.

For a few weeks, I tried out a borrowed lathe mounted on the glued-up Baltic-birch plywood bed suggested in the owner's manual. The bed was rigid enough for light work, but needed more weight for roughing-out bowls. Adding a few hundred pounds of sand would solve that problem fast. The lathe itself is good quality and feels solid. □

David Sloan is an associate editor of **Fine Woodworking.**

Two Sleds



To survive a breakneck dash down a snowy slope, a sled's structure must be robust but relatively light, criteria met by both designs pictured here. Jonathan Shafer's Austrian sled, top, has laminated runners buttressed by steel underpinnings. John Sollinger's simpler hardwood clipper, below, was inspired by traditional 19th-century New England designs.

Shiny paint dresses up Vermont clipper

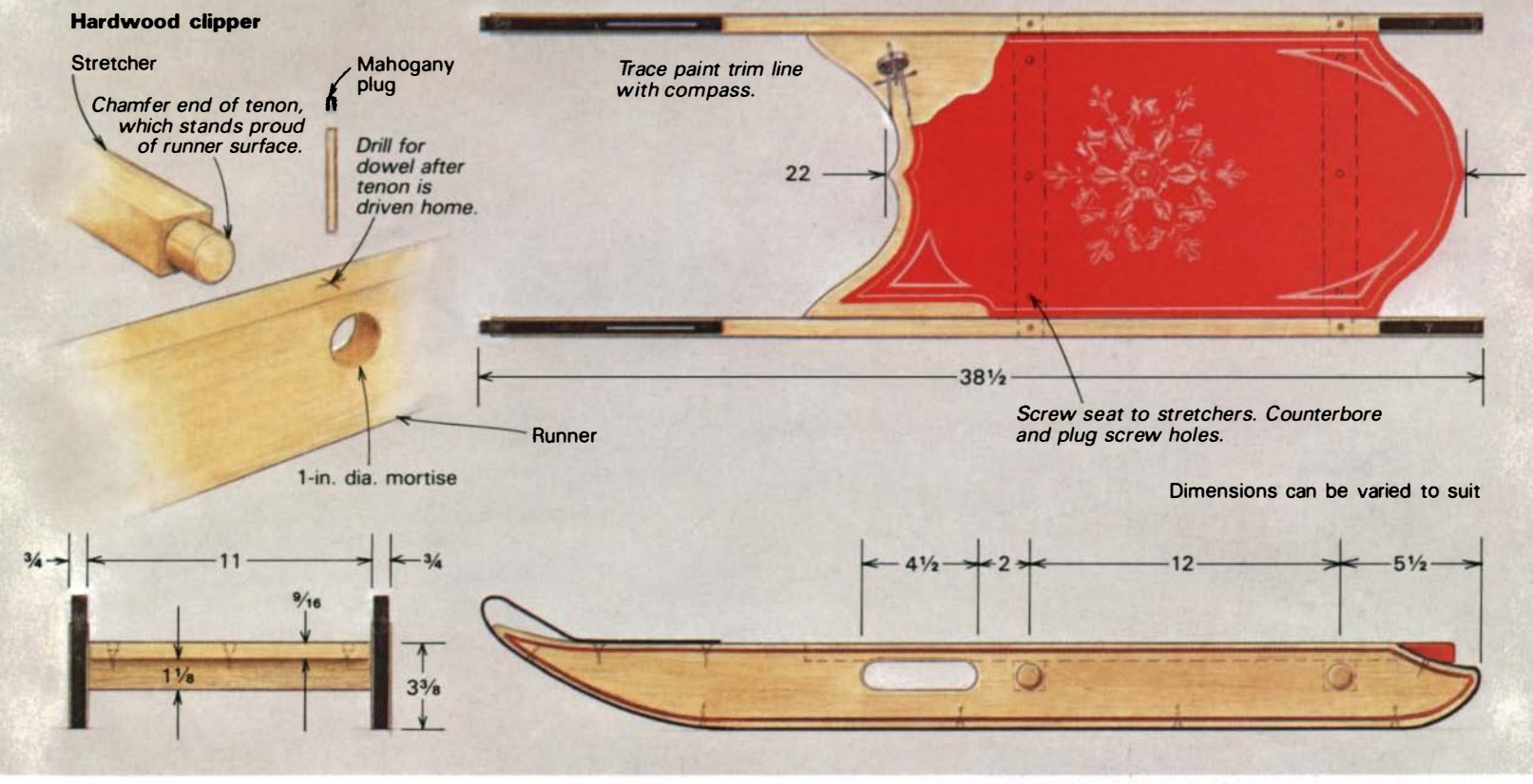
by John Sollinger

I'd been employed as a full-time woodworker for most of my life and the work had always been satisfying. But ever since my wooden-model building days in grade school, I had always wanted my own shop. Yet I never knew quite what direction my design and building efforts should take. One day about six years ago, my wife suggested I stop talking about it and actually do it. She even had the product: wooden sleds.

Because I live in snowy Vermont, sleds have always been objects of wonder and beauty to me, natural enough, I suppose, from an object that earns its keep toting firewood and groceries yet can still carry passengers on a heart stopping joyride down a steep slope. The design inspiration for the sled shown here came from a couple of magazine articles describing styles of sleds produced in this country during the past century and a half. Substance was added to the style when a neighbor took me on a private tour of the nearby Shelburne Museum's collection of antique sleds and sleighs. The photographs, dimensions, and notes on construction details taken from the sleds at the museum led us to choose the hardwood clipper as our first sled project.

I began three sizes of clippers and finished the smallest in time for my daughter's first Christmas in 1980. An enthusiastic reception encouraged us to establish the Vermont Sled Co. We later added a rocking Holstein cow and some smaller items, but the sleds remain my favorite product. The clipper is handsome, simple and extremely rugged, all of which make it ideal for small-shop production. It's composed of five pieces of wood—a frame consisting of two stretchers tenoned into two runners and a seat or platform whose chief function is to keep the sledder from falling through to the snow, but which also strengthens the frame. The sled's real strength lies in the pinned tenons that join the stretchers to the runners. It's an attractive detail and capable of surviving the constant pounding sleds must endure. Since the runners are fixed, you steer by dragging a heel or toe (depending on riding position) on the side you want to turn toward.

The drawing on the facing page shows construction details. Dimensions can be scaled up or down for any desired size or function. Our sleds range from 32 in. long by 10½ in. wide to 45 in. long by 13 in. wide. Our largest sled, the Long Rider, has a slatted seat and the runners are pierced for lightness and looks. We use ash for the runners, sugar maple for the stretchers, white pine for the seat and hardwood dowels capped by mahogany plugs for pinning the tenons. The runners are shod with mild steel bar stock, available at hardware stores. The sleds are finished with a clear satin-finish polyurethane and



An extra runner, left, serves as a bending form for the sled's steel shoes. Bent cold, the steel is coaxed with a hammer where overbends are required. To paint the seat, Sollinger masks with tape to layout lines struck with a compass. Once the enamel has dried, he paints pinstripes with a striping wheel guided by hand or, where practical, a straightedge.

over that I spray a high-gloss exterior enamel for color.

Select a board for the runners wide enough to lay out both, top to top—that way color and figure will match. For obvious structural reasons, avoid checks or knots. We bandsaw the runners out of 4/4 stock before thickness planing and we use a pattern to guide final profiling on the shaper and overhead router. All sanding, except final touch-up, is done at this time using a pneumatic sander. Round mortises for the stretcher tenons are drilled after sanding, to keep the edge of the hole from rounding over, ensuring a crisp joint. We cut the stretcher tenons with a chucking tenoner that produces a 1-in.-dia. tenon with a square shoulder, however, you could just as easily turn the tenon on a lathe. Tenon length should be ⅛ in. longer than the thickness of the runner so it will stand proud of the runner's surface. Before assembly, we chamfer the end of the tenon on a disc sander to produce a nice decorative touch.

Pine for the seats is glued up then planed to 9/16 in. before being bandsawn to shape. We glue and screw these seats cross grain to the maple stretchers which is, strictly speaking, not good construction practice. However, we have had no problem with cracking because we avoid checked or figured wood and glue up only when the humidity is in the 40% to 60% range. That way the seat will neither shrink nor swell enough to cause problems. If you are concerned about the seat cracking, you could skip the glue and fasten it with screws through slotted holes, but the sled will not be as strong. You could also make a slatted seat instead of a solid one.

Once the sled is assembled and sanded with 220-grit paper, you can finish as desired. We apply a coat of satin polyurethane (made by Zip-Guard), let it dry, sand with 220-grit, then spray a final coat. If you don't have a spray rig, brushing will give acceptable results. We use satin polyurethane because it's easy to apply and the enamel for the seat adheres well to it. For the seat's glossy finish, we use an oil-based enamel called Lustaquick made by Kyanize in Everett, Mass. 02149. Local paint stores can order this material and it is worth the wait. The paint has a high solids content and whether sprayed or brushed, it produces a beautiful, durable finish in one coat.

We mask the sled, spray the main color area and, when it has dried, paint the pin stripes with a striping wheel ($11.75 from Brookstone Co., 127 Vose Farm Road, Peterborough, N.H. 03458, catalog number 2812 or from auto-body supply stores). Practice with the wheel before tackling the sled. Good results can also be had with an appropriate-sized sword-striper brush, thinned paint

and a steady hand. The snowflake pattern on the seat is taken from a book by W.A. "Snowflake" Bentley, a Vermont farmer who photographed thousands of snowflakes as a hobby during the 1930s. We had a silk screen made to transfer the pattern. For just one sled, you could make a paper stencil and paint it by hand or hand letter a child's name as we are frequently asked to do.

To complete the sled, add steel shoes to the runners. The shoes are of ⅛-in.-thick by ½-in.-wide mild steel, cold bent around a form made from an extra runner screwed to an 8/4 pine base. I added hold downs and bumps where overbending is required to counteract the steel's natural springiness. Mild steel is flexible enough to take sharp bends without breaking and it drills easily. Before bending, we bore and countersink for the screw holes and grind off the flash. The steel is placed in the jig and pulled around, using a hammer and wood block to coax it into the tighter curves. Once bent, it's finished with a rustproof primer and a high-gloss enamel finish coat. Screw the shoes on, add a suitable length of rope and your sled is ready for use.

Our three original sleds have seen four Vermont winters. They're left outside from the first good ground cover (usually November) to the last possible day we feel they can still be used in late March. Off-season storage is in the rafters of our barn where the temperature and humidity reach rather unpleasant extremes. They get rained on, climbed on and generally abused. These sleds are tough and have far exceeded our expectations for usefulness and fun. We fully expect them to become valued possessions of our grandchildren. □

With his wife, Sharron, John Sollinger operates the Vermont Sled Co. in North Ferrisberg, Vt.

Austrian design has laminated runners

by Jonathan Shafer

One of my fondest childhood memories is of the Christmas I received a wooden wagon with removable sides. After many years of driving it with one leg out for propulsion, hauling people and things and using it as a saw horse in the yard, the wagon was retired to the garage while I finished growing up. I have since rescued the wagon, cleaned it up and built new removable sides. The project gave me the urge to create something unique for my own son, an object that would be worth rescuing from my garage someday. So, with my son's joy of the outdoors as apparent as my desire to graduate from straight-plane woodworking, I built an Austrian sled, based on a picture I saw in an L.L. Bean catalog.

As the drawing on the facing page shows, the sled has a slatted seat attached to a pair of frames that join the runners. The runners themselves are laminated using the form shown or, if you prefer, they can be steambent. In either case, you'll need to construct the bending form, as well as the jigs to cut the angled mortise and tenons that hold the frame together. The bending form should be made longer, both vertically and horizontally, than the runner so the laminae can be clamped to it. The excess runner length is cut off later.

I laminated the runners out of white ash but any species with good bending characteristics and straight grain will do, such as the oaks or hickories. I made my laminae ¼ in. thick so only four were required for each runner. Laminae this thick may have a tendency to spring back and if this becomes a problem, use thinner strips. If you soak the wood in hot water first, it will bend easier, but then you must clamp the strips in the form and let them dry overnight before gluing. I used epoxy glue for the runners, which, in addition to being waterproof, is good at filling any small gaps between the laminae.

The mortises in the runners that accept the uprights were cut on a shop-built horizontal router table, like that shown in *FWW* #42, pp. 50-51. So the sled will have good torsional strength, the uprights are splayed out 13°, requiring angled mortises where the uprights join the seat crosspieces. I devised the router mortising jig shown in the drawing to cut the angled mortises. I cut the tenons for the uprights on the tablesaw, using a dado blade and with the miter gauge set to 77°. To position the shoulder cuts precisely, I fastened a board to the miter gauge then clamped a stop block to it, referencing each shoulder cut against the stop block. If you don't have a dado blade, cut the tenons with repetitive passes over a regular blade, then clean up the cheeks with a sharp chisel.

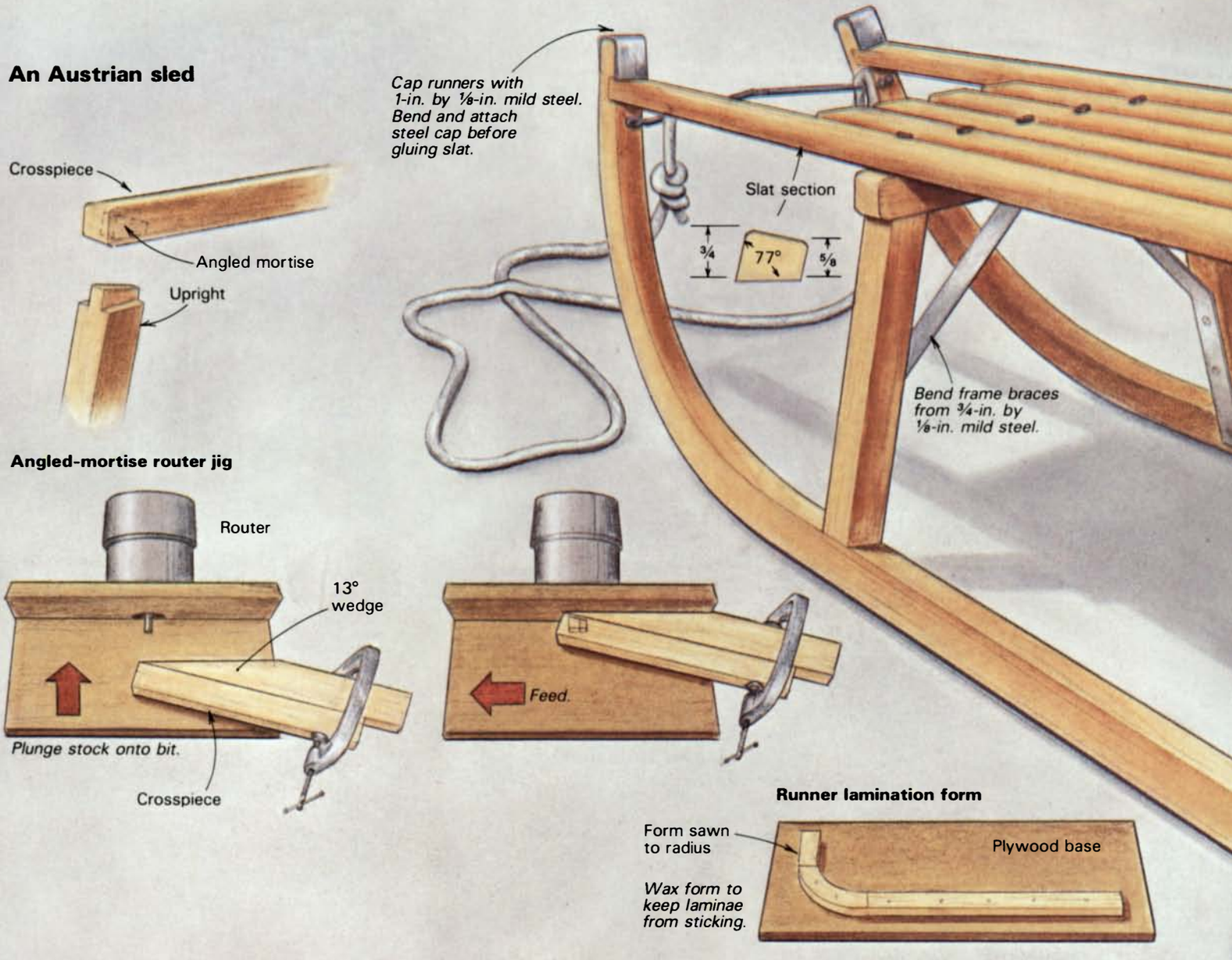
After a dry run to check the fit of all the joints, glue the two uprights into each seat crosspiece using the fixture illustrated. Before applying clamp pressure, square the frames by measuring diagonally from the upright/crosspiece intersection to the inside of the crosspiece shoulder, adjusting the frame until the measurements are equal. When these joints have cured overnight, use the same fixture (move the cleats to accommodate the runner) to glue the uprights into the runners.

The seat, or deck, is composed of six slats. The two outermost ones are wedged-shaped in section and are let into an open mortise in the top inside edge of each runner. I found it easiest to mark the slat's cross section right on the runner then saw and chisel the mortise by hand. However, I didn't glue the exterior slats in place until after I'd fitted the steel runner caps so that I could butt the steel tightly against the wood. The four interior slats are rectangular in section but their edges are radiused with a ¼-in. roundover bit. All of the slats are attached to the crosspieces with flathead brass woodscrews and decorative washers.

Finish up by attaching frame braces, a tow bar and steel caps to the runners. The frame braces are of ⅛-in.-thick steel, ¾ in. wide and the runner caps are the same steel, 1 in. wide; the tow bar is a ¼-in.-dia. rod. Since I didn't have access to a forge, I cold bent the steel where possible. However, to bend the caps sharply around the tips of the runners, I heated the steel to a cherry-red glow in a barbeque grill then bent it around a wooden block identical to the runner's cross section. I also heated the ends of the tow bar and flattened them with a hammer to yield a better bearing surface where the bar contacts the runners. The metal parts are attached to the sled with countersunk wood screws. Three coats of Deft Exterior Clear Stain #2 polyurethane, applied over wood and metal parts, completed the project. □

Jonathan Shafer lives in Columbus, Ohio, where he works in the construction industry. The commercial version of the sled is made by Paris Manufacturing Co. in South Paris, Maine.

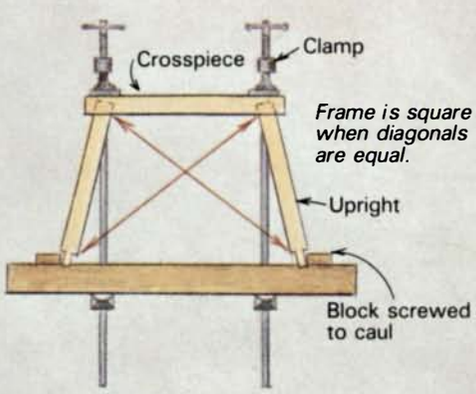
An Austrian sled

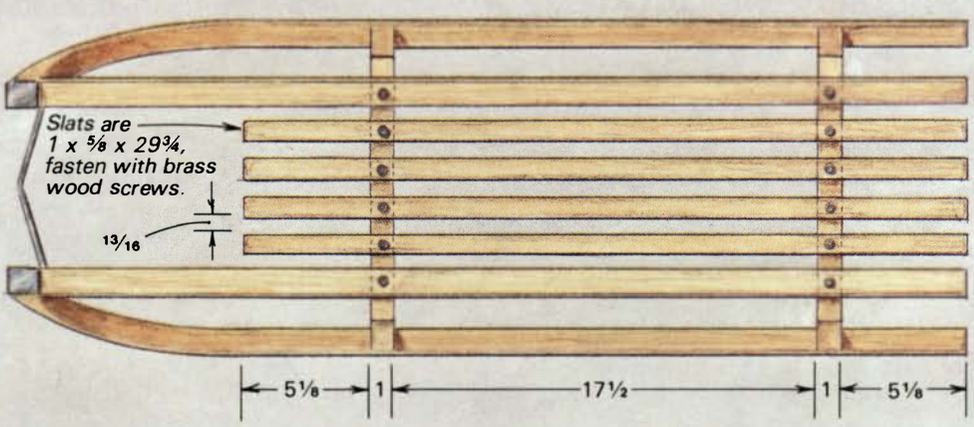


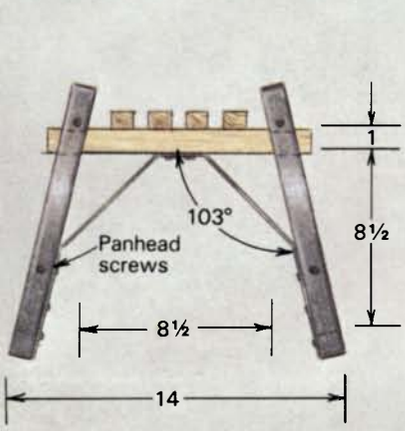
Angled-mortise router jig

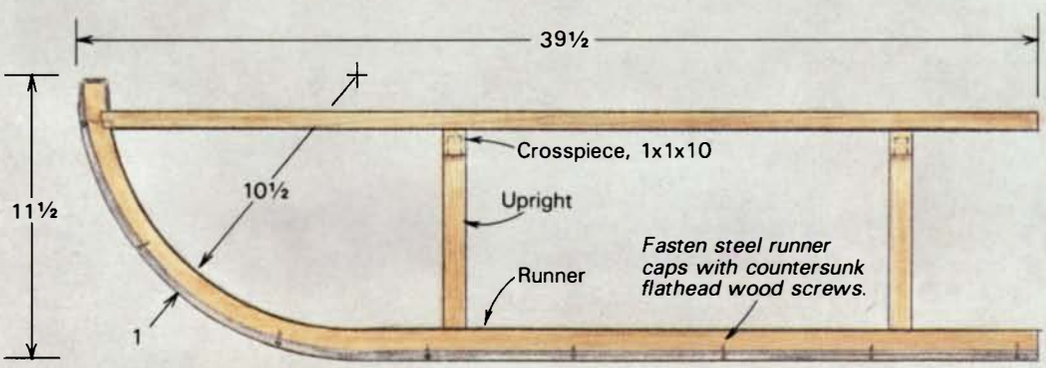
Runner lamination form

Upright and crosspiece glueup





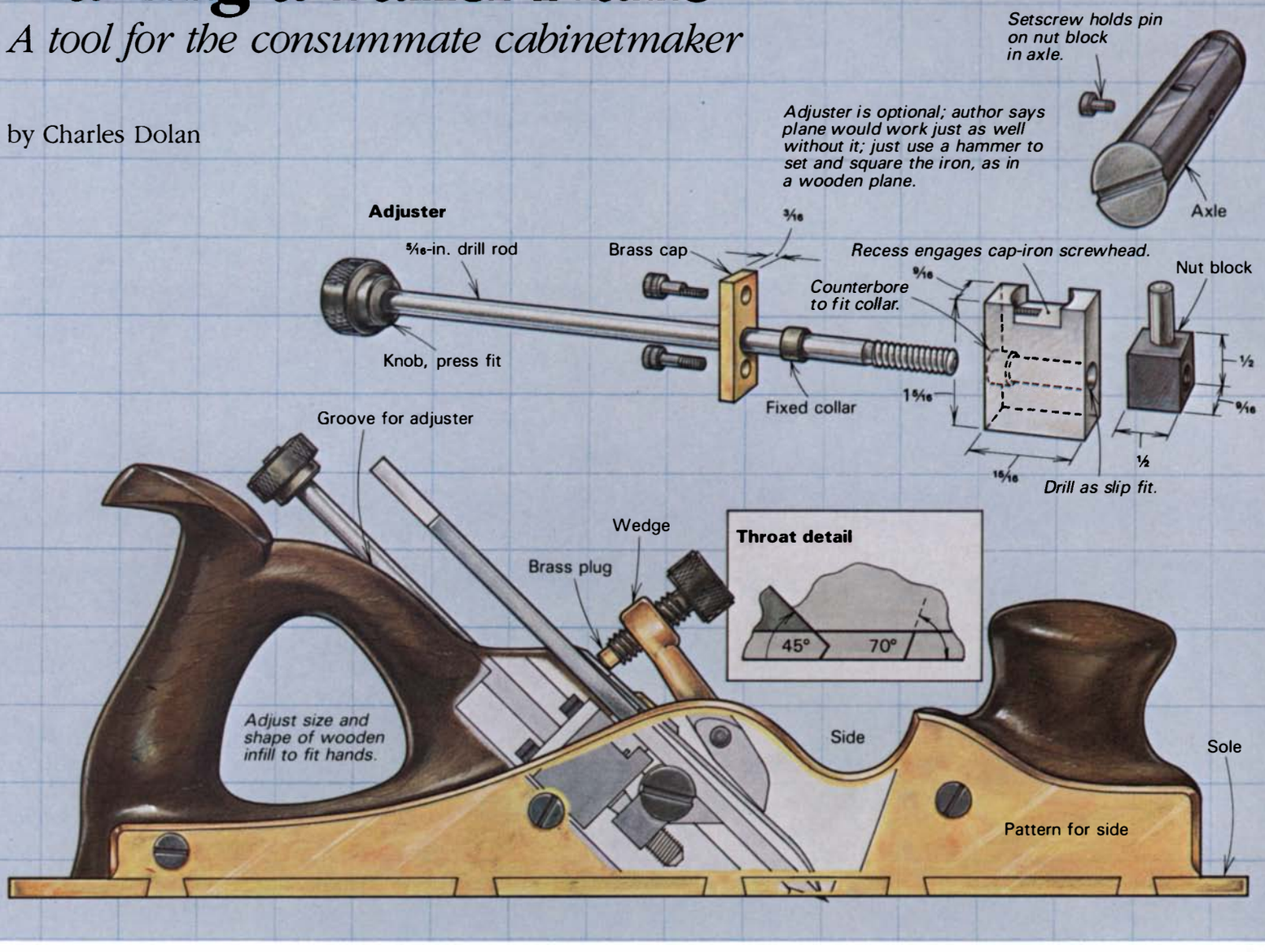




Making a Panel Plane

A tool for the consummate cabinetmaker

by Charles Dolan



Some years ago I was fortunate enough to acquire an old cast gun-metal smoothing plane made by J. Rodgers of Minshull Street, Manchester, England and bearing the date 1886. The plane, however, lacked its original iron, and after much searching in vain, I finally decided to try making one for it myself. The resurrected plane performed so well that I thought I'd attempt to make a companion for it—a 16-in. panel plane of similar design—from scratch. A panel plane is the cabinetmakers' refined equivalent of the jack plane used by carpenters and joiners.

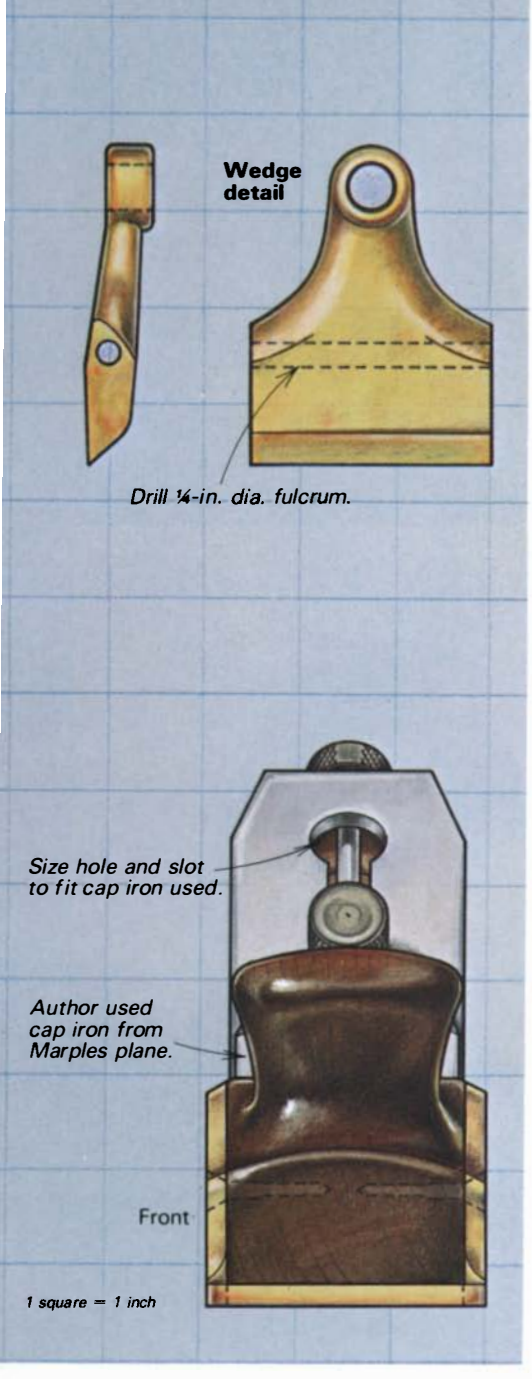
At first glance, making a tool such as this might seem too daunting, yet I found the task pleasant on the whole, and ultimately very rewarding. I use the plane almost daily in my work as a specialty contractor and restorer, and I continue to be amazed at the way this hefty tool seems to sit down on the wood, leaving me free to push and control it rather than having to force the iron into the work.

It is very unlikely that a tool such as this could ever be made commercially today and few of the old ones ever find their way to the marketplace. When new, this grade of plane cost several times the price of the Stanley/Bailey tools, which were, in turn, much more expensive than the wooden planes in general use. Planes like this were the prerogative of the most conscientious craftsmen executing consummate work to the highest standards.

The first step is to make the iron, a process described on p. 63. Those who have already made steel tools will be quite familiar with how it is done. This article, however, is more concerned with cutting and soldering the body and flattening the plane's sole. Even if you never make a plane, flattening is a process that you can use to bring any plane sole to very close tolerances, something the factories can no longer afford to do.

Cutting the body—My first inclination was to have a casting made, as the idea of making a wooden pattern and having someone else translate it into shiny gun-metal was particularly appealing. However, none of the foundries that I approached would cast fewer than five pieces (at substantial cost). Plane makers at the turn of the century often made plane bodies by joining the sides to the sole with through dovetails in the metal. I decided to do the same, soldering the joints together. This proved to be a first-class way to fabricate a body in brass and I am sure that it will do just as well in steel for those who prefer it.

I bought one bar of rolled brass 3 in. by ¼ in. by 16 in. and two of 2⅝ in. by 3/16 in. by 14 in. The two smaller pieces had been cut from sheet and accordingly required some flattening with a ham-



A plane like this is comparable to the highest grade commercial tools at the turn of the century. Such tools are scarce, and rarely reach the marketplace, but you can make one from dovetailed brass plate. The author spent many hours working on the screw-type adjuster (right), but realized at the end that he seldom changed the set of the iron. He recommends that readers omit the adjuster and simply set the iron's depth and lateral adjustment by tapping with a hammer, as in a wooden plane, with the wedge screw snug but not fully tight.

mer. [Conklin Brass, 345 Hudson St., N.Y.C., N.Y. 10014 sells brass by mail order. The bars should cost about $70, postpaid.]

Using blue layout paint (a colored shellac that cuts down glare and allows you to see fine scribed lines), I marked out the sides very much as I would a drawer joint. I cut the narrow tails in the sides first and used these to mark out the broad pins in the sole.

A number of methods will work to remove the waste—jigsaw, hacksaw, jewelers' piercing saw, metal-cutting bandsaw, whatever is most convenient. Various files serve to work down to the layout lines. Files that have been used on steel don't work too well on nonferrous metals, and it is worthwhile having a set for each. The most difficult part of the job is to produce flat square lands between the tails on the side plates. I ground one edge of a 10-in. second-cut file (a medium-cutting file) to an angle that allowed me to clean out right into the corners (photo, p. 62).

When the tails are finished, use them to mark the sole. Rough cut first, then clean up with a four-square file with one of its sides ground smooth to act as a safe bearing surface. When the joints are as near perfect as you can make them, you can drill a line of holes across the sole to begin the mouth slot. Clean up the edges by filing, but leave the throat undersize for the time being, because final shaping will be done after the iron is fitted.

Soldering—Ordinary 50/50 solder is not in any way difficult to work with provided three requirements are met: there must be adequate heat, a good flux, and surgically clean surfaces, as shiny and clean as a guardsman's buttons. Wire the parts securely together and use some pieces of hardwood to spread everything square and true. You can provide sufficient heat by placing the work on one of the rings of an electric cooking stove at medium heat for half an hour. Bring the work to a heat where the solder will just go pasty but not run freely and then heat locally with a propane torch, flowing the solder into the joints all around. Use plenty of solder or it may not completely fill the joints (I had to reheat some spots with the torch and refill them). It is safe to ignore any runs or drips—they won't stick to the stove rings, and the excess can be filed away from the plane when it has cooled.

When all is run in, stand back, turn off the stove and leave well enough alone until cold. Moving the work too soon will cause frosted joints that will have to be heated all over again. Then remove all the excess solder and file the work flat.

Making the infill—I chose walnut for the infill as it is both strong and easy to work. I recommend a bed angle of 45° for the general work to be expected of this plane. This can be cut on the

Drawing: David Dann

Brass can be bandsawn with an 18-TPI blade (top left). The metal has been sprayed with layout dye, a colored shellac that cuts glare and shows fine scribe lines clearly. With both sides clamped in the vise (top center), bandsaw marks can be filed away. To reach into tight corners (top right), grind the edge of a file to an angle that will fit. For soldering, pre-heat the brass on a stove (left) until it reaches a temperature where the solder almost flows. Use a propane torch to bring each successive joint up to full heat.

To flatten the sole, test it on a reference plate of heavy glass spread with blue oil paint (left). The thin paint transfers only to high spots on the sole. File and scrape these areas down, then test again on the glass, repeating until the critical areas at toe, heel and throat are fully covered by blue (for the rest of the sole an even spread of about 70% is adequate). A metal scraper (above) is used something like a paring chisel, working in a crosshatched pattern. The tool takes a series of fine, powdery shavings about ⅛ in. wide.

tablesaw using the miter gauge. I next cut the grooves for the adjuster. I put a lot of time into making the adjuster, but have decided it was more trouble than it is worth. I'd advise you not to bother with one, but simply to adjust the iron by tapping it with a hammer when necessary. The set of the iron in this sort of plane is not changed very often anyway.

For the actual shaping of the handle and knob, I simply drilled through the block to define the important radii inside and out, then I gradually shaped the wood with rasps and files, checking the fit and feel often. There are much faster ways to shape a handle, of course, and anyone in a hurry will doubtless use his own methods. But the handle and knob, to me, are critical parts of the plane, and I wanted to get mine right.

Making the wedge—The wedge is cut from a solid slab of ½-in. brass by drilling adjacent holes around its perimeter (line drilling). I began the shaping with a big rat-tail file, then moved on to a half-round, a small flat file, and a smooth file for the finishing cuts. I then evened out the surface with 200-grit wet/dry paper.

It remains to tap the wedge for the screw, and drill a hole clear through it for its pivot pin, which is a length of ¼-in. drill rod with one end peened slightly so it is a friction fit in one side of the plane body.

The wedge screw is best made on a metalworkers' lathe but an alternative would be to epoxy a hardwood knob onto the head of a ½-in. socket-head screw.

Finishing up and flattening—Mount the iron in the plane and start to refine the size of the mouth slot. I feel that there has been a recent tendency to overstate the advantages of a very narrow mouth and would personally never have one thinner than 3/64 in. for a plane such as this, which will occasionally be required to "shift some stuff." Make sure that the mouth is square across the body and have the top of the front edge sloping away from the iron by a few degrees, as shown in the drawing on p. 60.

The last job is to flatten the sole. The heating of the body during soldering will inevitably have left some distortion, which will now have to be removed. The most suitable low cost way to flatten the sole of a plane is by filing and scraping, using a surface plate as a reference.

Flattening to a plate is a technique well worth learning as it allows precision flats to be put on any machine pieces or tools with just hand work and patience. You will need some good files and also a scraper, which can be bought quite cheaply or can even be made from an old file for nothing. You will also need a tube of artists' thalo blue or Prussian blue oil paint, some light oil and of course a surface plate.

If you do not expect to be doing much of this work, buy an 18-in. by 12-in. rectangle of plate glass, ¾-in. thick. To avoid twist, house the glass in a strong plywood box supported by only three feet. Plate glass is ground and lapped to quite fine limits of flatness to achieve optical truth and if treated carefully is more than adequate for this purpose—you should be able to flatten to

tolerances well under a thousandth. If you intend to do more serious fitting than that, I would advise you to buy a granite bench plate of the same size. Avoid all used cast-iron plates like the plague. These are very sensitive to abuse and there is no easy way of diagnosing or correcting faults. A piece of new glass is infinitely preferable to an old iron plate that may have been used as an anvil.

Fit the iron in the plane and tighten the wedge screw to stress the tool to working conditions. Apply a thin glaze of paint and oil over the surface of the plate and lightly rub the sole of the plane on it. The blue will adhere only to the high spots.

Carefully file these blue areas away. For control and precision, press the front of the file down with your left thumb, and file in short strokes right on the mark. When the first set of spots has been filed off, repeat the marking and remove the new ones. The high spots will increase in number and gradually spread all over the surface of the sole.

When the file begins to do as much harm as good, change to the scraper, which can remove fine, precise shavings. The scraper should be kept sharp and is used rather like a paring chisel being pushed into the work. By repeated marking and scraping, the spots will progressively become more numerous until they cover the whole of the surface. Work slowly and deliberately and crosshatch the cuts frequently. There is no denying that this is a tedious business, but it is, in fact, very reliable.

You can now strip everything down and finish file the metal parts. A good rub with 120-grit wet/dry paper will give a very smart finish to the brass. All the steel parts can be blued with cold gun-bluing solution if such meets your fancy.

You now have a tool that will last several lifetimes and which will constantly delight you with its performance. I hope that the use of the plane as well as the elementary fitter's skills that you have learned in making it will provide you with greater scope and more satisfaction in your trade. □

Charles Dolan lives in Montreal West, Quebec, Canada.

Making the iron

I feel that the principal reason old irons (and modern Japanese ones, for that matter) are held in such high regard is that they have great weight and thickness, and not that the steel is superior to modern alloy steel. For my iron I chose an alloy of carbon, manganese, chromium, tungsten and vanadium, a steel made in Sheffield by Sanderson Kayser Ltd., and sold as Precision Ground Flat Stock Oil Hardening Non-Distorting Pitho Alloy Tool Steel. Similar tool steels are available from any industrial hardware supplier and should work as well, as long as they contain tungsten and vanadium for toughness.

Blanks are available in a great size range—mine (18 in. by 2½ in. by ¼ in.) cost $18. There is still enough of it left for two more irons. The steel is sold in the annealed, soft state—22 on the Rockwell hardness scale. With a little patience, a good hacksaw, some sharp files and a drill press, an afternoon is all you need to make as good an iron as can be had at any price.

Much has already been said about making tools in past issues of this magazine, so I will concentrate on some fine points. I decided to hacksaw the iron to length at a 25° bevel angle, in order to save a lot of filing afterwards. Not much has been written about hacksawing. A rigid frame and a good high-speed-steel blade make a lot of difference. Saw with long full strokes without forcing the blade. Some 3-in-1 oil in the kerf will ease friction. If the blade begins to lead off the line, lightly dress the teeth on that side with a whetstone to get the blade going straight again. If it continues to run out, put in a new blade and saw from the other edge until the cuts meet.

To file the bevel, position the iron with the bevel uppermost and horizontal in a vise. I'd recommend a clean, sharp 14-in. mill-bastard file for this job. It helps a good deal to rub chalk over the faces of the file and use it only until it starts to slide. Then clean the file with a file card and remove any "pins" with the point of a soft iron nail. Then chalk the faces again and continue.

You will by now have seen how much effort is needed to work this stuff, but there should be some light at the end of the tunnel. You must next mark out the size and position of the hole and slot for the cap-iron screw. I used the cap iron from a Marples plane.

Drill a hole the width of the slot at the bottom and one big enough to clear the head of the screw at the top. Back the iron with a piece of mild steel to prevent the drill from grabbing when it breaks through. Then drill carefully with the drill running slowly, and use enough pressure on the quill to make the drill really cut. It is essential to clamp the work firmly. Trying to hold the work free-hand would be very dangerous. The swarf will be coming off the drill at a very high temperature and will certainly burn skin. Lastly, be sure to wear good eye protection.

The slot is cleared by drilling a row of adjacent ⅛-in. holes around the perimeter of the piece to be removed. When the row is complete the cutout will fall free, looking something like a metal centipede. If any of the holes don't quite touch each other the waste can be cleared by sawing or chiseling. The edges of the slot are cleaned up by "drawfiling" smooth, a technique in which the file is used crossways along the work, as explained in *FWW* #46. Next file the top corners of the iron at your chosen angle and finish-file all the edges smooth. Do all the filing now as the next step is to harden the steel after which it can be shaped only by grinding.

A recent article in *FWW* #50 explains basic heat treating, but this plane iron is rather heftier than most of the tools the author discusses. I found I needed a charcoal barbecue force-drafted by a hair dryer to generate enough heat. Also, I tested the temperature of the steel by using a magnet, because it is very difficult to discern color changes in the midst of the fire. I attached the magnet to a longish wire, and gradually fanned the flame hotter, testing from time to time until the magnet was no longer attracted to the steel. Then I quenched the iron in 2½ gallons of old motor oil in a 3-gallon metal bucket. Quenching produces all sorts of spectacular fulminations—have the bucket's lid handy in case the oil catches fire, and on no account use a plastic bucket.

If you have used the magnet correctly and not overheated the steel, no scale will have formed—the iron will come out of the oil clean and smooth, apart from some minor surface staining. I cleaned the surface with 200-grit wet/dry paper and tempered the iron in a kitchen oven at 200°F for two hours. This brings it to a hardness of about 60 RC, tough enough to be driven through a nail without chipping and capable of taking an edge you could shave with. Despite the myths about laminated irons, Victorian blacksmiths, magic swords and hobbits and dragons, I am certain that properly heat-treated modern alloy steel is in every way superior to the old stuff. —*C.D.*

Kerbschnitzen

Two-knife Swiss chip carving

by John Hines

It never occurred to me that I could become seriously interested in chip carving—a skill I always associated with primitive folk objects covered with rows of incised squares and triangles repeated in boring symmetry. Then I saw Wayne Barton's work. It was so crisp and lively that it seemed to leap off the table as I walked by his exhibit at a woodworkers' show in San Francisco two years ago.

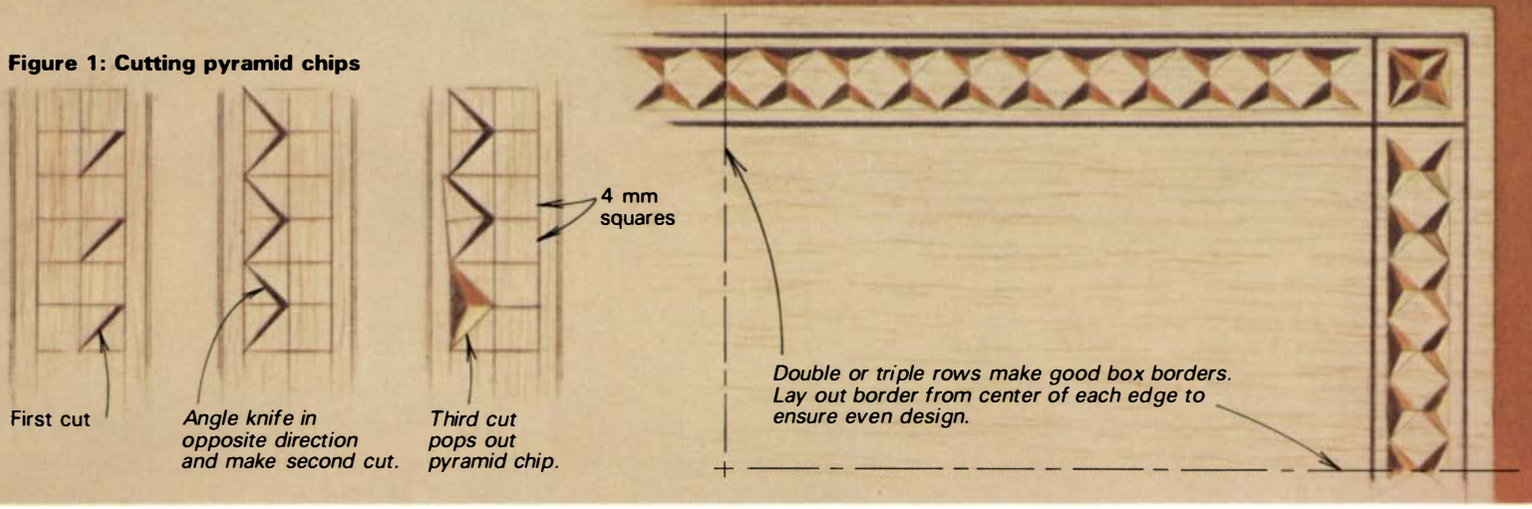
Like beautiful music, the elements of his carvings flow smoothly without breaks from one segment to the next, often creating stunning curvilinear forms. Even though the pattern of each carving is generally geometrical and symmetrical, the cuts—because they are so perfectly executed—have the boldness of a Picasso stroke. And, like all true artistry, his work gives the impression of effortlessness.

Surprisingly, Barton uses only one short-bladed knife to cut nearly all of his intricate designs, most of which are incised on the lids and sides of jewelry boxes. The designs are based on series of pyramids, triangles, many of them elongated, and gracefully flowing sweeps. Each facet of the design is created by making two or more converging knife cuts into the wood and popping out a chip. No matter how intricate the design, Barton cuts each wall of the facets with a single stroke. No trial cuts. No clean-up cuts. Just one bold incision to sever the wood fibers cleanly from one end of the facet to the other.

Barton, a professional carver who learned his art in Switzerland, says that the key to mastering chip carving, which he calls *kerbschnitzen* (Swiss for engraving carving), is learning how to hold the knife in an unvarying, cocked-wrist position. This ensures a consistent 65° cutting angle and clean cuts. Then all you have to do is practice until you learn how to make the shallow cuts (seldom more than ⅛-in. deep) meet at precisely the same point at the bottom of each facet.

I was dubious as my classmates and I settled down for five days of instruction at Barton's Park Ridge, Ill., home near Chica-

Figure 1: Cutting pyramid chips



go last summer. The four of us marveled at the carvings in the home—boxes, chair backs, kitchen-cabinet panels—as well as dozens of samples he had carved onto small ½-in.-thick basswood blocks. "You will be able to execute all of these carvings by the end of the week," he said, as he gave each of us several basswood blanks, a cutting knife, and a "stab knife" that is used to impress short, wedge-shaped lines into the wood to enhance some designs. Barton prefers basswood because of its softness, tight, even grain and light color, but you can use just about any wood, although it's difficult to cut woods that are very hard or have very pronounced annular rings.

The two Swiss-style knives Barton uses with his students were specifically designed by Alpine craftsmen for chip carving. The short blades are easy to manipulate, take a keen edge, and resist bending and breaking. The rectangular handles are easier to grasp than the round- or oval-handled models sometimes sold as chip carving knives. Besides the $20 knife set, the only equipment needed is a pencil, a compass, a metric ruler and an eraser.

The sides and lids of Barton's jewelry boxes (facing page), show delicate and complex patterns. Barton cuts the curved pattern with his knife held at a 65° angle to the wood. The key to the kerbschnitzen *is to lock your wrist as shown, so your thumb and fingers guide the cut. Hold your elbow close to your body for better leverage and control. Barton works on his lap and rotates the wood to cut in different directions.*

The first thing you must learn is how to hold the knife, as shown in the photo, below. It'll feel awkward, but be persistent. Wrap your fingers around the handle, with the first joint of your thumb riding on the lower end of the handle near the blade. Cock your wrist out until your thumb is in a fairly straight line with your forearm. With your knife in this position, bend your hand down until your thumb tip, index-finger knuckle and the blade tip form a fairly rigid tripod to support your knife and hand as they move over the work. Seen from the side, the edge of the blade resting on the wood should look like a capital V. To make the same cut on the opposite side of the V, roll the knife about 90° and move your thumb to the top ridge of the blade without changing your wrist position. The hand and knife move as a unit—never try to pull the knife toward your thumb, as you would if you were peeling potatoes. Part of your hand or finger must be touching the work as you cut, and keep your elbow close to your body for better leverage and control. If you want to cut long curves, keep turning the wood as you carve, rather than changing your hand position.

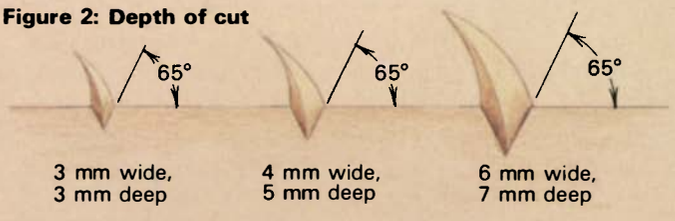
Since you're using only two tools, you can work without a workbench, with its hold-downs and other vises and faults. You can carve just about anywhere, in a comfortable sitting position with the work held in your lap by your non-carving hand. You don't even have to worry about holding the work flat because the position of the hand and knife relative to the work never changes, no matter how many times you shift the work in your lap to find a comfortable position, reach a tight spot or take advantage of the light.

In class we began carving by cutting tiny pyramid chips, probably the most frequently encountered shape in chip carving, as shown in figure 1. "The biggest problem," Barton warned us, "is that unlike chisel carving, once you have committed your blade to the wood, rarely can you alter or cover up a mistake—or a change of heart." You must get each cut right the first time, a tricky operation because the depth of cut varies along the incision. Hold the tip of the knife at the top of the pyramid (the proper 65° cutting angle is guaranteed if you're holding the knife correctly), and stab down to the full depth. Roll the knife to make the same cut from the opposite angle and stab again. Go back to your original knife angle and slice along the triangle to free the chip.

Though getting the correct depth on the first attempt is not easy, it is a skill that comes with practice. As a rule, the wider the chip, the deeper the cut, as shown in figure 2, p. 66. You can see the width of the chip on the pattern you've drawn on the wood. I have found—after cutting quite a few chips—that I now have a pretty reliable feeling for the amount of knife pressure needed

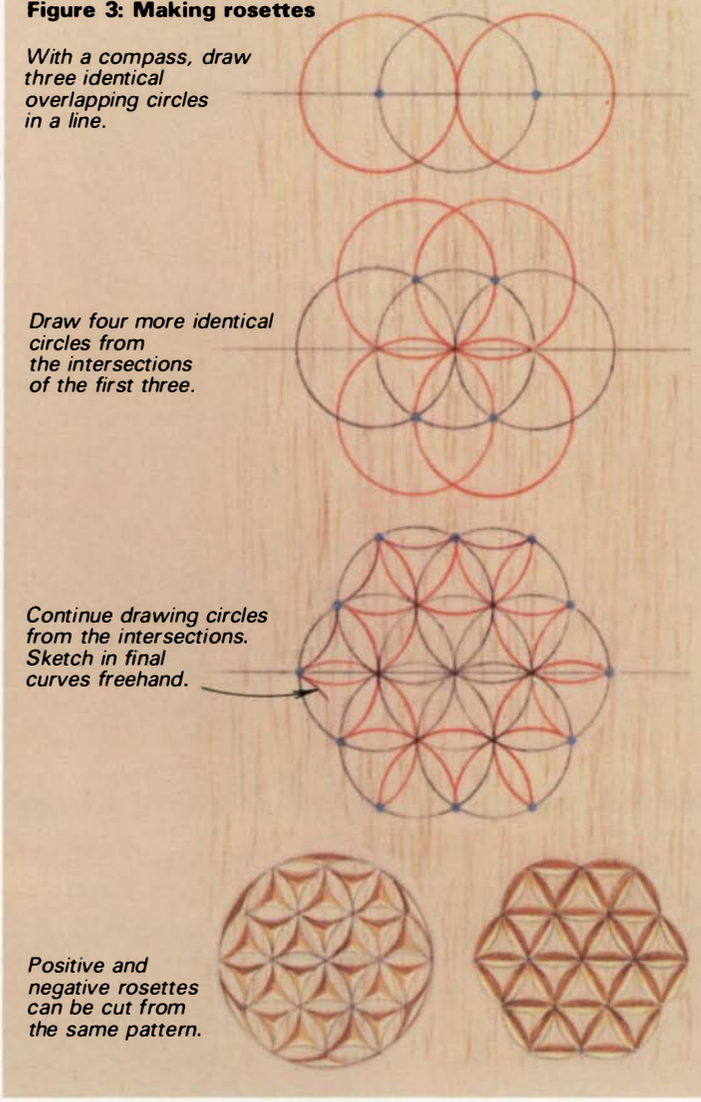
Barton begins his cut at the center of the rosette and pulls his hand and knife as a unit along the pattern line (left). He forces the blade down in a gentle arc to midpoint of the line, then gradually eases it up toward the surface. Then he rotates the piece and cuts along the curved rim (center). A final cut from the rim to the center frees the elongated triangular chip (right).

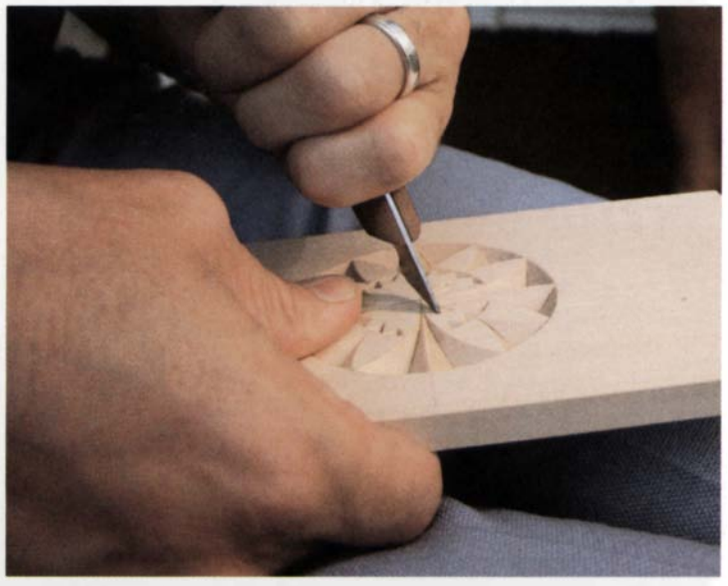
Figure 2: Depth of cut



It takes time to develop the knack of making both cuts meet exactly at the bottom of the V-groove. The depth of cut depends on the width of the V, as indicated by these sample cuts, but the knife angle is always 65°.

Figure 3: Making rosettes





The stab knife's thick edge is ideal for cutting and wedging fibers apart to create decorative indentations.

to achieve the correct depth for various sized chips. If the cuts are too shallow, the chip will not pop out. Then you have to re-enter the incision and try to sever the fibers that were missed the first time. If you don't exactly match the first angle, and you probably won't, you will create a second line on the carved wall which will look like a scar in the finished piece. If you cut too deeply, you create an undercut that robs a work of its crisp look and could weaken the delicate areas.

To remove a crescent, another common design, ease the knife tip below the surface as you pull it along the pattern line. As the blade approaches the other tip of the crescent, reduce the downward pressure and bring the knife tip up so it surfaces precisely at the tip of the crescent. Rotate the piece and cut the wide rim of the crescent. Rotate the piece again and make another cut right next to the first one to free the crescent-shaped chip. If you're cutting a curve with a small radius, you'll have to raise the knife on its tip, leaving a minimum of blade in the wood for a smooth cut. If you want to make a straight trough, cut along the line freehand rather than try to fit your hand and blade along a straightedge. You'll cut amazingly straight if you concentrate on the line right in front of the cutting edge. Your hand will follow your eye.

If you do all of your cuts correctly, there is a special reward: the chip springs from the work like a prisoner released. By the end of the week, we novice carvers were beginning to exclaim "Aha!" with increasing frequency, as the chips began to pop out

Sharpening chip carving knives

by Wayne Barton

You'll never be a top-flight carver until you learn to sharpen your knives to a razor edge. If you already have a method that works for you, use it. If not, here's a simple method of getting a perfectly sharp edge at the correct angle on your chip carving knives. Even a brand new knife, which seems sharp, needs this treatment before it is fit to carve with.

The knives I use are the ones principally used by Swiss carvers. Even on large scale work, like ceilings and walls, these short-bladed knives are the tools used, although sometimes a carver may put the blade in a 2-ft. section of a broomstick so he can use his shoulder for leverage. The blade is designed to strike the work at the correct angle when your hand is held in the position described on p. 65, so don't change the blade's shape when you sharpen.

To sharpen the knives, you need two stones, a medium-grade India and a hard, smooth-as-glass honing stone. A hard Arkansas is good. In recent years I've substituted a ceramic block for the hard Arkansas. The block doesn't need to be lubricated with water or oil the way some stones do, so it's great for honing knives wherever you go. I often carve and hone my knives while traveling, if I can get a friend to do the driving.

The stones must be flat. Test them by putting a straightedge across the length and width of the stone. You shouldn't be able to see any light under the straightedge. If the stone isn't flat, replace it or flatten it on a steel plate covered with a little oil and carborundum powder. If you use a stone that isn't flat, you'll round the tip of the knife, changing the cutting angle. You'll also find it easier to maintain a smooth, straight edge if you use a stone that's large enough to sharpen the entire knife edge at once. Unlike many carvers, I never use a leather strop on my knife. It's too easy to use a strop wrong, which will round over the knife edge and tip, decreasing the cutting efficiency. My advice is to stick with the edge you get off the stone.

To sharpen the cutting knife, drop a little oil on your India stone, hold the blade flat on the stone, then raise its back edge about 10°, as shown at right. Don't sharpen at a greater angle or you'll create a thick, obvious bevel that makes the knife drag as you pull it through the wood. Move the knife back and forth on the stone, first one side then the other, using the same pressure and number of strokes on each side. Concentrating the pressure on the heel of the blade helps avoid rounding the tip.

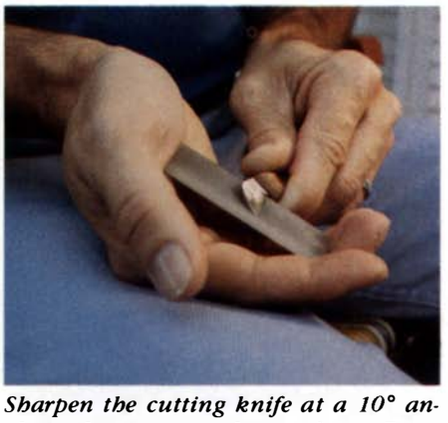
A burr may develop as you sharpen the blade. You can feel it if you run your finger along the flat of the blade, from the back toward the cutting edge. Once you raise a burr along the edge, continue sharpening in the same manner, but use less pressure. Work one side of the knife, then the other, until the burr falls off. If the edge is sharp, it won't reflect any light when you rock the blade slightly under a strong light as you look at the edge from a 45° angle.

Hone your blade on the hard Arkansas just as you sharpened it on the medium stone. Continue until you have a mirror finish that will let the knife slice smoothly through the wood. Be careful to hone each side of the blade equally. You don't want to raise a burr that will drag through the wood, possibly tearing the fibers.

When the blade looks and feels right, cut diagonally across a piece of wood. If the knife drags, check for a burr, a bevel behind the edge, or a dull light-reflecting edge. You can often eliminate the problem with the honing stone, but if you've really been careless, it's best to go back to the India stone. If the knife cuts smoothly, you're ready to start carving.

Once you're knife is sharp, never let the blade get dull. Hone the blade on the hard Arkansas or ceramic block as soon as you feel it dragging and have to use more pressure to make the cut.

The stab knife is sharpened the same way as the cutting knife but at a 30° angle on each side. You want a definite bevel here. The stab knife doesn't cut—its thick edge should indent the wood by wedging the fibers apart. Even though the stab knife isn't used nearly as much as the cutting knife, it does add a nice decorative touch to your work. You'll be surprised at how much you can do with those little indentations. For a start, use your cutting knife to cut a flowing flower stem, then stab around the end of the stem to suggest a billowing flower. —*W.B.*



Sharpen the cutting knife at a 10° angle to the stone, as shown above. For a straight, smooth edge, always work on a stone that is large enough to hone the entire blade at once.

of their basswood prisons. Those crisp cuts are too good to hide under a heavy finish, so Barton just sprays his carvings with dull polyurethane after erasing any remaining pattern lines and lightly sanding the surface.

As the week went on, we advanced from borders to grids, then on to challenging and beautiful rosettes. They're easy to lay out with a compass once you get the knack of it, as shown in figure 3, facing page. You can create your own designs, or use the ones in Barton's book. If you develop your own designs, you will probably find that it is much easier to work with chip carving's two-plane perspective than three-dimensional, in-the-round-carving.

We wrapped up the week with a session on free-form carving and lettering. Barton was right. We *could* carve just about any design. But it would take many practice cuts before we could produce first-class work. Like beginning piano students who could plunk out a melody by Mozart, we were not quite ready for Carnegie Hall.

If you like objects with a hand-made look and feel, you'll like chip carving. Machines are often used for in-the-round carving, but *kerbschnitzen* is unique—perhaps the only technique in the woodworker's repertoire that a machine can't duplicate. □

John Hines is a furniture designer and builder in Weatherford, Texas. Barton's school is Alpine School of Woodcarving, 225 Vine Ave., Park Ridge, Ill. 60068, (312) 692-2822. For more about kerbschnitzen, *see* Chip Carving Techniques & Patterns, *by Wayne Barton, Sterling Publishing Co., Inc., 2 Park Ave., New York, N.Y. 10016, 1984. Chip carving knives and ceramic sharpening blocks are available from the Alpine School and several mail-order tool supply houses. Taunton Press is planning a video tape next year featuring Wayne Barton's techniques.*

Machining Stock to Dimension

Start right to finish right

by Roger Holmes

The process of accurately dimensioning lumber lacks the romance of cutting beautiful joints, but is fundamental to quality woodworking. If you want precise joinery, easy assembly and a good finish, you must begin every job by making your cupped, twisted and bowed boards flat, straight and square—the accuracy of all future operations depends on straight, square stock. Before the advent of stationary power tools like the jointer, planer and tablesaw, woodworkers prepared their stock by hand. Today it's possible to sidestep all that handwork and rely on the speed and, to some extent, the built-in accuracy of power tools.

You can check for cup and bow by sight or straightedge, looking across the width for cup and along the length for bow. When placed on a flat surface, a twisted board will rock on the low corners. Sighting over winding sticks (identically dimensioned lengths of wood) placed across both ends of the board will also indicate twist.

Before doing any flattening or thicknessing, it pays to lay out and cut pieces to the rough width and length your project requires. Smaller pieces are easier to handle and less wasteful. A badly bowed 12-ft. board, for example, may make three relatively straight 4-ft. pieces, and the same logic applies for reducing width, as shown in figure 2 on the facing page. You can start with thinner rough stock because you'll need to remove less wood to flatten it. Of course, if you need four 2-in.-wide pieces, it may make more sense to dimension, then rip a 9-in.-wide board, and so on. If you'd rather not lay out the pieces before finding what's hidden beneath the rough surface, skim both faces in the planer before you cut it up.

Regardless of the size of the pieces, you must start by flattening one face of each on the jointer. Resist the temptation to skip this step and go right to the planer. A planer can't remove twist, bow or cup because the machine's rollers will flatten the board before it reaches the cutterhead. The board will lose its rough-sawn exterior, but the defect will spring back as the board leaves the planer.

A jointer is basically an upside-down, motor-driven handplane. It has two adjustable tables flanking a cutterhead. Each table should be perfectly flat, and, across its width, parallel to the cutterhead. The outfeed table is set at the same height as the highest point in the arc of the cutterhead. This alignment is critical—if the table is high, the board will taper end-to-end; if it is low, the end of the board will be gouged by the cutterhead as it leaves the infeed table. Moving the infeed table up or down sets the depth of cut. When flattening wide boards, I usually align the jointer's fence with the end of the cutterhead, allowing maximum width of cut. For narrower boards, you can set the fence to use the sharpest part of the cutterhead. Rub paraffin or pastewax on the tables so the board will slide easily—the less force required to push a board across the cutterhead, the better. Before running a board over the jointer, remember that the most finely-wrought machines you'll ever see are attached to your wrists. Be careful.

If the board is badly cupped or bowed, I flatten the concave face, which is more stable on the tables than the convex face. It often doesn't matter which face of a twisted board is flattened first, but if the board is also cupped or bowed, plane the concave face first. Once you've picked a face, check the edge of the board to determine grain runout, as shown in figure 3, to avoid tear out. Set the infeed table for a shallow first cut, about 1/32 in., then feed the board into the jointer so the grain is rising into the cutterhead. If there is much tear out on the first pass, turn the board end-for-end. If the grain changes direction along the board, taking light cuts or angling the board across the cutterhead to produce a shearing cut will help.

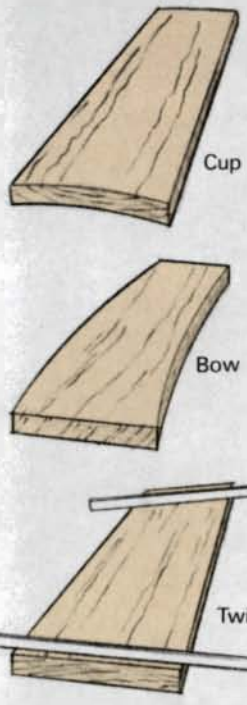
Once you've determined the grain direction, increase the depth of cut, if necessary (I find 1/16 in. is usually plenty), and continue. Place your left hand near the front end of the board, and make sure that all four fingers and your thumb are touching the top face, not hanging over the end or edge. Sometimes I put my right hand on top of the board to push; on longer boards I grasp over an edge to begin the cut, then move my hand on top of the board or to a push stick.

As the face passes over the cutterhead, push it down on the outfeed table with your left hand. The contact of the newly planed face with the outfeed table ensures that the remainder of the face will lie in the same flat plane. Keep pressure on the board over the outfeed, not the infeed table. When 6 in. to 1 ft. of the board has moved across the cutterhead, I often move both hands over the outfeed table to feed the remainder of the board through. If you need more horizontal force, or if the board is short, push the end through with a push stick, not the end of your fingers. Be especially careful with thin or narrow pieces.

Work all the stock for a particular job in one batch—face it all at once, thickness it at once, and so on. Stack the boards by grain direction as they come off the jointer. An arrow on the flattened face helps for future reference. Keep the piles straight for all remaining operations and you'll save time and avoid frustration and torn grain.

When flattening cupped or bowed boards, try not to push down too hard as the board goes over the cutterhead—the board will spring back, thinner, but still bowed. For long, badly bowed

Fig. 1: Board defects



Rock board on flat surface, or sight over winding sticks to detect twist.

Fig. 2: Efficient material use

To use material more effectively, lay out and cut pieces roughly to size before flattening and thicknessing.

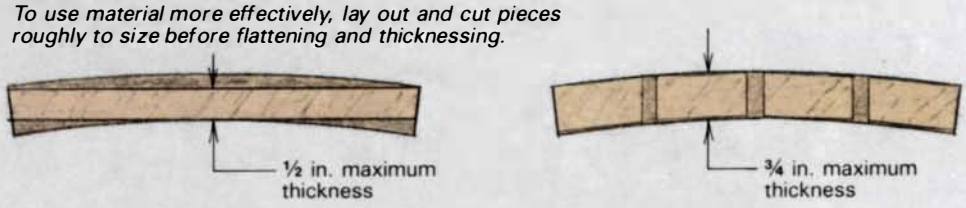


Fig. 3: Jointer

Feed rising grain into cutterhead to avoid tear out.

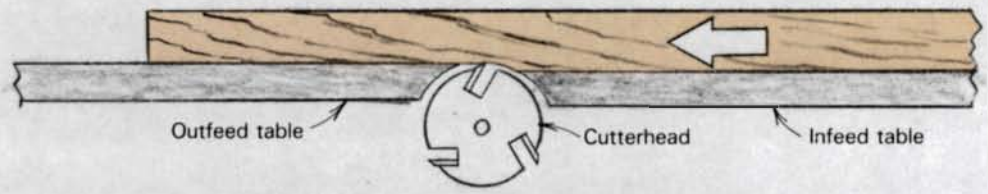
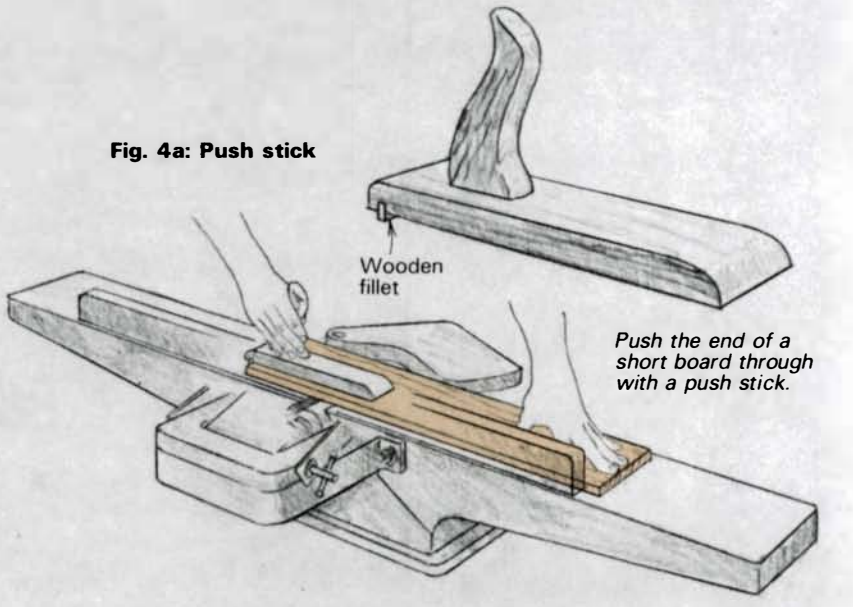


Fig. 4a: Push stick



Push the end of a short board through with a push stick.

Fig. 4: Hand positions

B. When 6-in. to 1-ft. of the board has moved across the cutterhead, you can move both hands over the outfeed table to complete the cut.

A. To start the cut, push the board down on the table with your left hand, feed with your right. As the board passes over the cutterhead, shift the downward pressure to the outfeed table.

Fig. 5: Thickness planer

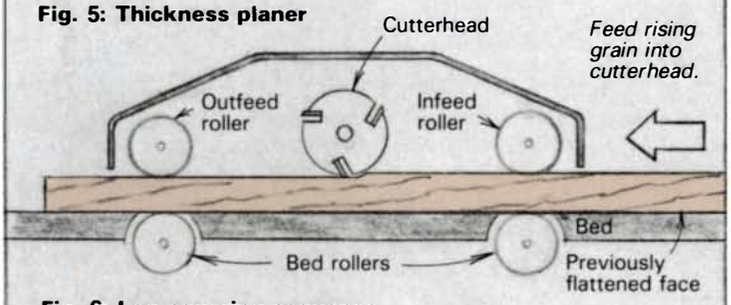


Fig. 6: Leg-squaring sequence

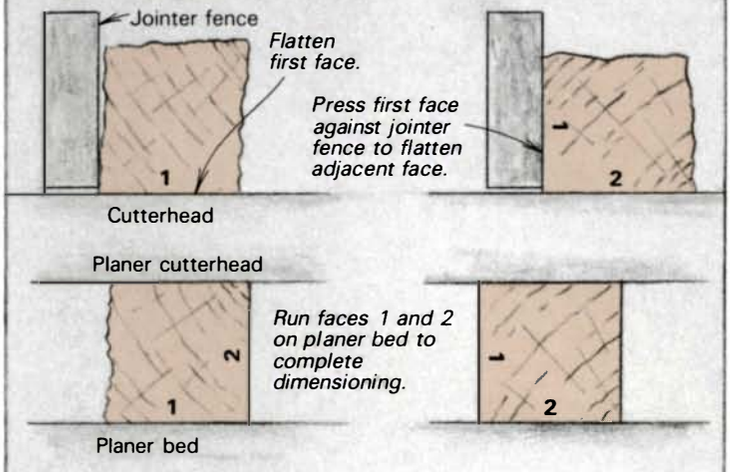


Fig. 7: Edge-jointing

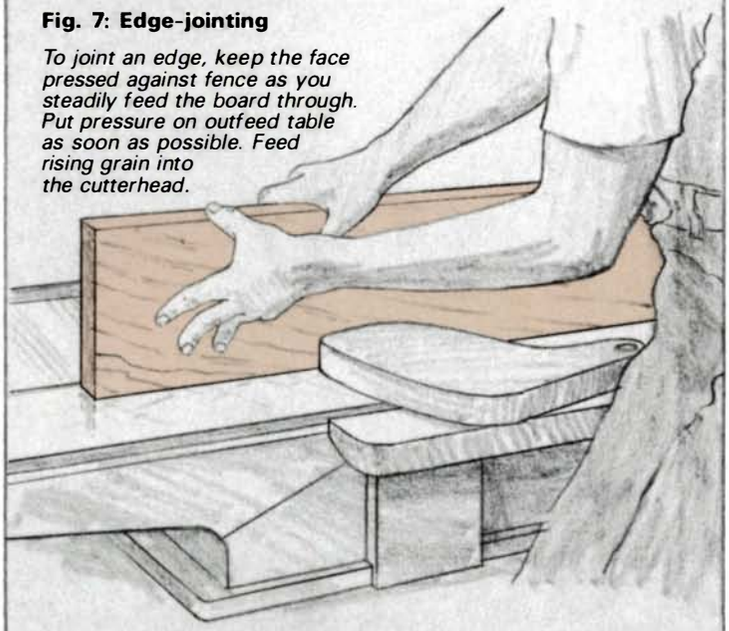
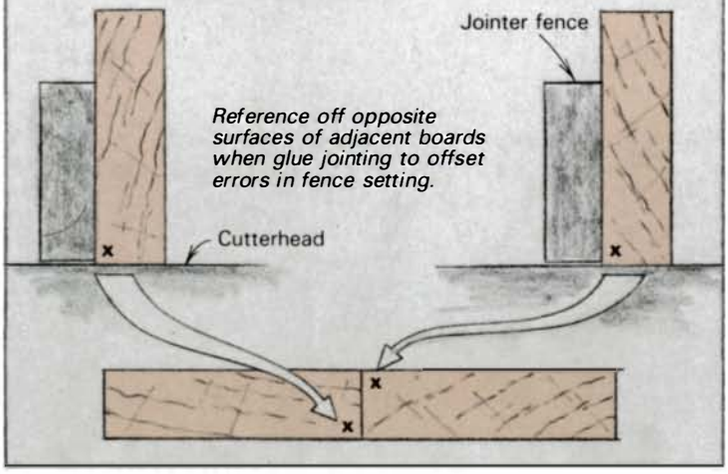


Fig. 8: Edge-jointing for glue-up



boards, lower the middle of the board over the cutterhead and joint the trailing end, then reverse the board and repeat the process. Continue until the board looks straight, then make a pass from end-to-end.

Flattening a twisted board is a little trickier, and you can waste a lot of wood if you're not careful. You can see why by first balancing the board on its two diagonally opposed high corners, so that the corners are an equal distance above the surface. This distance indicates the amount of wood that must be removed to eliminate the high spots and flatten the face. Now, push down on one end of the board so the board is resting on three corners, and note how the gap increases at the fourth corner. This difference in height indicates how much more wood must be removed to flatten a board pushed over the machine balanced on three corners. The trick, then, is to balance the twisted face on two corners as it is fed into the cutterhead until there is enough flattened surface to support the piece. Don't rock the board as you push it through; this will just create another twist. When the board looks flat, make a single pass over the whole face.

Dimensioning table legs can cause headaches—it's maddening to end up with a rhombus instead of a square section. The solution is simple. Rip the legs roughly to size, flatten one face, then press that face firmly against the jointer fence and joint a second, adjacent face square to the first. Check to make sure the faces are at 90°; adjust the fence if necessary. Move to the planer to finish, alternating the two flattened faces on the bed.

Flattening a board wider than your jointer is always a problem. The safest solution is to rip the boards as wide as the jointer will take, flatten and thickness them, then reglue to make the wide, flat pieces needed. If you're loathe to rip that beautiful width of walnut, a less reliable and more risky method is to run first one half of the face, then the other over the jointer. Set the machine for a light cut and don't worry if the surfaces don't match each other exactly. If you can flatten the face, you can clean it up on the planer.

Pushing a board over a jointer always removes wood; whether it's the right wood depends on you. Pay attention to defects in each board as you try to remove them, and make a mental note when something goes right or wrong.

The planer excels at two jobs the jointer is not intended to do. It can create a flat surface that is parallel to an already existing flat surface, and it can uniformly reduce the thickness of stock. The planer is also one of the few woodworking machines that requires very little skill to operate, beyond organizing the boards so the machine cuts with the grain.

Most planers consist of a cutterhead and one or more powered rollers suspended over, and parallel to, a machined table (called the bed), which can be moved up or down to set depth of cut and thickness of board. Lay the flattened face down on the table, engage the end of the board with the powered roller and the machine does the rest. Remember, a planer won't flatten a bowed or twisted board, it will just make it thinner. (If a board is thick enough to resist the roller pressure, a planer may slice off the high spots of a cupped board enough to flatten it.)

I always run the thickest boards first, planing the whole batch at one setting before changing it. Add thinner boards into the batch as you raise the bed. Run the entire batch through at the same setting on the final pass to ensure uniform thickness. Take light cuts, not more than 1/16 to 1/8 in. If you must remove a lot of wood, alternating the faces after the second face has been flattened will reduce the possibility of warping.

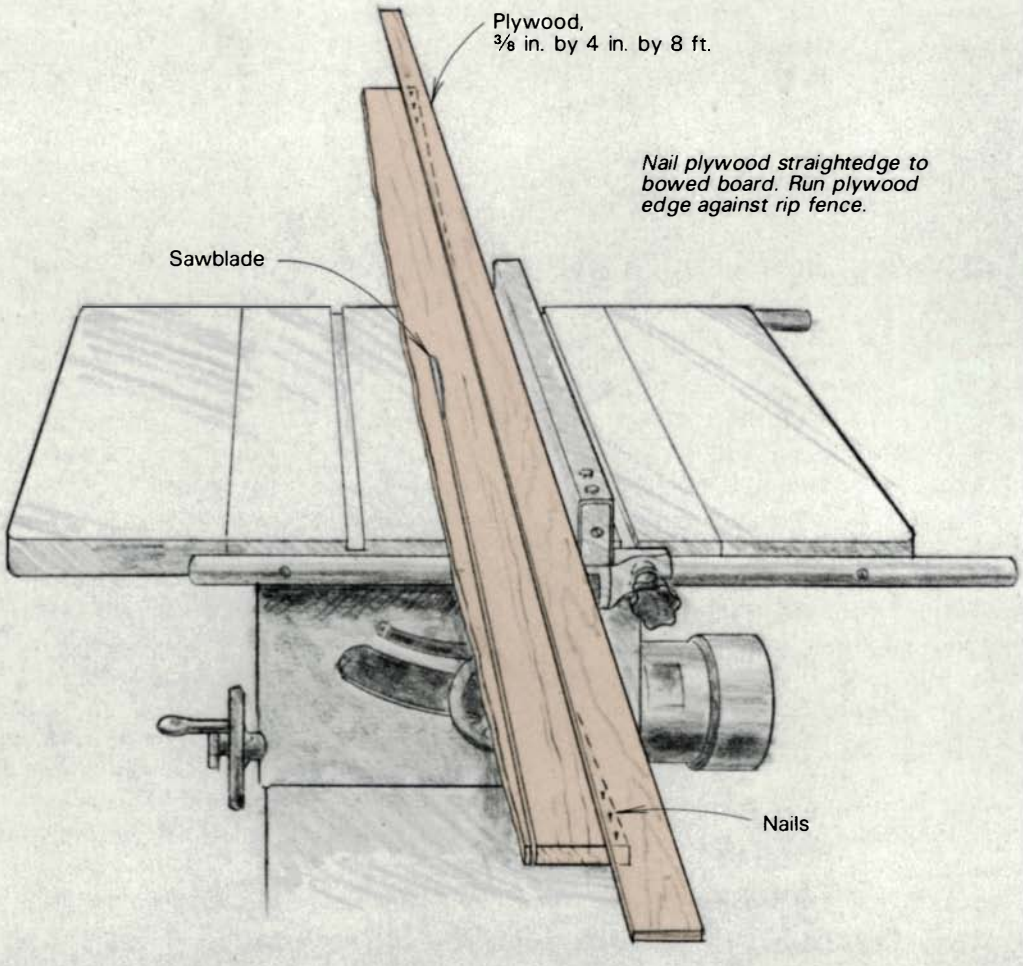
Saw it straight

by Larry Montgomery

As an apprentice boatbuilder, I was taught a method of straightening long, bowed edges that is much more efficient than repeatedly jockeying 12-ft. boards over a jointer.

The method is simple, as the drawing shows. Tack a perfectly straight piece of ⅜-in. plywood about 8 ft. long and 4 in. wide along the concave edge, leaving the nail heads about ¼ in. proud, for easy removal. Run the package through the tablesaw with the plywood guide against the fence. Pull the nails, flip the board, set the fence, and run the newly trued edge against it for a second edge parallel to the first. For longer boards, splice two pieces of ⅜-in. by 4-in. by 8-ft. plywood, end-to-end, with an overlapping backing piece.

If you don't have a tablesaw, or don't want to nail into FAS walnut, you can clamp a length of ¼-in. by 2-in. by 2-in. aluminum angle (available from building supply houses) to the board for a guide, and rip along it with a circular saw and a combination or rip blade. If all else fails, snap a line and bandsaw the edge. □



Larry Montgomery is a professional boatbuilder and writer in Port Townsend, Washington.

For thin stock, say ¼ in. or less, lower the bed rollers flush with the bed, or place an auxiliary bed of plastic-laminate-covered plywood or chipboard on top of the planer bed, to prevent the knives and rollers from distorting the piece. I find using an auxiliary bed as long as the pieces being planed works even better. The bed travels through the planer with the thin piece and cuts down on chatter. Wear good ear protectors, and don't ever attempt to reach or look into a planer while it is on.

Edge jointing involves straightening and squaring the edges of the board to its now-parallel faces. Use an accurate try square to check that the first board's edge is square to its face and adjust the fence as necessary. I push the board firmly against the fence with my left hand and push it along with my right. Keep the fingertips of your left hand in contact with the board and at least a couple of inches above the table and behind the cutterhead when starting out, and keep it on that same spot on the board as it passes over the cutterhead onto the outfeed table. When your left hand is over the outfeed table, a few inches beyond the cutterhead, leave it in that position and slide the board between it and the fence. As soon as possible, the downward pressure should be on the outfeed, not the infeed, table. When you need to reposition your right hand on the top edge, keep the board moving by pushing with your left. The whole operation should be smooth, the two hands working in unison so the edge doesn't stall over the cutterhead. Don't do all the work with your arms, but shift your weight as the board goes over the cutterhead. A slower feed produces a smoother edge.

If necessary, make a couple of passes to straighten the edge, taking off 1/16 in. or so, then a final, slow, shallow pass for a smooth edge. If possible, feed the board in the direction of the rising grain. If you must go against the grain, feed very slowly and take a shallow cut. If the faces are flat, the machine will more-or-less automatically correct all defects in the edge, except bowing along the length. Bowing can be remedied by flattening increasingly larger sections on the ends of a concave edge or the center of a convex edge. Lower a concave edge over the cutterhead, as described for face flattening. If you've cut the pieces roughly to width, joint one edge, then rip the other to exact width. For glue-joint edges, reverse adjacent boards, as shown in figure 8 on the facing page, to compensate for slight inaccuracy in the fence setting.

Those are the basics of dimensioning stock. I tend to treat precise cutting to length as part of the joinery or assembly, because it makes more sense to me to lay out the finished length of a piece at the same time I'm laying out the location of a through-mortise or some dovetails. The shop is quiet, I get myself in a meticulous mood, sharpen my pencil and get to work. □

Roger Holmes is an associate editor of Fine Woodworking.

Jointer Talk

Getting along with home-shop machines

by Jim Cummins

There are two jointers in my shop, a fairly new 6-in. Rockwell and an old 4-in. Sears. Neither one has an adjustable outfeed table, so setting the knives has been a trial-and-error chore that I used to put off as long as I could. Three years ago, I decided to set up the Sears for finishing work, particularly to get some good surfaces on a series of small boxes I was making in my spare time (*FWW* #43, pp. 32-38).

Following directions I'd read somewhere, I set each knife a hair higher than the outfeed table, then turned the jointer on. I put a fine, flat India stone on the outfeed table and slowly passed one end of it over the whirling cutterhead. This process, called jointing, removed a tiny bit of metal to lower each knife edge exactly even with the outfeed table. Of course, it blunted the knives at the same time, leaving a little hairline flat instead of a cutting edge. To resharpen each knife, I lowered the infeed table and laid an 8-in. hard Arkansas stone on it so that the stone rested on the knife bevel. Then I clamped the cutterhead so that the stone, moved by hand in a series of tight circles along the length of each knife, was at the proper angle to hone the flat away, as shown in the photo at the bottom of the page. The infeed table was protected by a sheet of paper under the stone.

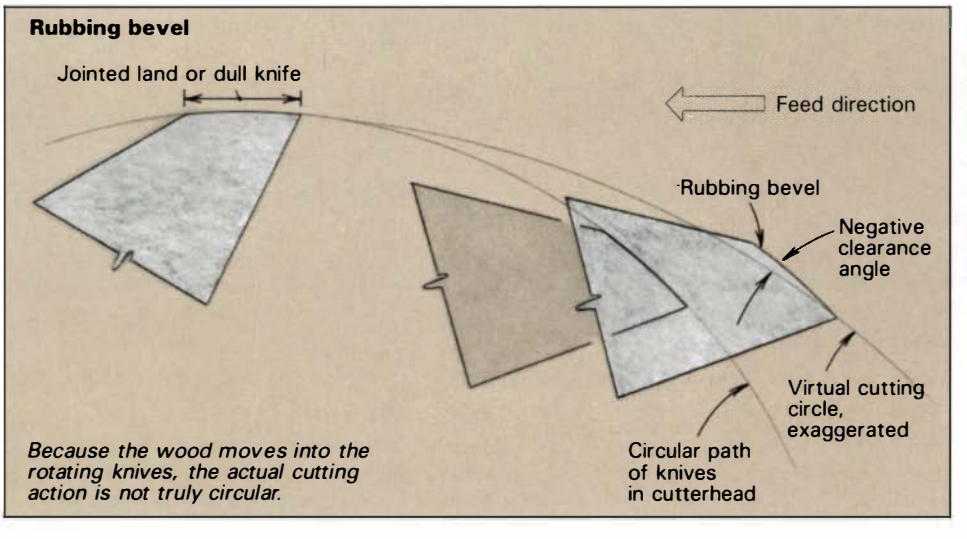
This procedure forms a small secondary bevel. The cutting edge has a little more steel behind it than a single-bevel knife, and is, therefore, a little more durable. It took almost an hour to set, joint and hone the knives, but it proved worth it—the edges lasted much longer than they ever had before (partly, I'm sure, because I had more respect for the machine and took some care about what I was feeding it). One benefit came as an unforeseen bonus. The machine was set up so well that I began to sense how my own work habits subtly influenced its performance.

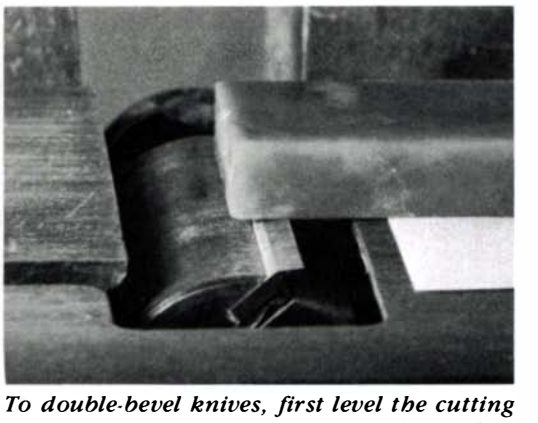
After a while I could walk up to that venerable, rackety old jointer with absolute confidence. On my good days I can surface bird's-eye maple box lids without tear out—I double-tape the lid to a heavier piece of wood that damps out vibration and acts as a push stick. Then I feed ever so slowly, imagining each knife taking a separate delicate slice, getting maybe three hundred cuts per inch. The waste box under the jointer slowly fills with slivers of wood as fine as featherdown.

With anything but super-sharp blades, such a method would be all wrong. In general work, if the feed rate is too slow the blades will rub the work and cause friction that burnishes the wood, as shown in figure 1. Such a surface may look all right, but it won't finish well or glue reliably—the surface fibers will have been pounded flat, overcompressed and overheated. A really dull set of knives can leave burn marks, but the wood can be damaged and chemically altered long before that point.

Usually, the first sign of dulling comes when I'm trying a slow feed on a hard wood, and the work rides up, resulting in a tapered cut. This is the point where I have to decide what's most important: a flawless surface or a straight joint. The blades are probably still sharp enough for general work, but I'll have to feed the work harder and faster. This usually cures the problem for a while. The surface will show some washboard marks, but at least glue joints will be straight and chemically unaltered.

The other choice is to change the blades. Nowadays, since I discovered the gadget described in the box on the facing page,





To double-bevel knives, first level the cutting edges with a stone placed flat on the outfeed table and the jointer running, then hone them sharp as shown, with the cutterhead clamped steady. This gives a lasting edge.

this is no great chore. But it wasn't always that way. I went through the stone-and-hone routine once with my 6-in. jointer, but within half an hour one of my helpers put a nick in the knives and I swore: "Never again." Instead, I devised a method that uses a pane of glass to set the knives. Coincidentally, the same idea appeared in Methods of Work in *FWW* #41, submitted by Joe Robson of Trumansburg, N.Y.

First you set the infeed table level with the outfeed table, checking alignment with a straightedge. Then you put a new knife in position, tightening the locking screws just enough to allow the knife to slide if pushed. You pull the knife up a little higher than the table and span the cutterhead opening with a pane of glass, holding the glass flat against both tables. Rotating the cutterhead backwards by hand brings the knife in contact with the bottom surface of the glass and pushes it down exactly the right amount. Then you remove the glass and tighten the screws, snugging each one down a little at a time, working from the center out, until all are evenly tight (otherwise you can bow the knife). Talking about distortion, don't take all the old knives out at once, but change one at a time so the tensions in the cutterhead stay balanced.

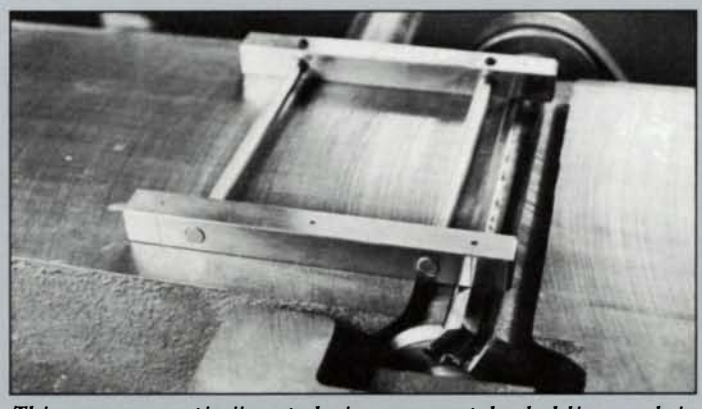
As a final check when all knives are set, you can press the glass down directly over the cutterhead as you turn the machine by hand. The glass will flex enough to let you feel each knife "drag" on it. If one knife drags more than the others, you should reset it. The accuracy of this method depends on how carefully you set up the sliding fit of the knives. Too loose, and they'll be pushed down too far. Too tight, and they'll be too high. The screws must be set evenly across the width of each knife, too, or one corner will end up higher than the other. The drag test will show you where adjustments are needed, and they usually are.

If your jointer has an adjustable outfeed table, you can set knives entirely by drag. Take a straight, light piece of scrap about 1 ft. long and lay it over the cutterhead. Rotate the cutterhead so the knife grabs the stick and moves it forward onto the infeed table. Mark the distance on the stick. When all knives move the stick the same distance, tested at various places across their width, their height is the same. You then adjust the height of the outfeed table to get a straight cut. The method is accurate, though tedious, and it won't work very well on jointers with fixed outfeed tables—unless you want the knives set high.

High knives do have one application, they produce what's known as a sprung joint, one slightly open in the middle. A tabletop joint with the right amount of spring would let you slip a cigarette paper between the boards at the middle. At glueup, the clamps easily pull this tight. The advantage is that the joint at each end of the tabletop is slightly overcompressed and therefore less liable to crack open in a dry spell. You can get a sprung joint either by setting the knives a few thousandths high in the first place or, on some jointers, by loosening the outfeed-table clamp screws, which causes the table to sag a bit.

Never having had an adjustable outfeed table myself, I have never been able to take advantage of the feature—when I want a sprung joint I take a pass or two with a block plane. Yet I know people who subscribe to arcane and magical outfeed table settings. Me, I like the machine to be level and parallel, with the knives exactly flush with the outfeed table. As long as the machine is at the same setting all the time it will be predictable.

The first step in jointing is to check the stock. The edge of the wood has to be roughly straight before a jointer can do its job. If the edge is severely convex, I take a pass or two just in the middle. Then it will ride right. The same goes for a badly concave edge, or a board with too much taper—I nip away the offending



This new magnetic jig sets knives accurately, holding each in alignment as the gibs are tightened. A set of knives can be changed and set perfectly in less than ten minutes.

Magna-Set makes it easy

In a book once, I saw a photo of a man adjusting jointer knives with a large horseshoe magnet. He laid the magnet on the outfeed table, with the poles above the cutterhead. Next he rotated the cutterhead so that the cutting edge of a knife was at top dead center, and the magnet held the knife up in position while he locked the gibs. "Bingo!" I said, and started looking all over for a large horseshoe magnet. But such magnets are obsolete, and I eventually gave up the search, falling back on my old methods and putting off changing knives as long as I could.

Yet an ingenious inventor, George Hessenthaler of Quest Industries (Box 7768, Murray, Utah 84107), has come up with a $40 gadget that, instead of one large magnet, uses six small ones to imitate a giant, adjustable horseshoe. I tested the device, called Magna-Set, on my 6-in. Rockwell the other day, using it to move two of the knives sideways a little in opposite directions (this trick misaligns the little nicks in the knives and gives a smooth surface again). The job took just five minutes, and the jointer works great.

Here's the procedure: First, you figure out where top dead center is. The easiest way to determine top dead center is to look straight down at the cutterhead, and rotate it until the cutting edge is centered over the cutterhead shaft where it enters the bearings.

With top dead center as a reference, you scribe permanent lines on your jointer to index the jig. The jig is held flat to the outfeed table by four of its six little magnets, and the other two hold the blade in alignment while you tighten up. It's dead easy. Without affecting accuracy, you can even slide the two arms of the jig sideways if you need more room for your tools. The standard jig will slide open to span a 6-in.-wide jointer table, and there are optional rods that extend the reach as far as 12 in.

Can you use Magna-Set to set the knives a little high to make a sprung joint? Sure, there are two ways: either raise the jig with a sheet or two of plastic wrap, or experiment with different jig positions until you find one that works, then scribe a second reference line (any position other than with the knives at top dead center will leave them high).

This invention is so simple, straightforward and accurate that I may start changing jointer knives for the sheer fun of it. George Hessenthaler deserves as much credit as the guy who invented the self-piloting router bit. ***—J.C.***

ends before taking a full-length cut. I check the quality of these roughing cuts to see if I've guessed right about grain direction.

When jointing faces, except when feeding very thick or very thin pieces, I use the push blocks that came with the Rockwell. They have comfortable hand grips and a flat, non-slip bearing area. I begin a full cut with controlled pressure on the infeed table, trying to guide the work level over the cutterhead onto the outfeed table. As soon as enough of the work is over the outfeed table I apply downward pressure directly over the cutterhead with one push block (to help prevent vibrations), and with the other block I press down just beyond the cutterhead. The idea is to register the cut against the outfeed table as soon as the jointed surface is long enough to bear properly. As the work moves along, I simply keep exchanging hand positions, taking care to keep the feed rate even and not to let the work ever stop.

If you are routinely getting edges that are concave or convex even though your knives are sharp, first check that your tables are parallel, and correct them according to your owners' manual if they're not. Then think about knife height—if knives are too high, you'll get a concave cut, and vice versa. But if your knives are level with the outfeed table, try adjusting the way you feed the work before you experiment with different settings.

Be conscious of the back pressure from the knives as they cut; if it diminishes, it means the stock is riding up and you'll have to take another pass at a faster feed rate. Listen for telltale "snick" or "pop" noises caused by thick chips tearing out ahead of the cut; if you slow the rate of feed your final surface may still be all right. Take note of everything: When a jointer is working right it sings a harmony of knives whacking away, motor shouldering the load, feathery chips flying against the chute and bearings humming under pressure. It pays to listen for such music—I've found that sharp senses are as important as sharp blades. □

Jim Cummins is an associate editor of Fine Woodworking.

Face bevels

by Galen J. Winchip

If you experience tear out and chipping on your jointer (or planer), even though the blades are sharp, here's an idea borrowed from industry that may eliminate the problem.

Most jointers are designed to handle both hardwoods and softwoods and have a rake angle of about 30°, as shown in the sketch. For softwoods, such an angle works fine, but it's too acute for many hardwoods—when you cut against the grain, the wood splits ahead of the cut, chipping and tearing the surface. Hardwoods are best worked with a steeper rake angle, in the range of 10° to 20°. This more scraping cut leaves a smooth surface.

Rake angles in this range can be achieved by a process called back-beveling or face-beveling, and there's no major surgery required on the machine. All you need is a thin bevel on the flat face of each knife. It doesn't have to be any deeper than the thickness of the chip you're taking—realize that this is not the depth of cut, but the thickness of the individual chips that go into making a full cut. A bevel of 1/64 in. will certainly do the job, and a bevel half that wide would probably work fine.

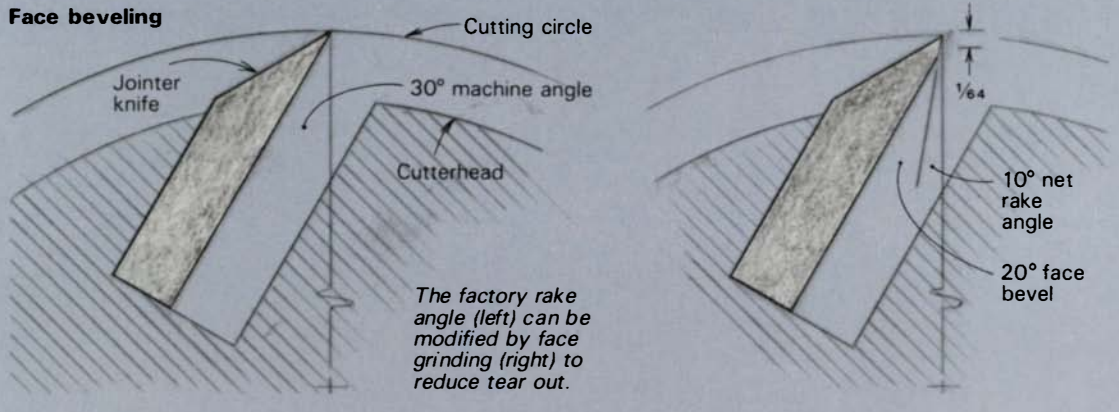
To determine the proper bevel angle, you will need an accurate drawing of the cutterhead and knives in your machine. After you have worked out the necessary angles, you can ask your sharpening shop to grind both the sharpness bevel and the face bevel. I do not recommend that anyone grind jointer knives without special wet-grinding equipment. Dry-grinding in the home shop produces microscopic heat fractures at the cutting edge. Even home-shop honing can be done wrong. It is best to work the stones perpendicular to the edge, not parallel to it, otherwise the cutting edge is weakened by the scratch lines.

Cutting speed, surprisingly, has no effect on the cutting process in wood—think what a good job a hand plane can do. High speed tools such as routers make smooth cuts not because the cutter is moving faster, but because the faster speed means that the chips are thinner. The same applies to a jointer. Chip thickness depends on cutterhead speed, the number of knives, the depth of cut and the rate of feed. The thinner the chips, the less tear out.

Face beveling your jointer knives is the same idea as choosing a cabinet scraper instead of a hand plane. Some woods are more prone to chipping and tearing than others, but for most work, you'd probably want the plane. Consequently, face bevel your knives only if you have chipping and tearing problems. There is no optimal rake angle for all work, unless it's the 30° angle that manufacturers already use. While you can modify this for special cases, don't overdo. For example, a rake angle of 5° will let you surface bird's-eye maple with no tearout, but the tradeoff is that it will take a lot of force to feed the machine, you'll have to take a shallow cut and reduce the feed rate, and the process will be noisy as well as a large load on your jointer. These drawbacks will apply to any other woods you may run over the machine, but there won't be any corresponding gain in surface quality.

Lastly, for good jointer performance, learn to feel your jointer work. The human being is the most variable and important part of the cutting process. □

Face beveling



The factory rake angle (left) can be modified by face grinding (right) to reduce tear out.

Galen Winchip teaches computer-aided design and manufacture at Illinois State University, Normal, Ill.

Built with the aid of 20th-century technology, Effinger's stately mahogany tall clock captures the graceful proportions and crisp carving of the 18th-century Rhode Island original. The dial face was hand painted by Judith W. Akey.

Photo this page: Schopplein Studio

Newport-Style Tall Clock

Tackling the tricky details

by Robert Effinger

When I moved to Maine in 1970, I left behind a career as a tool-and-die maker. Working with wood instead of metal, I managed to eke out a living selling my turned bowls and wooden novelties to tourists who drove through town in the summer. One day a local gentleman stopped in to ask me if I could make a tall clock. I'd never attempted anything that ambitious before but I took the job. Since then, I've turned out quite a few. Along the way I've developed some methods that make short work of the details; I'll explain several of these in this article.

The clock shown is based on an 18th-century mahogany tall clock attributed to Newport, R.I., cabinetmaker John Goddard (1745-85). I scaled up the plan from a measured drawing in Wallace Nutting's book, *Furniture Treasury: Vol. III* (1933, MacMillan Publishing Co.).

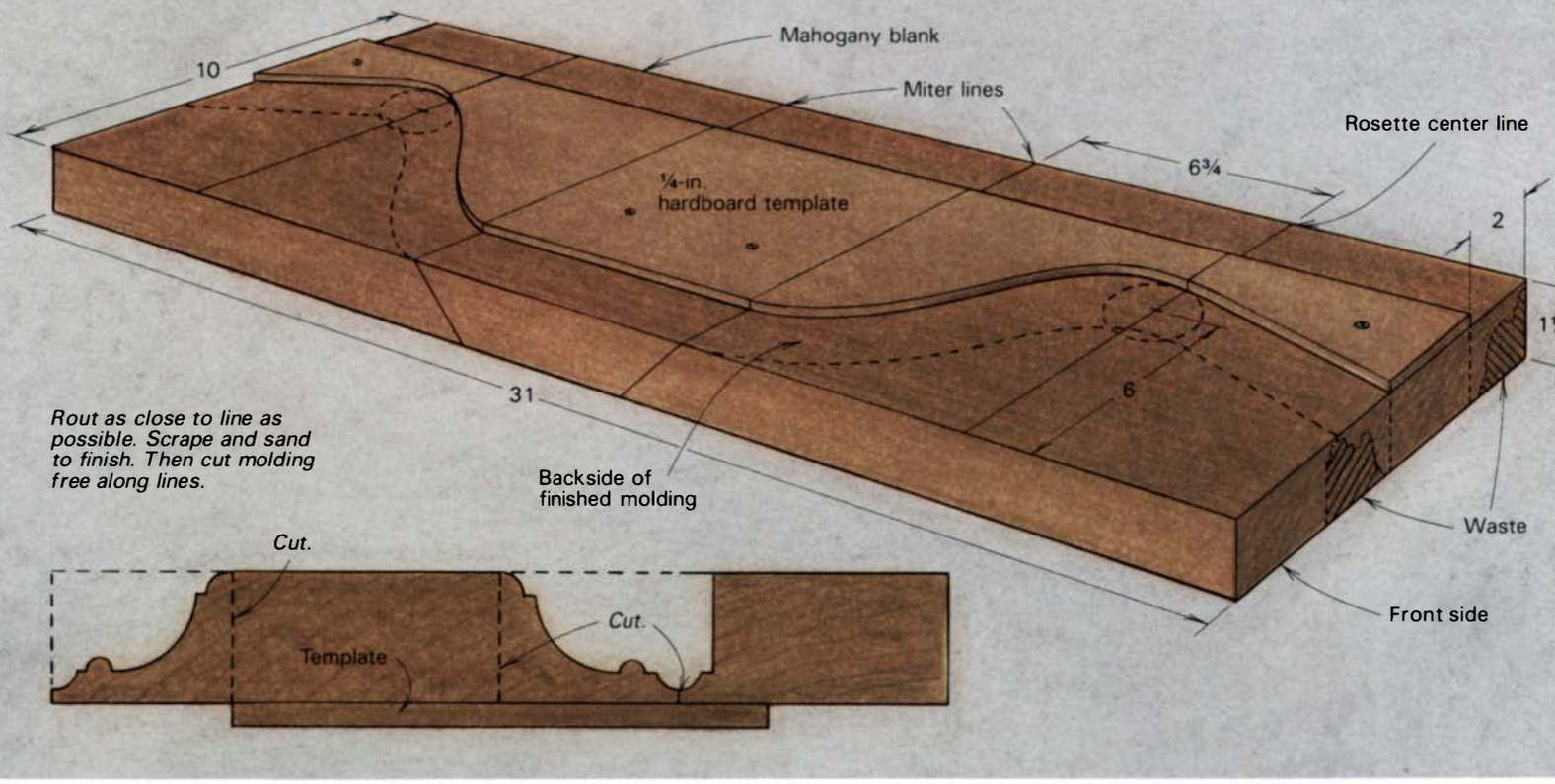
I'm not a period purist so my clock isn't built exactly like the Goddard original. I'll improve on the old construction methods if I can. For example, unlike many old clocks, mine are built to allow for seasonal wood movement in places where the old clocks might have nails, glue blocks and, more often than not, cracks. The most radical change I've made is in the supports for the seat board—the horizontal board that supports the clockworks. On old clocks, the waist sides extended up into the hood and the seat board was nailed across them. My adjustable seatboard assembly slides up or down until the movement's at the correct height, then screws tight against the waist sides.

The ¼-in. plywood bottom of my clock is another break from tradition. Old clocks had a thick bottom that was often dovetailed to the base sides. This construction works fine until a weight cable breaks and the cast-iron weight wrecks the bottom, feet and sides of the clock. A falling weight will smash through my thin plywood bottom, without damaging the rest of the clock.

Buy the movement and make the dial before you start cutting anything. The depth of the movement determines the depth of the case and the dial must be made to fit the hood or vice versa. It's easier to make your own dial than it is to redesign the Goddard hood around a store-bought dial. Some of the fancy old engraved dials were made from brass, but I cut mine from 16-gauge sheet steel and sent it out to be hand painted. The sources of supply on p. 78 lists a few of the many companies that sell movements. The movement I used in this particular clock is a cable-wound, nine nested-bell movement (No. 213) from the Concord Clock Co., 96 Main St., Plaistow, N.H. 03865.

Think of the clock case as three separate sections: the base,

Fig. 1: Setup for routing hood moldings



waist and hood. Figure 3 (p. 81) and figure 4 (fold-out section) show how these sections are built and how they fit together. The waist sides screw to the base while the hood just rests on the waist. The hood slides off the front to allow access to the works. The ¾-in. pine back ties all three parts together, as shown in figure 4. In general, the waist must be about ¾ in. wider inside than the swing of the pendulum. Most old clock waists measure 13⅞ in. across the outside and 7 in. to 8 in. from front to back. I increased the depth of my clock case because modern musical movements are larger than the old ones.

I made the special one-piece hinges for the hood door from ⅛-in.-thick sheet brass. These hinges screw to the top and bottom of the door and pivot on ⅜-in. #2 woodscrews in the scroll board and hood molding. The waist door also requires special hinges with an offset to match the ¼-in.-thick lip on the hinge stile as shown in the detail, figure 4. Ball and Ball is the only company I've found that makes these hinges.

The curved goose-neck, or swan-neck moldings at the top of the hood are often the most intimidating part of a tall clock case. In the old days they were shaped by carving and scraping, but I prefer to make them with a pin router. My method of pattern routing cuts both of the curved moldings and both of the return moldings that run along either side of the hood at the same time, from the same piece of mahogany.

To make the moldings, I've converted my drill press into a pin router (see *FWW* #37, pp. 26-27). My setup guarantees that the moldings will match up perfectly at the corner miters.

Start with a mahogany blank 1½ in. thick, 10 in. wide and 31 in. long. Make a template by drawing the molding curves on a 6-in.-wide piece of ¼-in. hardboard, as shown in figure 1 and bandsawing to shape. On this template, mark off the miter lines and the center lines for the rosettes.

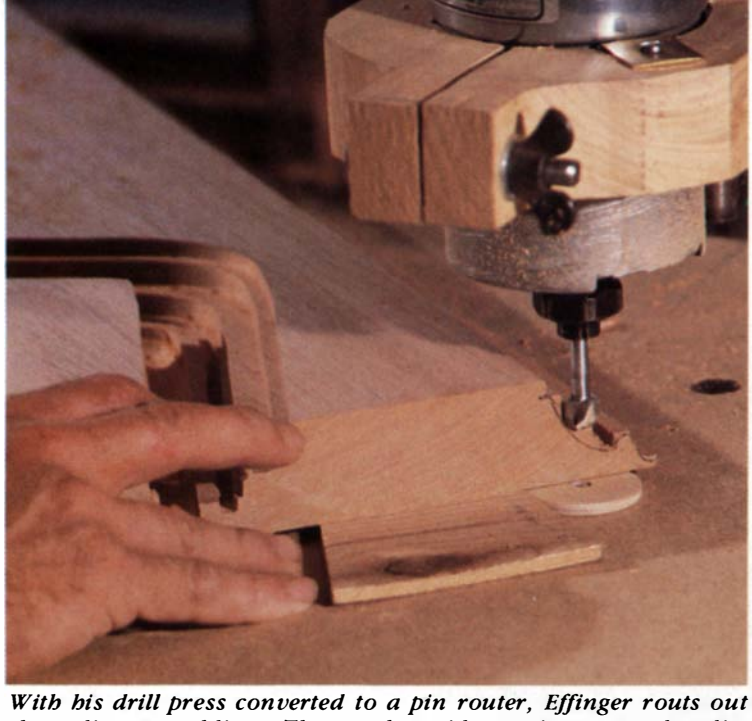
Place the template on the bottom of the mahogany blank and transfer the miter lines and rosette center lines to the blank. With a square, extend these lines across the width of the blank, extend the line of the curve over the end of the blank. Fasten the template to the mahogany with small screws making sure that the template marks line up with the lines drawn on the blank. Draw the molding profile on the ends of the blank as shown in the drawing. You'll set your router bit against this profile.

One-quarter-in.-thick wooden discs in increments of 1/16-in. in diameter fit over a pin in the auxiliary drill-press table directly underneath the bit. With the template side of the blank down on the table, I select a disc that positions the bit where I want it against the profile on the blank end, adjust the bit to the right height, then guide the template against the disc to make the cut, as shown in the photo, p. 77. One pass hogs the straight return moldings, another pass at the same setting cuts the curves. Next I switch to a smaller disc to move the stock closer to the bit or a larger disc to move the stock away. The idea is to rout as close as possible to the molding profile you've drawn on the end of the blank. I do as much hogging as I can with a ⅝-in. straight bit then I switch to smaller straight bits followed by whatever curved bit gets closest to the line. After routing, I scrape and sand out any imperfections in the molding.

After routing, trace around the template on the back side of the blank. This line will become the cutting line for the top edge of the molding. Remove the template, set the tablesaw blade to 45° and cut the blank along the miter lines.

To mark for the rosette, score about ⅛ in. deep with a 2½-in.-diameter hole saw on the back of the blank. This gives you a definite line to follow later on the bandsaw. Rip the return molding off the blank along the straight template line. Now, with the back side up, bandsaw along the curved template line that marks the top edge of each goose-neck molding, including the radius marked by the hole saw. Flip the molding over. The cutting line for the bottom edge of the molding lies at the lowest point of the radius, as shown in figure 1. If you run a pencil along the bottom of this groove, it's easier to follow with the bandsaw.

Drawings: Lee Hov



With his drill press converted to a pin router, Effinger routs out the pediment moldings. The template rides against a wooden disc over a pin under the work. Bit height is adjusted against the molding profile drawn on the end of the blank (above). After a pass along the straight molding, the goose-neck molding gets a pass at the same setting (top right). After sawing the miter, the rosette location is scored with a hole saw (right), then the goose-neck is bandsawn from the blank. After sawing the top edge and the rosette, the blank is flipped over and the lower molding edge is bandsawn free (far right).

The moldings are now ready to glue to the scroll board.

The smaller scroll-board arch moldings can be made using the same technique, but I find it easier to mount a router on a cobbled-up pivot to cut the semi-circular part and guide the hand-held router against a straight edge to cut the straight sections. You could also turn the semicircular molding on the lathe.

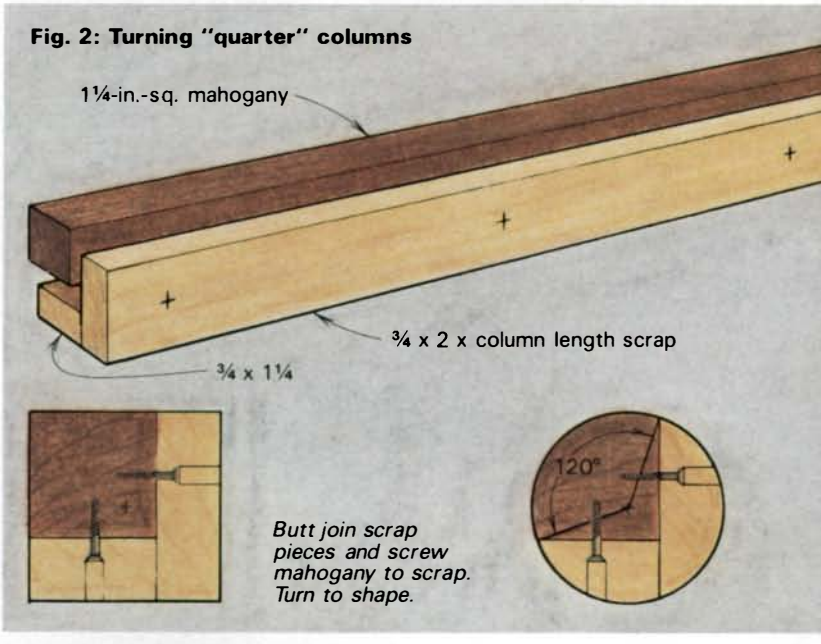
The quarter columns on the waist of old clocks were just that, ¼ of a circle. To my eye, these look sort of flat. I thought that the effect would be more dramatic if the columns were just slightly more than ¼ of a circle. Here's the method I developed to turn a "quarter" column that's really a 120° section of a circle.

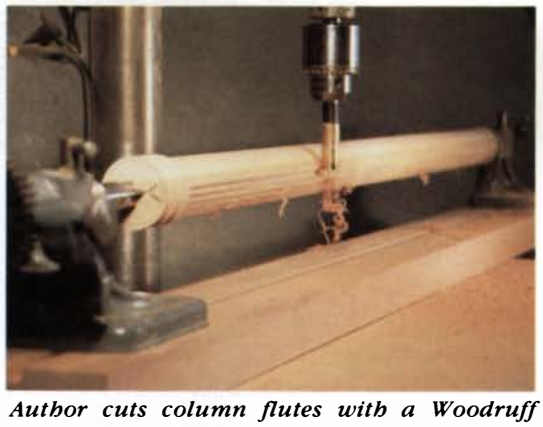
Make a fixture from two pieces of ¾-in. scrap stock as long as the column. Rip one piece 2 in. wide and one 1¼ in. wide and butt glue them to make an L-shaped fixture, as shown in figure 2. Cut a 1¼-in.-square piece of mahogany for the column. Screw this square blank into the L-shaped piece as shown. Make sure that your screws are recessed enough that you don't turn into them later. Lay out the center on each end, remove the corners on the tablesaw, if you prefer, and turn the column and the jig to shape. A new L-shaped jig must be made for each quarter column.

If your lathe has an indexing head, you can rig up a router box and cut the flutes right on the lathe with a small veining bit in a router (see *FWW* #37, p. 34 and #38, p. 40), but I have a different method. I have an old indexing jig that holds the column between centers and allows me to slide it across the drill-press table against a cutter chucked up in the drill press. My cutter is a 5/32-in. Woodruff key seat cutter that I've ground to a radius as shown (available unground from Manhattan Supply Co., Inc., 151 Sunnyside Blvd., Plainview, N.Y. 11803). A bronze sleeve over the shaft acts as a bushing and limits the depth of cut.

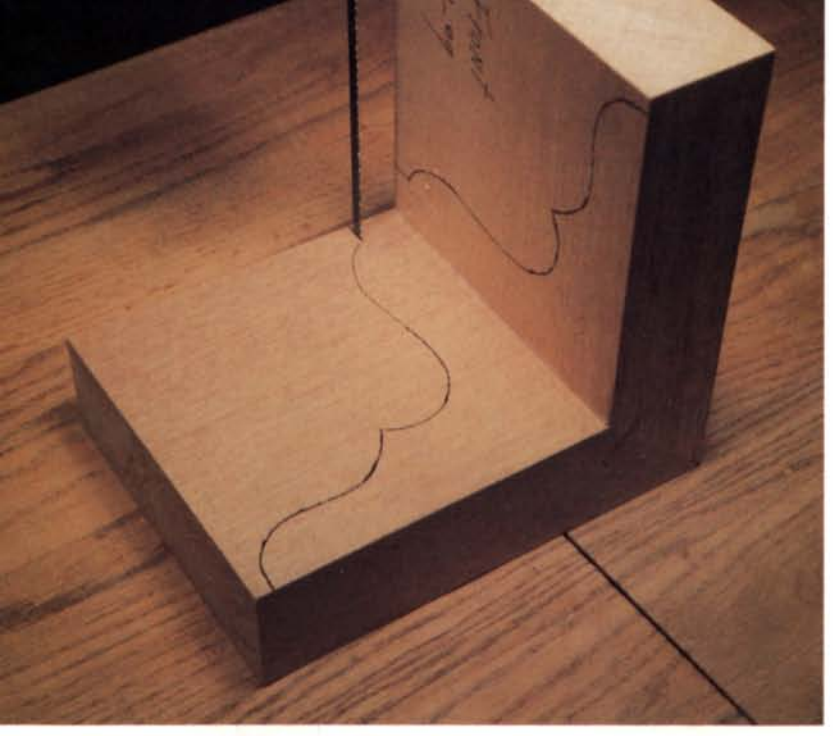
There are lots of ways to make ogee bracket feet but I think that my method is the easiest. I cut and glue up the joints while the stock is still square. By clamping the glued-up foot to a small

Fig. 2: Turning "quarter" columns





Author cuts column flutes with a Woodruff key seat cutter ground to a radius and chucked up in the drill press. Indexing jig rests on drill-press table and slides by cutter. Sleeve on cutter limits depth of cut.



Ogee bracket feet are glued up while square then cut to shape on the bandsaw. Supporting the foot over a wooden box allows the ogee profile to be cut on the bandsaw (left). Finial is lathe turned, then flutes are marked out in indexing jig and carved by hand. To lay out the flame, divide flame into six longitudinal sections and five latitudinal sections to form a grid (below). Connect points on the diagonal to form spiral lines. Pencil holder shown marks out axis lines.

wooden box for support, as shown in the photo at left, I cut the ogee curve on the bandsaw.

The front feet are joined with a splined miter. I cut the spline slot on the tablesaw with the blade at 45°. The back feet are joined with half-blind dovetails. The rear section of the back feet is made from thinner stock and left flat to allow the clock to sit closer to a wall.

The flame finials that crown the hood are turned from 3-in.-square blocks about 8½ in. long. Turn the finial in the middle of the stock leaving about 1 in. of waste on each end, as shown in the photo. For now, just turn the flame section to shape—carving comes later. On the bottom of the urn, mark off 24 divisions for reeding and stop fluting. If your lathe has an indexing head, you can mark and carve the finial between centers. I carve the reeds with a V-tool working from larger diameter to smaller diameter. Tipping the tool to the left and right, I take off the sharp edges to round over the reed. About ⅛ in. down from the top of the reeding I mark a line around the circumference and another line about ¾ in. from the first. This designates the lengths of the shallow flutes within the reeds. I carve these with a small gouge.

On old clocks, the flames on the outside finials spiral in opposite directions. To lay out the flame spiral, I draw lines parallel to the finial axis that divide the circumference of the cylinder into six equal sections. Then I draw lines around the circumference, spaced ½ in. apart, to form a grid. I connect the intersections with diagonal lines to form the spirals. Carve between the spiral lines with a small gouge. After the flame has been carved, cut the waste off and finish to a point. I sand the completed finial with a 220-grit flap sander chucked up in the drill press.

One other detail worth specific mention is the shell carving on the waist door. Some of the old ones were glued onto the door panel after carving. I like to make the door panel and shell from one board as thick as the combined thickness of the shell and panel. I set the thickness planer to remove ⅛ in. and I stop the planer before the shell area goes through. The finished shell is about ⅛ in. higher than the panel and overhangs each edge by ⅛ in. I set the jointer for a ⅛-in. cut and joint the panel edge stopping when I get to the shell area. □

Robert Effinger makes period furniture in Fryeburg, Me.

Sources of supply

These firms sell tall-clock movements, clock supplies and hardware, except as noted.

Selva-Borel, 347 13th St., P.O. Box 796, Oakland, Calif. 94604.

Mason & Sullivan Co., 586 Higgins Crowel Rd., West Yarmouth, Mass. 02673.

Turncraft Clock Imports Co., 7912 Olson Highway 55, Golden Valley, Minn. 55427.

Klockit, P.O. Box 629, Highway H, North, Lake Geneva, Wisc. 53147.

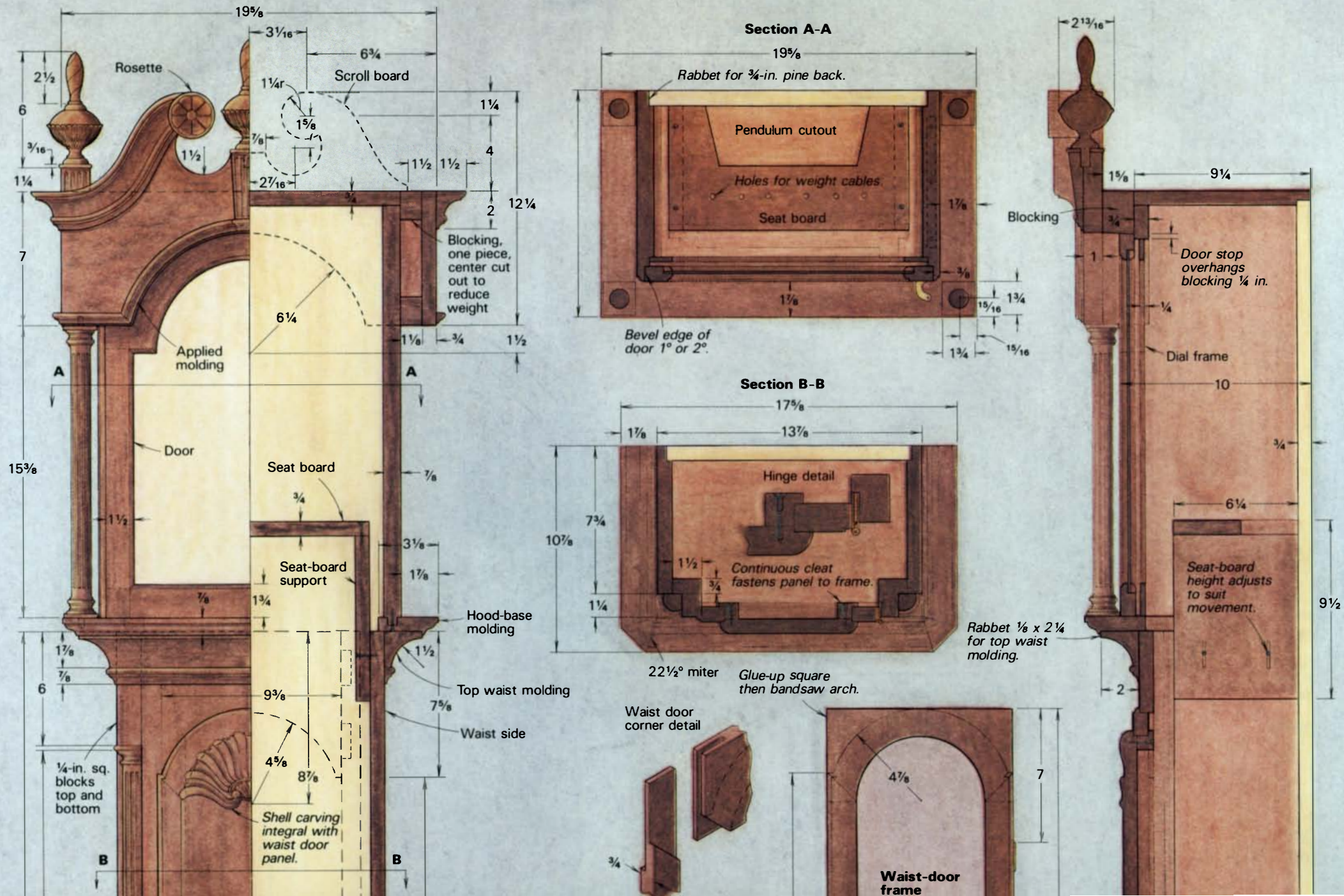
Craft Products Co., 2200 Dean St., St. Charles, Ill. 60174.

Ball and Ball, 463 West Lincoln Hwy., Exton, Pa. 19341 (authentic reproductions of hood-door hinges, offset waist-door hinges and clock hardware).

Judith W. Akey, 173 Harbourton Rd., Pennington, N.J. 08534 (hand paints clock dials).

The Dial House, Rt. 7, Box 532, Dallas, Ga. 30132 (custom dials and hand painting).

Fig. 4: Newport-style tall clock



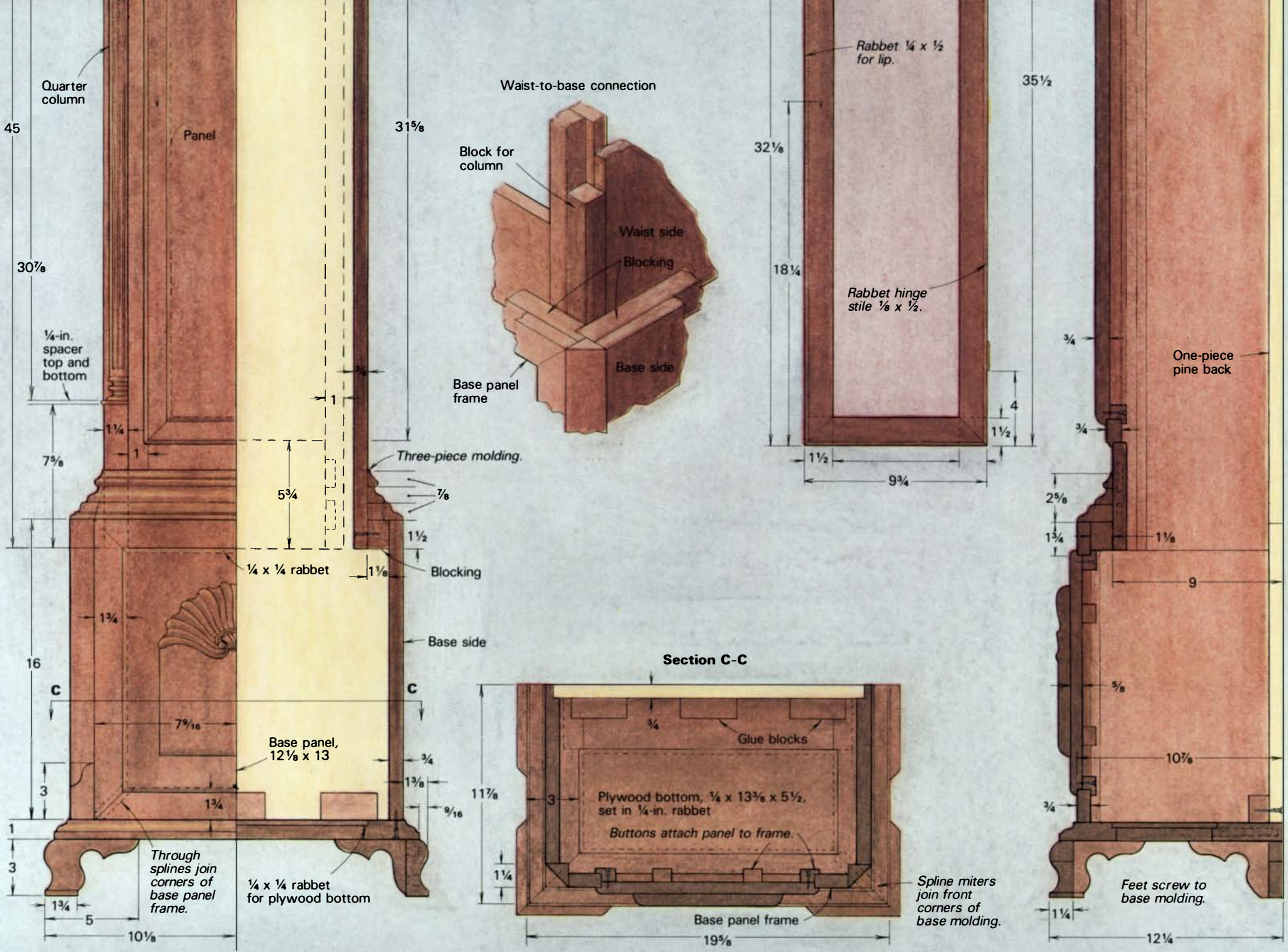
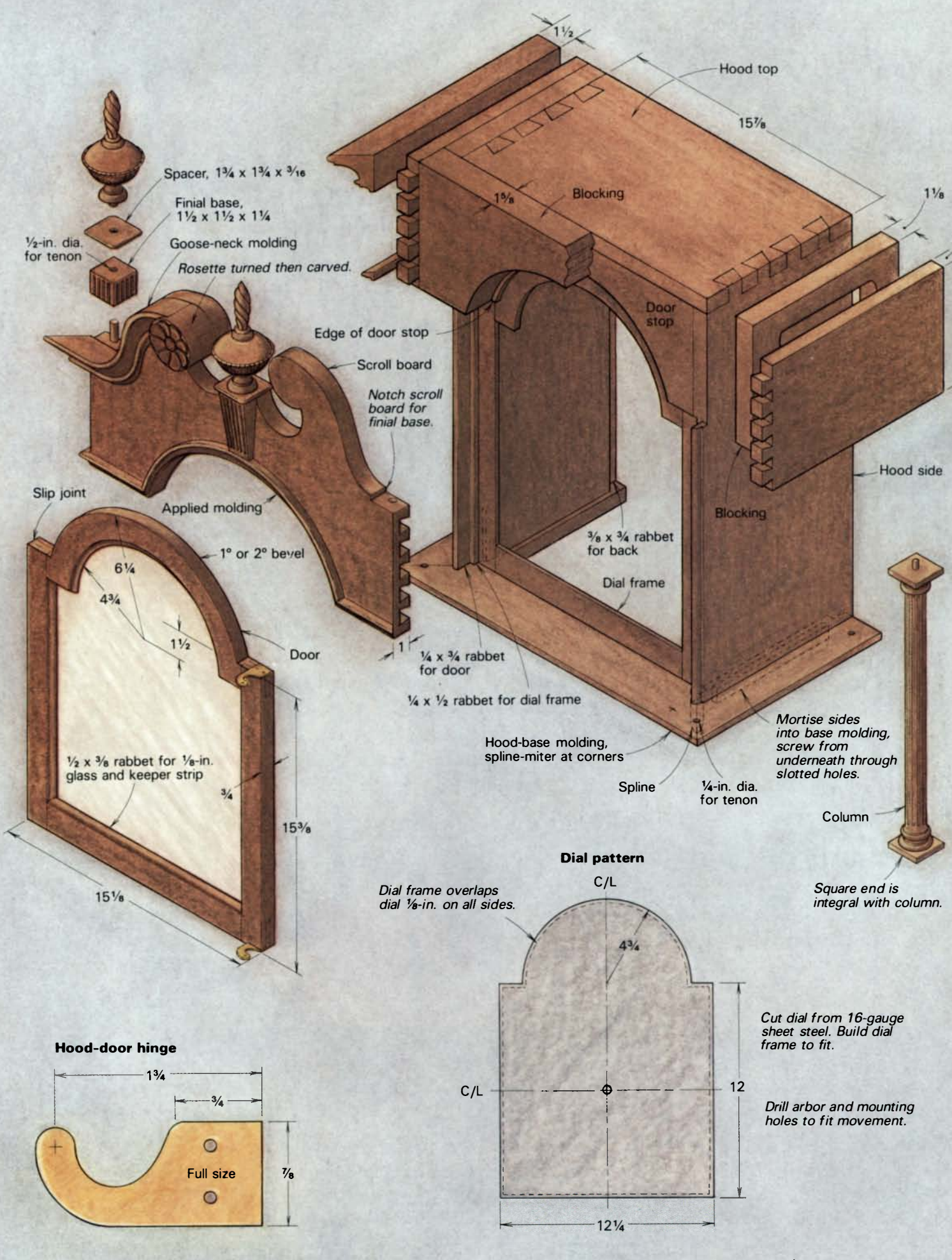

Quarter column
Panel
45
30⅞
¼-in. spacer top and bottom
1¼
1
7⅝
5¾
1¾
16
C
C
7⁹⁄₁₆
Base panel, 12⅛ x 13
3
1¾
1
3
1¾
5
10⅛
Through splines join corners of base panel frame.
¼ x ¼ rabbet for plywood bottom
¼ x ¼ rabbet
1⅛
Blocking
Base side
Three-piece molding.
⅞
1½
31⅝
1
¾
Waist-to-base connection
Block for column
Waist side
Blocking
Base side
Base panel frame
Rabbet ¼ x ½ for lip.
32⅛
18¼
Rabbet hinge stile ⅛ x ½.
1½
1½
9¾
4
35½
¾
¾
One-piece pine back
2⅝
1¾
1⅛
9
5⅛
10⅞
¾
1¼
12¼
Feet screw to base molding.
Section C-C
¾
Glue blocks
11⅞
3
Plywood bottom, ¼ x 13⅜ x 5½, set in ¼-in. rabbet
Buttons attach panel to frame.
1¼
Base panel frame
19⅝
Spline miters join front corners of base molding.

Fig. 3: Hood construction



Dial pattern

Hood-door hinge

Wood Stains

Five ways to add color

by George Mustoe

Woodworkers often dismiss staining as an unpleasant, unskilled task that seldom produces natural-looking colors. That's to be expected. Retailers primarily stock semi-opaque stains, which can smother the wood if they are applied improperly. Manufacturers often encourage applications like "rosewood" stain on fir plywood, as if you could make drab wood exotic by tinting it a lurid shade. All this advertising hype ignores the real value of stains—they let you make a board's heartwood and sapwood a uniform color without fundamentally changing the wood's natural hue. Stains let you make six chairs and a dining table all the same color, without cutting a forest of trees to obtain matching boards.

Five basic groups of coloring agents are commonly called stains. *Semi-opaque stains,* the well-known oil stains sold in every hardware store, are surface finishes made by mixing transparent and opaque pigments with mineral spirits and linseed oil or varnish. *Transparent wood stains,* close chemical cousins of fabric dyes, are relatively color-fast aniline compounds derived from coal tars. The dye powder is dissolved in water or alcohol. These solvents carry the color deep into the wood cells. *Varnish and lacquer stains* are the conventional clear sealer coats tinted with transparent dyes. *Tinted penetrating oils* are billed as a complete finishing system that penetrates deeply into the wood to seal it, and provide a satiny "handrubbed" look. The oils, usually tung or linseed, are colored with dyes or pigments. *Chemical stains* are water-soluble inorganic compounds that react with the wood to create colorfast tints without dyes or pigments.

Transparent dyes are the best choice for hardwoods. More than 70 colors are available, ranging from subtle browns to spectacular bright colors. Their high degree of transparency means you won't hide the beauty of the underlying wood grain. Avoid these dyes on softwoods which absorb the watery solutions so rapidly that it's difficult to get even coloration.

Water-soluble aniline dyes are non-toxic (good for toys if you add a moisture-proof coat of clear varnish), non-flammable and very fade-resistant. Dissolve an ounce of dye powder in a quart of hot water in a glass, plastic or stainless steel container, then saturate a sponge or rag with dye. Wearing rubber gloves, squeeze out enough liquid to prevent dripping and splashing, then wipe on a generous coat parallel to the wood grain. To obtain a lighter shade, water down the dye rather than apply a skimpy coat, or you'll get uneven coloration. After wetting the surface, wipe off excess dye with a squeezed-out sponge or rag. The color will lighten as it dries, so leave the piece overnight before you decide if the shade is right. Apply a second dye coat for more intense color. Since water in the dye also swells the wood fibers, smooth the dried coat with fine 400- to 600-grit paper before adding a top coat of finish. An alternate method is to moisten the wood with water before adding any color, then sand the raised grain before dyeing.

Aniline dyes soluble in methyl (wood) alcohol are called "spirit stains." These are available as powders or pre-mixed liquids (Watco 5-Minute Wood Stain). Although not as fade resistant as water-soluble dyes, they produce sparkling clear colors. You apply them the same way as water-soluble dyes (the alcohol even contains enough water to raise the grain), but the solvent makes them potentially hazardous. Good ventilation is essential because respirators won't completely block out the fumes. Wear rubber gloves to prevent skin contact. These dyes are difficult to apply evenly on large surfaces because they dry so fast, usually within 15 minutes—if one section dries before the adjacent area is covered, you'll get a hard line between the two. The dyes are, however, particularly useful for touch-up work. The alcohol solvent lets them bind to oily woods or surfaces with traces of old finish that would repel water-soluble dyes. Adding a little shellac increases this ability.

You can avoid the grain-raising problems of water- and alcohol-soluble dyes by using NGR (Non-Grain Raising) dyes. You buy these pre-mixed in a water-free hydrocarbon solvent. NGR dyes are lightfast, but their fast drying rate limits them to small surfaces. The vapors are toxic, so good ventilation is essential.

Oil stains have done the most to give staining a bad name, but they can be good for enhancing the not-so-nice softwoods used in much interior carpentry. Go easy, though. The stains' high pigment content makes it easy to produce dingy-looking finishes, and the colors may be way off. "Mahogany" stains can range from red to brown to nearly purple, and maple can be anything from tan to orange. However, you can mix several colors to obtain a more pleasing shade; the formulas are so similar that even different brands can usually be intermixed.

Oil stains should be wiped on in the direction of the grain with a brush or a soft cloth. After waiting a few minutes for the wood to absorb the stain, wipe off the excess. If you want a darker shade, increase the waiting period or apply a second coat of thinned stain. Wiping the surface with mineral spirits will lighten the color. Again, good ventilation is essential because the vapors are flammable and toxic; oily rags are also a fire hazard.

Water-based stains, like those by Deft, are a fairly new product made up of opaque pigments suspended in a vinyl or acrylic base. Generally the colors are less intense than most oil stains,

an advantage when subtle staining is desired. They are nonflammable and have no toxic vapors or bad odor.

Tinted penetrating oils are useful whenever an easy-to-apply, complete finishing system is needed. You apply the oil according to the package directions, then wipe off the excess. Additional coats can be applied before hand buffing the finish. Penetrating oils are not intended to be used with any other type of finish—some of these oils leave behind residues that may inhibit the drying time of varnish or lacquer. You can also make tinted oils by dissolving dye powders in tung or linseed oil, then thinning with 20% to 30% mineral spirits.

Varnish stains are synthetic or natural varnishes tinted with transparent dyes. This combination makes them highly transparent, and they intensify porous areas of the wood less than other stains. The first coat of varnish penetrates the porous area deeply, causing darker coloration, but then this coat blocks further absorbtion after it dries. Thus, subsequent coats will even out the color. Varnish stains have highly diluted tints, so you must apply several coats. The transparent color also makes it a good choice for softwoods such as pine and fir; inexpensive lumber can be livened up without ending up with the lurid colors and grain patterns that often result from oil stains.

Lacquer stain is similar to varnish stain but dries faster and has more toxic vapors. Ordinary clear lacquer can be colored by adding alcohol-soluble aniline dye, first dissolving the dye in a little methyl alcohol or lacquer thinner.

Chemical stains react directly with the wood and are somewhat unpredictable, so you must experiment with every species to see what color the chemicals will produce, especially if you want to reproduce the chemical stains on old pieces. Oak treated with ammonia turns a warm brown. Wood containing tannin becomes silvery gray when wiped with a solution of ferrous sulfate. Potassium dichromate, potassium permanganate and sodium carbonate (sal soda) will darken most hardwoods. The methods are simple: stir 1 to 2 tablespoons of chemical into a quart of lukewarm water in a glass jar (don't use metal, which may react). Except for ammonia, the chemicals are free of fumes, but they are poisonous if ingested. Wear rubber gloves and apply the solution with a rag or sponge. Let the stain dry overnight before sanding the raised grain.

Regardless of the product, staining can be a valuable technique in this age of high lumber prices and dwindling forest resources, when it's often necessary to salvage sap-streaked and bland boards. It's definitely not a sign of shoddy workmanship. □

George Mustoe is a geochemistry research technician at Western Washington University in Bellingham, Wash. Sources for stains include Sigma Chemical Co., P.O. Box 14508, St. Louis, Mo. 63178 (chemicals); Henningson & Associates, P.O. Box 6004, Rockford, Ill. 61125 (water-soluble dyes); Woodfinishing Enterprises, Box 10117, Milwaukee, Wisc. 53201 (stains and dyes), The Woodworkers Store, 21801 Industrial Boulevard, Rogers, Minn. 55374 (water- and oil-based stains, penetrating oils, NGR stains), H. Behlen and Bros. Inc., Route 30N, Amsterdam, N.Y. 12010.

Staining problems

Many staining problems are due to poor surface preparation, rather than a problem with the stain. No stain will work well unless it's evenly absorbed into the wood. Dull planer knives can glaze and compress the wood fibers enough to block stains. Thorough sanding parallel to the grain (to at least 120-grit) is essential. Even tiny swirl marks and scratches will absorb stain differently than smooth surfaces. Problems here can be cured only by sanding or handplaning the wood to a fresh surface.

Dried glue won't absorb stain, so gluelines can show after staining, especially where the joint juxtaposes contrasting grain patterns. You can't fix these defects, so lay out stock so grain patterns match, and fit joints tightly so gluelines are thin.

The only way to remove ugly glue smears that appear after staining is to resand and restain the surface. If you suspect smears, you can make the glue temporarily visible before staining by dampening the wood with mineral spirits or lacquer thinner—use chalk or a pencil to mark areas that need more sanding.

End grain is highly absorbent and can sometimes turn almost black if you don't seal the open pores before staining. For oil stains, use linseed oil as a sealer. Shellac (3-lb. cut) diluted 1:1 with denatured alcohol makes a good blocking agent for most other stains. No matter how much sealer you use, large areas of end grain don't stain well unless you are trying to emphasize the contrasting textures.

Wood-patching compounds and fillers seldom absorb stain like the surrounding wood. Unless you have extraordinary luck, you must do a good deal of experimentation on scrap lumber to come up with a colored patching compound that dries to match the stained lumber. Some stainable compounds remain porous after drying, but if porosity of the patch differs greatly from that of the surrounding wood, these fillers may come out lighter or darker than you desire. Even if you get a good color match, the lack of grain patterns will reveal large patches. Instead of using synthetic patches, the best results often come from inserting a plug of matching wood. This means routing or chiseling out the defect to get smooth margins and thin gluelines. If synthetic patching compounds are used, hand-tint the repaired area with oil stains or artists' acrylic colors to match the adjacent stained wood. Apply the colors with a fine brush and streak them to follow the grain lines of the surrounding wood.

Wood fillers applied to smooth the surface of open grained woods usually work well with stains. The fillers come in many colors, so experiment to find one that matches the stain. Mineral-spirits based fillers can also be custom tinted with dry pigments or up to 30% oil stain.The pastelike filler is thinned to a creamy consistency with mineral spirits, then liberally brushed onto the stained wood, saturating the open pores. Wait a few minutes for the filler to dry to a dull luster, then rub with a coarse rag to wipe off the excess and smooth the surface. Let dry overnight, then sand lightly with 320-grit paper.

Once stain has been applied, don't let the colors bleed into later coats of finish. Your best precaution is to make sure the stain has a different solvent than the next coat of finish. For example, water-soluble dyes won't bleed into lacquer or varnish, but oil and spirit stains will. You could also let the stain dry thoroughly, then seal it with a thin washcoat of shellac.

Stained wood is vulnerable to surface damage because scratches and abrasions may penetrate the colored layer and expose lighter wood. You can't just restain a scratch—the microscopically rough walls pick up pigment and end up too dark. A better approach is to restore the color by applying a tiny brushful of diluted stain, tinted varnish or shellac colored with spirit stain. With extensively damaged pieces, it's better to strip off the finish and redo the whole piece. —*G.M.*

A Cabinetmaker's Baskets

In the Nantucket tradition

by Charles H. Carpenter, Jr.

Some lightship basket variations: The large photo shows an oval purse basket (8¾ in. by 7¼ in., 6 in. high) of oak and mahogany, which Hilbert made in 1977. The caning in each half of the double lid is inlaid into a recess. The open-top basket at top left has ear handles of bent oak and a turned mahogany bottom. The lid of the other small basket is fully caned, and the mahogany rims were bricklaid of many small pieces for stability. The basket, with its ivory finial, is at the Museum of Fine Arts, Boston.

Harry Hilbert is a former antique dealer from southern Connecticut with a great love of American decorative arts. He is also a woodworker of considerable skill. He has made his share of reproduction furniture over the past 45 years—tea tables, corner chairs, chests of drawers, children's furniture and so on. It is his baskets, however, that give Harry Hilbert a special place in the American craft scene.

In 1974, while visiting with my wife, Mary Grace, and me on Nantucket Island, Hilbert studied Mary Grace's collection of old Nantucket baskets and said: "I'm going to make one of those." In the years since, he has made dozens, no two exactly alike and none made for sale. Hilbert makes baskets solely for the joy of it.

In the 19th century, Nantucket baskets were made on board the lightships anchored in the dangerous shoals off Nantucket, hence the name lightship baskets. They are a distinctive type of American handicraft that came out of the maritime cooperage tradition. The process entails as much woodworking as it does basketry—the staves are related to the staves of a Nantucket cooper's whale-oil barrel.

In the old Nantucket baskets, the bottom of the basket is usually solid pine, but sometimes a hardwood. A groove is cut into the edge of the bottom and then oak or hickory staves (water-soaked to make them supple) are fitted into the groove and shaped around a form. When the staves have dried they more or less retain the form's shape. The staves are then interwoven with fine cane in a plain or decorative pattern. Small ear handles like those in one of Hilbert's first baskets (photo above, top left) are a typical way to finish up. Other baskets had flat wooden lids attached by leather-thong hinges wrapped with cane. Although some of the early lightship baskets had bottoms with turned scratched lines for decoration, many bases were so plain that they didn't even have beveled bottom edges. The lightship-

basket tradition continued in the 20th century, mostly in the form of open-top baskets, round or oblong. The round baskets were sometimes made in nests of six or seven. After World War II, lidded baskets became popular as purses and a cottage-industry grew up to produce them.

Hilbert, with his high-style cabinetmaker's instincts, has continued to refine the basic designs, adding features such as shopmade brass hinges instead of leather and all sorts of inlaid and applied decoration on the lids and tops.

Not all of Hilbert's refinements are purely decorative, as the small basket with pagoda-like lid in the photo on the facing page illustrates. If the mahogany rims of this basket had been turned from solid wood, they would constantly "move" with changes in relative humidity, becoming slightly oval, then round, then oval again. To ensure that the top and basket rims would stay round regardless of the weather, Hilbert laminated them from numerous thin pieces of wood in a bricklaid fashion. This also eliminates short-grain from the rims, greatly strengthening them. Functional as this basket is, it may also be considered a work of art. In fact, it was recently acquired by the Museum of Fine Arts in Boston and a similar one is now in the Art Museum of Yale University in New Haven.

Making a basket purse—The accompanying step-by-step photographs and drawings show how Hilbert makes one of his basket purses. The top photo at right shows two partially finished baskets with materials in the foreground. Hilbert makes the 6½-in.-long oak staves by splitting a wedge of oak from his own land, then bandsawing it into thin radial slices that resemble ⅛-in.-thick veneer. He then bandsaws these into staves that taper in width from about ⅜ in. at the top down to ¼ in. at the bottom. He handplanes these smooth, to a final thickness of about 1/16 in.

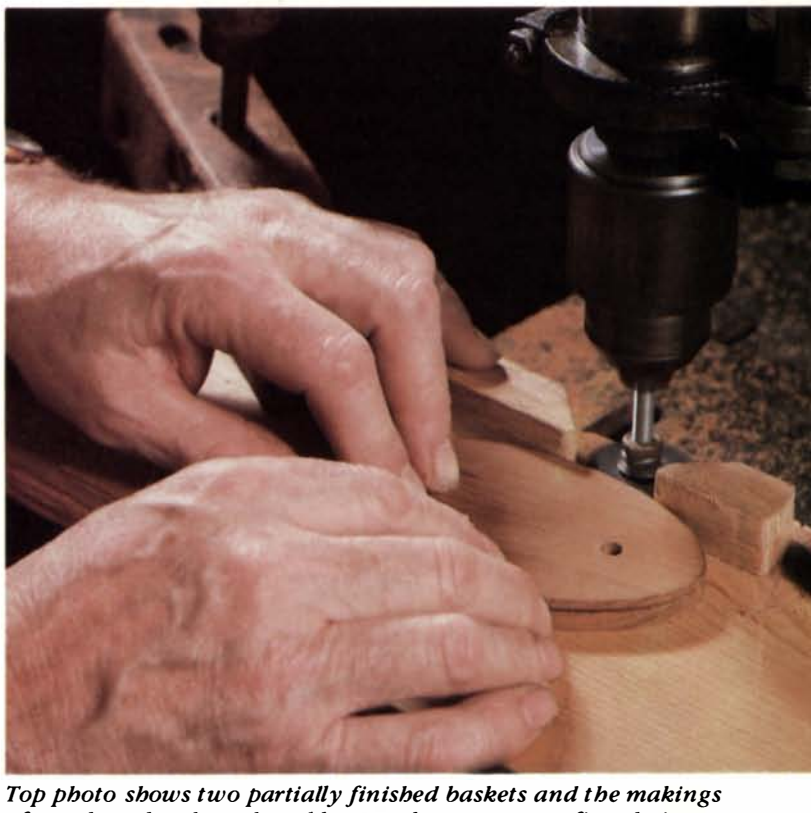
The weaving cane is a grade called superfine chairseat cane, which can be bought from many hobby shops or mail-ordered from general suppliers such as Constantine. One bundle of cane is enough for about six baskets. The top photo also shows the oval base of cherry or other hardwood, and brass ears sawn from 1/16-in. stock. The brass ears will serve to attach the lid, and can be made in whatever size is appropriate.

The next photo shows an oval basket mold, 5¾ in. by 8½ in. by 5½ in. high (about 1 in. higher than the finished basket). Hilbert makes molds by bandsawing four layers of 1¾-in.-thick fir. He saws the top oval first, tilting the bandsaw table about 3° so the sides of the oval will taper. Then he traces the next oval from the bottom of the first, and so on. After glue-up, Hilbert rasps and files the lower edge to a graceful curve and sands the mold smooth. The dowel at the top will serve as an axle, allowing Hilbert to rotate the work in a simple benchtop jig while weaving.

The staves will be glued into a 1/16-in.-wide sawkerf around the edge of the base. The bottom photo shows Hilbert cutting the groove with a 1¾-in.-dia. sawblade in his drill press. The kerf is one-third down from the top, and the shopmade fence is set so the kerf is about 3/16-in. deep. The kerf could also be cut with a handsaw, which is undoubtedly how they did it in the old days. The base is a 2⅞-in. by 4⅞-in. oval, ⅜-in. thick.

To shape the outside bottom rim of the base, Hilbert uses a router bit in the drill press. The top of the base is next shaped by hand to remove the sharp corner at its edge. Hilbert uses a spokeshave and file to gently round the top surface to blend down to the sawkerf, as shown in the drawing on p. 87. The base will be completely smoothed and sanded before weaving begins.

Hilbert next traces the base onto the bottom of the mold, and



Top photo shows two partially finished baskets and the makings of another—hardwood oval base, oak staves, superfine chairseat cane and shopmade brass 'ears' as anchor points for the hinges. The middle photo shows the built-up wooden form that controls the shape. At bottom, Hilbert cuts a groove in the base for the staves, using a small circular sawblade in a drill press.

routs a recess in the mold to accept the base. The recess brings the sawkerf in the rim of the base flush with the bottom of the mold. He then screws the base into position.

In the top photo on this page, weaving is under way. To get to this point, Hilbert first softens the staves by soaking them in water for three days, then inserts them into the slot one at a time, bending each to conform to the mold. A rubber band around the top of the mold keeps things in position as he proceeds. The staves were originally tapered on the bandsaw to allow space between them for the cane, and some of them must be tapered some more at this time, particularly where there are tight curves. The objective is to keep the gap between staves more or less uniform—it should be a little more than ⅛ in. at the top, and a little less than ⅛ in. at the bottom. After all the staves are inserted (as with any basket, always end up with an odd number), Hilbert wraps them tightly with cord and allows them to dry for 24 hours.

Hilbert advises gluing the staves in place after the shape has set. He pulls the bottom of each stave from its slot, applies a dab of glue, and reinserts it. He then starts the cane (which has been soaked in water) by drilling a small hole next to the center stave on one side, as shown in the drawing. From there, he weaves the cane around alternate staves, keeping it pulled taut to the mold and straightening and pushing each row down toward the base with the tip of a screwdriver, being careful to keep the rows of cane straight and even. In weaving, Hilbert suggests that instead of trying to push the cane under and over the staves in a straight line, as if sewing, it is much more efficient to slip the cane down from the top of the staves. Until the basket has been well started, this tends to spread the staves out from the form. Hilbert has devised a loose oval collar (of plywood and an inner tube) that fits around the top of the form. This prevents the staves from springing out too far, yet is loose enough for him to work the cane over and under the tops of the staves.

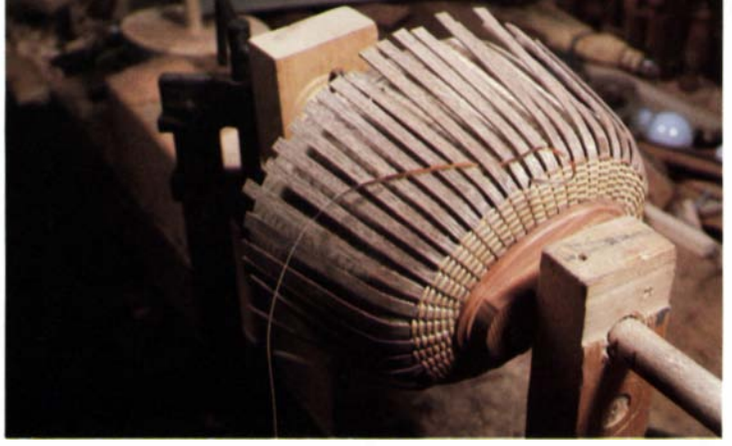
When Hilbert reaches the end of the first strand of cane, he interweaves a new piece (also shown in the drawing). Hilbert emphasizes that the staves should be kept vertical as weaving proceeds. He marks vertical reference lines at places around the sides of the mold as a guide.

When the weaving is within about 2½ in. from the top of the form, Hilbert marks a level line all the way around the top of the staves, gauging down about 1 in. from the top of the mold, and cuts the staves to the left and right of the center staves to final length with a sharp chisel (the rest of the staves will be trimmed when weaving is finished). He then makes a pair of brass ears to fit the basket and rivets these to the inside with No. 18 brass escutcheon pins (from Constantine). Hilbert removes the basket from the form while riveting the ears, then puts it back to continue weaving. The cane goes right over the brass, to within about ¼ in. of the gauged line.

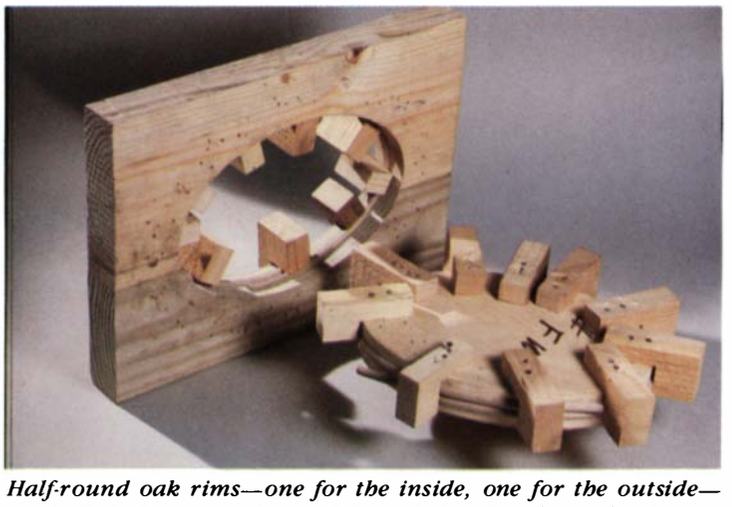
A bentwood rim fits just above the last row of cane and binds the staves together. Hilbert planes, scrapes and sands two 5/16-in. half-round oak strips (one for the inside, one for the outside), soaks them in water for three days, then boils them for 30 minutes before wrapping them into a pair of bending forms, as shown in the center photo. Drying takes three days. Then the inner rim is dry-fitted to the basket, stretching it as much as possible before marking it for cutting. Both ends of the strip are feathered to make a scarf joint, as shown in the drawing, overlapped and glued. Hilbert then does the same with the outer rim, but this time he makes the joint on the other side of the basket, diagonally opposite the first.

When the glue is dry, he positions both rims on the basket and marks and trims the staves so they will be flush with the top of the rim. He then drills and rivets the rims clear through every third or fourth stave, making sure that a rivet goes through each glued scarf joint to secure it. The drill bit is simply a No. 18 steel brad with the head clipped off. Hilbert places the brass pins in the holes as he goes along, cutting off the head and any excess length on the inside with pliers. He smooths the nipped ends with a file, leaving enough for final riveting with a ball-peen hammer. He then files the riveted ends even with the oak, covers the upper edges of the stave-ends with a single strip of medium cane, and binds around the top with weaving cane, as shown in the drawing. If you don't have medium cane, Hilbert suggests that you can plane down the strip of heavier cane that suppliers routinely tie around the chairseat cane.

He next bends the oak handle around a horseshoe-shaped ply-

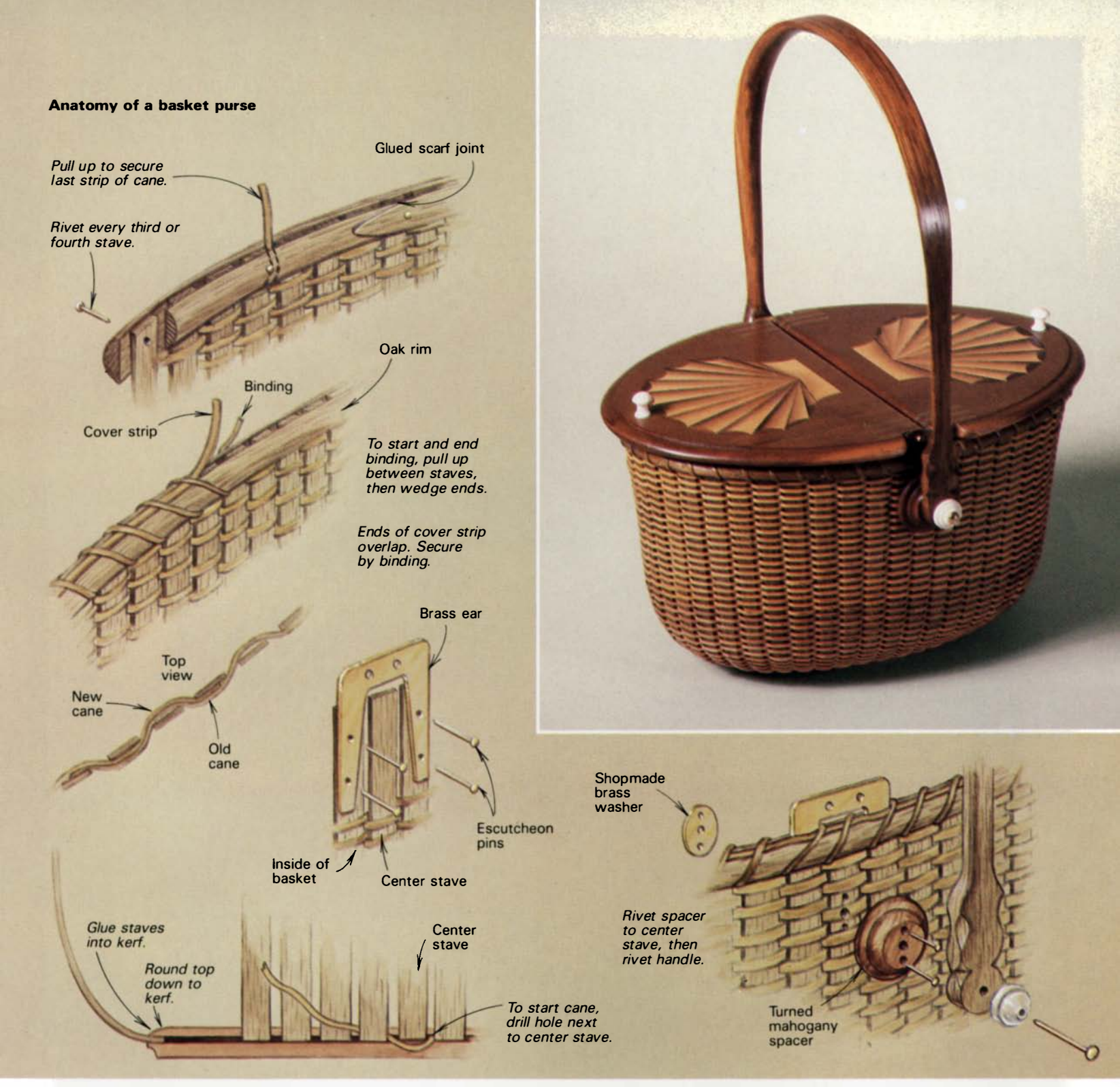


Successive rows of cane that have been straightened and pushed toward the base with the tip of a screwdriver. To keep rows even, apply slightly more pressure on the sides than at the ends.



Half-round oak rims—one for the inside, one for the outside—are boiled, then wound into shopmade bending forms for drying.

Hilbert reinforces the wood at the hinge points by epoxying brass strips into saw kerfs. Lid is bandsawn oval after fitting.



wood form and clamps it in place to dry for three days. He has had his best success working with green oak, soaked in water for three days, then boiled for 30 minutes. After drying, the handle can be shaped with spokeshave, rasps and files. Hilbert suggests that it is much easier to shape the inside surface of the handle if the bent blank is clamped in a U-shaped plywood cradle held in a vise—if you try to do it freehand, it's like wrestling with a snake. Each craftsman tends to shape handles differently, something of a personal trademark.

Hilbert hinges the double lid by means of 1-in. No. 2 brass wood screws through the ears. He reinforces the wood by epoxying thin strips of brass into bandsawn kerfs (bottom photo, facing page). With the lid blanks hinged in place, he marks the profile by tracing the basket's rim, then removes the lid, bandsaws it to shape, and proceeds with edge treatment and decoration.

This particular basket has shell inlays made of 14 pieces of satinwood, charred on one edge in hot sand to create shading, and 13 pieces of crescent-shaped mahogany. Turned mahogany spacers keep the handle from contacting the lid. They are riveted to the center stave with No. 18 escutcheon pins, as shown in the drawing, then the handle and its decorative ivory knobs are riveted through with No. 12 escutcheon pins. Finishing touches include turned ivory knobs on the lids and a finish of one coat of thin shellac and two coats of satin varnish, applied to the cane as well as the wood. The basket is then waxed and buffed. □

Charles Carpenter is an author and art historian who lives part of the year on Nantucket Island. For more on bending wood for baskets and other purposes, see FWW on Bending Wood, *which is a collection of articles from back issues of* FWW.

Photos: Arthur d'Arazien; drawing: Mark Kara

Hexagonal Table From Buckled Burl

A new approach to an old pressing problem

by Preston Wakeland

When I was approached by a customer to build a hexagonal table with an elm burl center and walnut trim, I decided on a pattern of triangles whose points would all meet in the center, as shown in the photo below.

Carpathian elm burl veneer is tricky to handle because the sheets are almost always badly buckled and puckered. This makes it impossible to lay out a pattern on the sheets and cut them to exact size. The traditional way of using such veneer is to flatten the slices first, as described in the box on p. 90, then cut the required triangles and tape them all together before veneering. Because burl veneer has grain running in all directions, it is very flaky. The prospect of flattening, cutting and taping 12 matched triangles without losing at least one crucial chip seemed very remote to me.

I decided to try an experiment which, I've since found out, is not entirely my own invention, although it isn't common knowledge either. I laminated the buckled veneer directly onto a ¼-in. fiberboard substrate, then cut the laminated pieces to the necessary shape with a router. I found that the technique makes the traditional flattening step unnecessary, provided that the veneers are not too dried out and brittle and that grain direction is random. Most burl can be laminated down quite well without preflattening, but some feather-figure veneer would probably crack up the middle. You can test pieces by trying to flatten them by hand. If they resist too much, dampen and flatten them first.

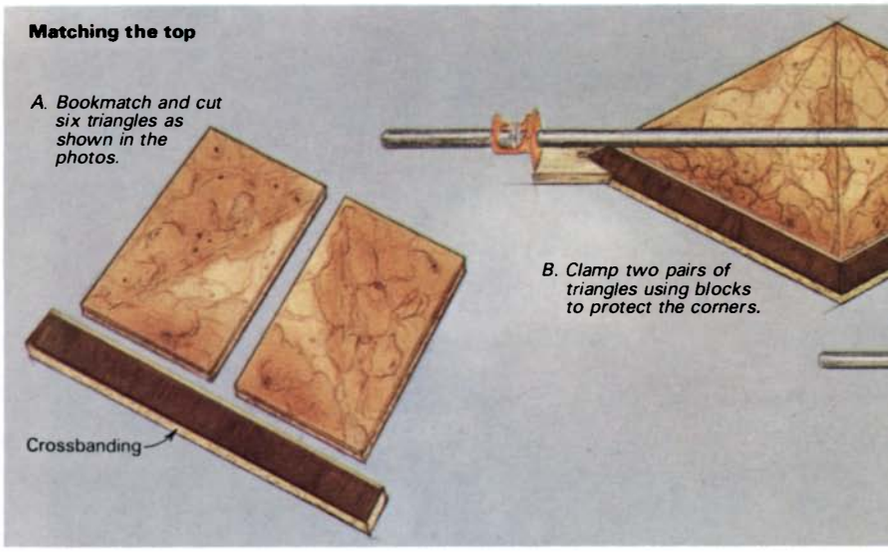
Once mounted, the backed-up veneers not only resist cracking and chipping, but the router's high-speed action makes cutting a breeze. The process is a little more complicated than conventional methods, but more than one book I have on veneering warns that making several pieces of veneer come together at a point is a difficult task, if not impossible. With this system it's relatively simple.

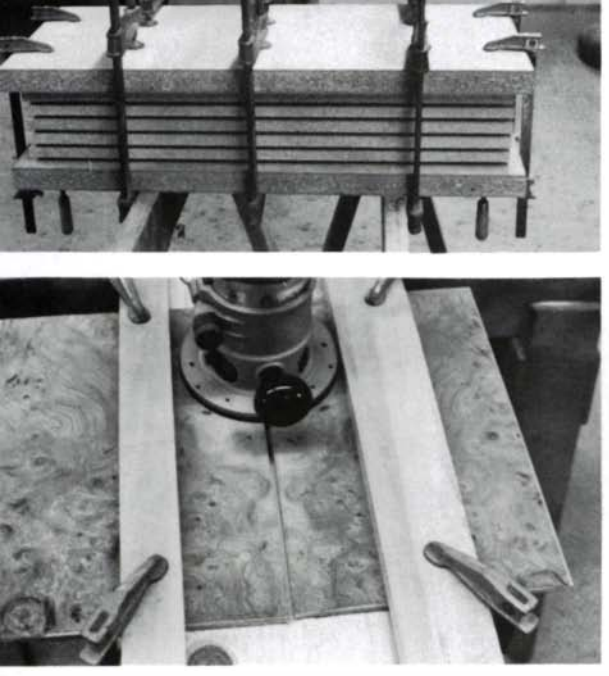
I began by selecting a grain pattern on the flitch that I thought would look good matched up, then I cut 12 consecutive pieces. It is not important at this stage what shape and size these pieces are, as long as they are big enough to cover the design. Mine, in fact, were rectangular. I arranged the slices as six sets of bookmatched pairs and numbered the sheets in the order they came from the flitch.

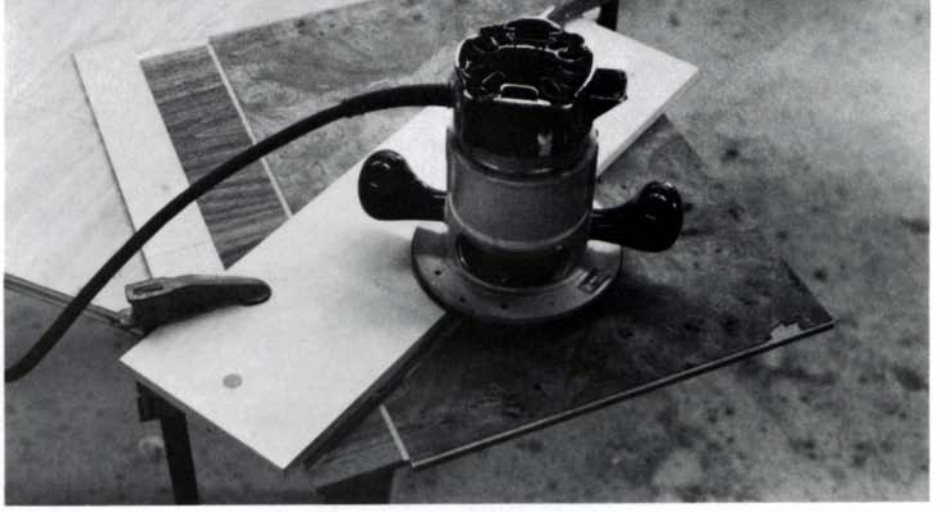
After selecting the pieces for the face, I cut an equal number for the back of the substrate, using a less attractive area of the same flitch. If both faces of the substrate are not laminated, the work will begin to warp almost instantly when removed from the press. I chose Fibercore (a 48-lb.-density fiberboard made by Plumb Creek, of Columbia Falls, Mont.) for the substrate instead of particleboard or plywood because I couldn't afford any chipping, no matter how small—any chip might take some of the surface veneer away with it. Fibercore has the texture of hardboard, a uniform thickness throughout the sheet and comes flat, not warped.

I use plastic resin glue for veneering, and I bend one cardinal

The finished surface of this burl-top table shows no evidence of its multi-layer construction.







At top left, unflattened veneer sheets are laminated onto ¼-in. substrate in a small press made from a solid-core door. Particleboard spacers separate the layers. To rout the first seam, left, clamp the pieces and cut both sides of the seam in one pass, guiding the router against one of the clamp strips. Above, cut the sides of the triangles in two passes, the first with a guide bushing to rough-cut about ⅛ in. from the line, the second by running the flush-trim bit directly along the guide board.

rule because I always apply a very thin coat of glue to the veneer itself, as well as a heavier coat to the substrate. I first apply glue to the substrate with a short-nap roller, then as the roller starts to dry out, I give the veneer a pass—it flattens enough under the pressure to be evenly covered. I take great pains not to get the veneer too wet, because too much moisture would cause it to expand in the press, then shrink and crack after the job was finished. If I don't have enough glue on the roller to get even coverage, I pick up some from the thin layer on the substrate, not from the pan. Using this method I have never had trouble with bubbles or loose edges, and my veneer has never yet cracked from excessive shrinkage.

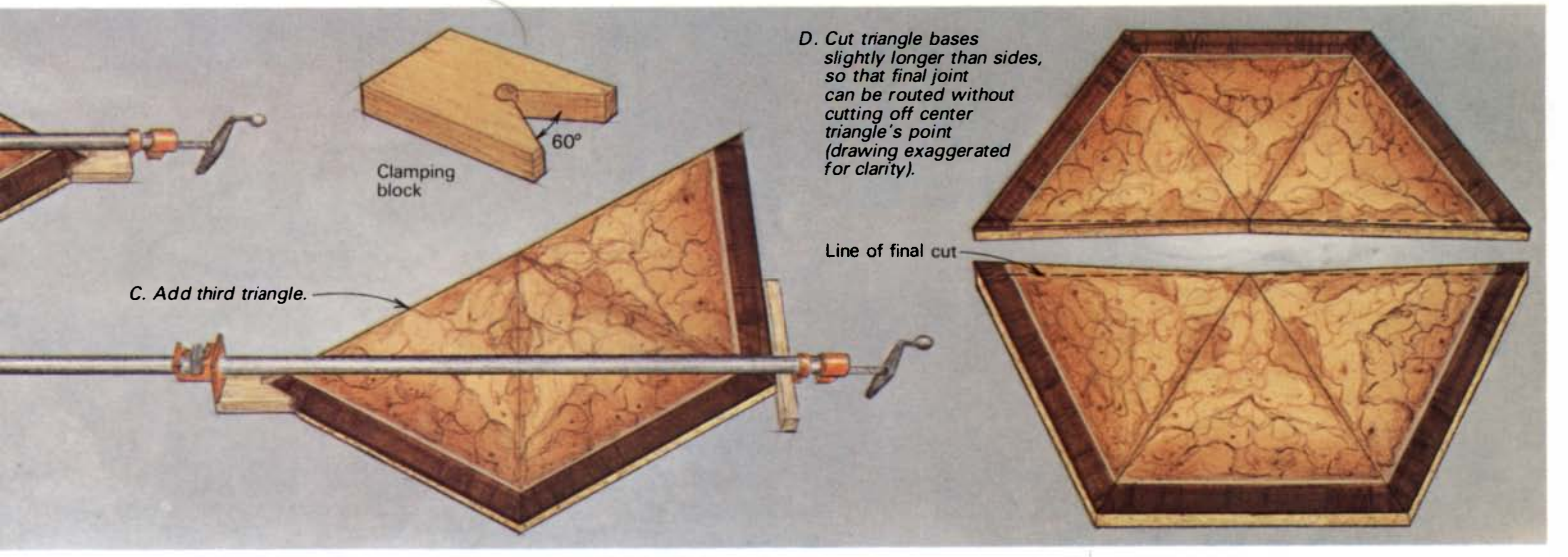
Instead of my veneer press, which would have been cumbersome to load with so many small pieces at once, I made a press from two halves of a solid-core door and some particleboard spacers. It is imperative that waxed paper be placed between the veneer and the parts of the press, because elm burl is so porous and so full of small checks and cracks that some glue certainly will seep through (the defects are eventually filled with colored wood putty and sanded level). I glued the pieces up in a pair of stacks in the press: first waxed paper, then the bottom veneer with the substrate and the face veneer, then waxed paper and a particleboard spacer. And so on. I then applied pressure with bar clamps and let the whole works sit for 24 hours.

When I removed the pieces, I set them on edge for a day or so to dry thoroughly. They must not be allowed to lie flat during this time, or moisture will escape faster from one face than the other, causing the pieces to warp.

The first step in bookmatching the tabletop was to make six pairs of matched panels to be cut into equilateral triangles. To cut the first seam, which would end up along the altitude of each triangle, I rough-sawed the joint about ⅛-in. oversize on the tablesaw, then set up to make the final cuts with a new carbide flush-trim router bit. To guide the router, I clamped the two panels as shown above in the lower-left photo. One of the clamp strips is a straight fence located so that the router bit runs down the middle of the seam, cutting about ⅛ in. from each side. With this system, any irregularities are cut into both pieces at once, and the seam closes up with very little pressure during gluing.

When the glue dried, I had six irregularly shaped rectangles with a nifty bookmatched seam up the middle. I used the tablesaw to square the pieces at a right angle to the seam, and glued on my 2-in. walnut crossband trim, which I had laminated to Fibercore in the same manner as the burl.

When these joints were dry, I laid out the other two sides of each triangle so that the baseline would be a tiny bit longer than the sides. This was to ensure that the two halves of the tabletop could be trimmed with the router without removing any of the triangles' points (see step D in the drawing below). I cut the sides of the triangles by laying a straightedge directly on



Rejuvenating veneers

by Ian Kirby

Spectacular crotch, burl or wild-grain veneers are sometimes so badly buckled, cracked or brittle that they seem practically useless. But such veneers are too beautiful to pass up, especially if you can buy them at bargain prices. Veneer suppliers are often eager to get rid of small parcels of abused-looking veneers and cut-offs from much longer, flatter slices. If you can flatten this stuff, you can create spectacular effects by joining the pieces together end-to-end or with some type of multi-match method.

Veneers become brittle and buckled because of drying out, poor storage conditions and age, but you can rejuvenate them. The usual way is to introduce moisture into the veneer at a very slow rate, in order to increase its flexibility, then to flatten it and allow it to dry under pressure.

You'll need a clean, flat, moisture-resistant work surface—plastic laminate is fine, but you can use a table or floor covered with a plastic sheet. You'll also need a pad of newsprint paper, an inch or so larger than the veneer, and a spray bottle full of clean water. Be sure to use clean newsprint, not your daily newspaper, or you'll get ink all over everything.

Dampen the newsprint and the veneer with a very light spray. Then stack the veneer sheets with two or three sheets of newsprint between each slice. Enclose the entire stack in a plastic sheet, then allow two or three days for the moisture to be absorbed by the veneer.

To test the veneer, lay a piece onto a flat surface and carefully try to flatten it by hand. In some cases, the veneer may resist being pressed or make cracking sounds, it which case it is not yet ready. If necessary, repeat the moisture treatment. Don't try to hurry the process. Raising the moisture content of the material without getting it too wet is a slow process. It's a fine line between sufficient and too much. The result of too much is mildew, which may permanently discolor the veneer.

When the veneer is sufficiently flexible to be pressed, the excess moisture is removed. Stack the veneer with three or four sheets of dry newsprint between each leaf and apply sufficient weight or pressure to flatten the stack. The newsprint will gradually wick the moisture from the veneer. Check the stack's progress after two days, and replace the newsprint with fresh, dry sheets if it seems necessary. You might have to repeat the treatment a third time, but eventually, the veneer will be dry enough to use.

Now that you have workable sheets of veneer, don't leave them out in the open where they will quickly buckle again. Put a sheet of newsprint between each slice, wrap the whole package in plastic and store it on a flat surface under weight.

An old technique for handling buckled veneer was to size it with a dilute glue solution and glycerine before flattening. This method is messy and has never seemed to me to be worth the trouble.

It has long been the practice with fragile veneers to glue them onto a sturdier backing veneer such as African mahogany or poplar. Even after the pieces of veneer are glued together, store them under pressure on a flat surface.

This whole process isn't as long-winded as it may sound—it's a little work over a long period—and the net result is that you end up with some beautiful and usable material. □

A little water, patience and pressure can transform bumpy veneers (bottom three sheets) into workable material (top sheets).

Ian Kirby* is *a designer, educator and cabinetmaker who operates Kirby Studios in Cumming, Ga. He wrote a series on veneering in* FWW *#46, 47 and 50.

the marks, then first routing a rough cut using a bushing. To make the final cut to the line, I simply removed the bushing and allowed the bit's shank to bear directly against the straightedge. After gluing the triangles together using 60° corner blocks as shown in the drawing, I matched the two halves of the top the same way.

The glued top at this stage was about 5/16 in. thick, and I was prepared to treat it like a pane of glass. Yet when I tested some of the scrap-wood glue joints they turned out to be very strong. I sanded the back so that all surfaces were flush, then laminated the top to a piece of ¾-in. particleboard. The rest of the table was made in a conventional manner using particleboard and walnut veneer fastened with plastic resin glue.

I have used this system several times now, and have come away with the following conclusions: Bumpy veneers require no flattening, thus eliminating the addition of extra moisture into the veneer. Splitting and cracking from cutting are eliminated even when cutting to a sharp point. Differences in veneer thickness can be dealt with by simply putting the faces flush when gluing up the seams. Laminating small pieces first reduces the need for a large veneer press.

I don't pretend that all veneering should be done this way. Certainly, conventional methods are faster and easier most of the time, but for me it provided a very slick way out of what could have been a very sticky situation. □

Preston Wakeland is a full-time cabinetmaker in Lockport, Ill. Photos by the author.

Survivors

With perseverance, it's possible to become a woodworker– earning a living as one is another matter entirely

by Roger Holmes

Fifteen years ago I decided to become a woodworker. Fed up with college and discouraged by the political and social climate of the times, I thought the life of a craftsman appealing. I liked to work with my hands and I wanted to be my own boss, working how and when I chose. I didn't worry too much about money, none of my friends did. It was the Age of Aquarius, after all. We were young and idealistic; to live righteously was to live well. Anyway, living was cheap then, particularly in Lincoln, Nebraska, where I lived at the time.

Quite a few craft woodworkers I've met started around the same time. By no means were all college dropouts or back-to-the-landers. Many sought in woodworking what they couldn't find as engineers, auto mechanics or computer specialists. Others chose it as a career from the start. Some had strong political motivations, others none. Their passion might have been design, technique or self-employment. For some, woodworking was an obsession, a way of life. For others, it was the spice, not the meat of life.

Much has changed since we all began. The Aquarian Age didn't survive the first oil embargo. Living is no longer cheap, even in Lincoln. What has become of the people who set up shop 10 to 15 years ago with high ideals and high hopes? To find out, I visited about two dozen woodworkers around the country last spring, ranging from perfectionists producing a few exquisitely wrought pieces a year to productionists producing thousands. All are bright and talented and could, almost without exception, earn a great deal more money doing something else.

Woodworking, like everything else, proves more complicated than it seems to the starry-eyed neophyte. Skills are difficult to acquire, shop space and machinery take time and money to secure. You soon realize that you're a woodworker at the bench, but a small businessman or businesswoman everywhere else. There are books to keep, bankers to convince, employees to manage, a roof to patch. On top of all this you're offering a product—high quality wooden furniture, say—that few people know about, fewer can afford and no one actually needs.

For some, these problems prove too much. Youthful enthusiasm fades, muscles ache. Wives and husbands, children, mortgages, doctor bills complicate life. Woodworking is satisfying, it's fulfilling, but it's too much work for not enough money. It happened to me, I decided to move on.

Others, more dedicated or more stubborn, face the same obstacles and stick with it. One of my first stops was to see Sam Jordan in my hometown of Lincoln. I have known Sam throughout the 10 years he has been woodworking. He's a good craftsman, and one of the hardest working people that I know, yet last year he took home only $7,000. Without his wife's dependable income from teaching, Sam could not meet basic living expenses.

One of Sam's goals was to make things of his own design, speculative pieces if possible, commissions if not. But as I walked through his small showroom, I saw the same pieces I'd seen there two years before. The workshop, however, was reassuringly cluttered, busy. "I've got plenty of jobs," Sam told me, "but I can't make money off them." The large library commission he was working on at the moment, for example, had dragged on, tying up the shop for three months. Now, Sam figured his assistant would make more from it than he did (a tale I would hear with disturbing frequency during my travels).

Sam is as stubborn as he is hardworking. A trained auto mechanic, he got fed up with grease and employers and turned to woodworking for job satisfaction, not for an easier way to earn a living. He's refused more lucrative but less-satisfying work, preferring to do the fine joinery and one-off furniture that he loves. Recently, however, he's been talking with a friend in the millwork business about setting up a shop together. By combining their hand and machine skills, they could tackle less labor-intensive and more profitable work, including top-of-the-line millwork and commercial cabinetwork.

Sam has mixed feelings about the prospects. "I enjoy what I'm doing now. If we go ahead, the one-offs will be few and far between. The more business you get, the bigger you have to become—I don't want to run a business and see my bench gathering dust." But necessity is the mother of compromise. "He's real tired of being poor," Sam said, "and so am I."

To a certain extent, Sam's problems are exacerbated by his location. Lincoln is not the greatest place for a craft furniture maker. A city of barely 200,000, the pool of potential customers for expensive one-off pieces is shallow. When the local economy is stagnant, as it is now, the prospects are even bleaker. Because craft woodwork is a marginal product—no

Phil Winston

Sam Jordan at the jointer in his Lincoln, Nebraska shop. He's found that used industrial machines give him big-shop performance at small-shop prices. Jordan's straightforward designs combine hand and machine work. Though most of his work is commissioned, this wavy oak desk (top) is a speculative piece.

Steve Jenkins (left) and Steve Lee in their Dallas workshop. By offering a high-quality design and build service, they can solve problems most contract furnishers are unable to address.

one really needs it—a large, or at least a healthy market is essential for survival.

Some 500 miles south of Lincoln is arguably the largest, healthiest market for non-essential products in the country, if not the world. From the air, Dallas' acres of opulent houses look like pricey mulch around the clustered stalks of multi-million dollar corporate high-rises. These palaces need furnishings, and Steve Lee and Steve Jenkins, whom I'd come to see, have set their sights on providing them.

Lee and Jenkins run The Wood Gallery out of a nondescript concrete block building in a stylish low-rise office park, surroundings that help to establish their credibility with the corporate clients that make up 90% of their business. When I arrived, the carpeted showroom contained a dozen pieces, ranging from a solid-mahogany executive desk in a restrained Georgian style to a simple modern desk made of three solid-mahogany slabs. It was good work, equal to or better than most upmarket contract furniture I've seen. Behind the showroom is a cavernous 7,000-sq.-ft. shop, divided into machine and finishing rooms. The machinery is mostly new, top notch and heavy duty. Their huge panel saw will rip an 11-ft.-long sheet, the spray booth is the size of a rec room. There doesn't appear to be a workbench or woodworking vise in the place.

Lee and Jenkins are machine woodworkers by background, preference and necessity. "The problem with a lot of handwork," Lee explained, "is that it's not economically feasible. We don't feel we're reducing the quality by using machines, just reducing the time." When time means quality, they'll spend it. I watched Jenkins take 15 minutes to fit a divider assembly into a credenza just so, no play in any direction. The critical comparison here is not between hand and machine methods, but results. Lee and Jenkins' competition isn't makers of gallery-quality one-offs, but millwork shops. Few of them exhibit comparable attention to detail.

A difficult task for any business trying to sell quality products is conveying to the customer what quality is. This is particularly so for woodworkers selling to a public that sees so little top-notch furniture. Most people, for example, have no idea how furniture is, or ought to be, put together. During my visit I eavesdropped as Lee discussed with a purchasing agent a bid for 118 occasional tables for the exclusive ($600,000 and up) boxes in Texas Stadium. At issue was the qualitative difference between the solid-wood spline-mitered Parsons table Lee was proposing and a plywood, edge-banded table offered by a millwork house. Using similar tables in the showroom as examples, Lee explained that the more substantial joinery of the solid-wood design would stand up to the expected wear and solid-wood could be easily refinished. It was an enthusiastic soft sell wrapped around a lesson in wood technology. They got the job. "What convinces them," Lee said in the showroom later, "is showing them the difference between doing it one way or another. Quality is easy to promote once you get them here."

To reach more clients, Lee and Jenkins arranged last January to be represented by a firm that handles a dozen lines of contract furniture. The firm has a showroom in Dallas' swanky World Trade Center and keeps three or four people on the road calling on furniture dealers, architects and designers. The reps believe the Wood Gallery could be a $2-million-a-year business. Lee and Jenkins would like to make it happen. When they moved from New Orleans to Dallas, they doubled their gross the first year, added another 40% the second and hope to top $250,000 this

year. But it's a big jump from a two-man, $250,000-a-year shop to a $2-million-a-year business. To accomplish it, Lee figures they'd have to add a line of production furniture to their custom work.

Lee and Jenkins have succeeded, like many other of the craft woodworkers, by selling a service, not a product. The service is problem solving, the solution is wooden. The problem may be simple—I can't find a work table exactly *this* big—or complex—I need to seat eight people for a conference in this awkward space. The ability to solve an individual's problem sets them apart from manufacturers selling a set line of goods; the ability to execute the solution to a high standard sets them apart from ordinary shops.

Production work will move Lee and Jenkins into direct competition with established manufacturers and will present a whole new set of problems. Lee is cautious. Product development takes time, and both he and Jenkins are working long hours now just keeping up with custom commissions. Hard work has its rewards. Lee, for example, owns two good cars, a sprawling ranch-style house in a desirable neighborhood, sends his two children to private schools and can afford to take the family off for regular vacations.

What success has cost is time. The day I visited, Lee finished up about 9 o'clock at night, and I thought of a comment he'd made earlier in the day. "I'm not seeing my children grow up," he had said. "I'm missing a part of life that I won't get a chance to see again." It was an offhand comment, echoed in various forms throughout my trip. Everybody expects to pay their dues, putting in four or five years of hard slog to get established. But after 10 or 15 years of it doubt sets in: This wasn't what I had in mind when I started. Lee, for example, told me that if he knew 12 years ago what he does now, he wouldn't have done it.

There's no question that craft woodworking is a labor-intensive business, but it also seems to attract people who hurl themselves without reservation into whatever they do. For a host of reasons—politics, social conscience, morality, ethics or personal pride—they all attach more significance to what they do than the simple production and sale of a wooden item. I've yet to meet a craft woodworker who got in it for the money. In the beginning, at least, their commitment to craftwork goes beyond business considerations.

Take the commitment to quality. Dissatisfaction with the quality of consumer goods has been a strong motivation for many craftsmen and craftswomen, a dissatisfaction often extended to the whole of middle-class life—ersatz antiques, wood-grained TV cabinets and so on. Instead of these tacky trappings, craftsmen and craftswomen would produce handsome, well-made things of lasting value. Well-made things, moreover, enrich the life of the owner in use, as they enriched the life of the maker in the making.

More than 100 years ago a similar, though much smaller, group of people in England and America took up craft work for many of the same reasons. The Arts and Crafts Movement, as it came to be called, is the ancestor of our recent craft revival, and there are parallels between the two. The 19th-century's consumer boom was due to the concurrent rise of the middle class (what we would now call the upper middle class) and mass production. The resulting shoddy goods, according to the Arts and Crafts theorists, degraded their users just as the assembly line degraded their makers. To counter this, the Movement called for a society of craftsmen and craftswomen living wholesome lives producing useful, pleasing goods for sensible, quality-conscious consumers.

Sounds a lot like the 1960s, doesn't it? Though the pioneers of the second craft revival date from the 1940s and 1950s—Wharton Esherick, Bob Stocksdale, Sam Maloof—the revival really took off during the mid-1960s and early 1970s. It was a time of plentiful goods and seemingly limitless horizons, and a time of considerable disaffection. In the midst of such plenty, obtaining a college degree or work at a boring job seemed less worthwhile than the righting of society's wrongs, or the fulfillment of dreams of creativity and independence. You might find fulfillment by opting out of the mainstream and setting up as a craftsman. If enough people followed suit, the nature of society couldn't help but change.

Society has absorbed a vast increase in the number of craftworkers since then with few visible signs of reform. However, many craftworkers have seen their ideals take a pounding. I figured Mendocino, California, would be a good place to check on the well-being of early fugitives from the mainstream. From the late 1960s, Mendocino attracted a varied collection of craftworkers, including quite a few woodworkers. The land was beautiful and cheap and if the locals weren't exactly friendly, they left you alone to build your place and your life as you wished. Furbishing cafes, stores and homes of more affluent residents and selling one-offs to tourists brought enough cash to cover the modest cost of living.

Today, the once-remote backwater of nonconformity has become a desirable watering hole for well-heeled urbanites. Buildings that might have been bought for back taxes 20 years ago are worth half-a-million dollars today. House and land prices have shot up. It's not surprising that new woodworkers are more likely to move to the area in a Bekins van than a microbus.

All the woodworkers I visited there were living comfortably, but most didn't seem to need much cash to do so. The early arrivals had established themselves before things got expensive; newcomers came with money or had good contacts. Prospects for area woodworkers are improving after a shakeout during the recession of the early 1980s when a number of people moved on.

Gary Church and Steve Doriss, both long-time residents, have recently joined forces to do upmarket cabinetwork. Like many others around the country, they hope it will provide that elusive combination of challenging work and adequate pay. When I arrived at the weathered barn that houses their workshop, the partners were puzzling over a construction problem on an Art Deco-style cabinet, part of a $50,000 job refitting an entire 1930s house near Los Angeles. As they talked about the future, I was heartened to see such enthusiasm in two seasoned veterans. Like other pioneer woodworkers in the area, their intensity and drive have probably kept them going through the years; those with lesser commitment wouldn't have made the sacrifices. The idealism that underlies the commitment has been tempered over the years by experience. As Church observed, "at some point you've got to choose between the stars in your eyes and the money in your pocket."

Specialist joiners and specialist cabinetmakers seemed healthy, or at least optimistic in Mendocino, but one-off furniture makers had problems here, too. Whenever the subject came up, people mentioned Craig Marks. Five years ago, Marks, then a newcomer to the area, was winning awards with his sophisticated furniture. He was, by consensus, the one-off maker thought most likely to succeed. Today Marks lives in Santa Barbara, a partner in a shop making high-quality cabinetwork for high-rolling south-

ern Californians. I phoned him to find out what happened.

Put simply, Marks discovered that he couldn't make his painstakingly detailed furniture fast enough to earn a living at it. Despite 100-hour weeks, he was able to produce just six to eight pieces a year. Almost all this work was sold through galleries, and the 40% mark up, Marks said, "finished me off." Selling $20,000 desks on a regular basis was clearly impossible, so after four years of non-stop woodworking, a burned-out Marks headed south. "Mendocino," Marks reflected, "was like college for me. When I went up I was very idealistic, I had an intense desire to make a living that way. As long as I had the desire, it worked. But if you're burned out and not making any money, why do it? I'm relieved not to be working so much now—there are other things in life."

Mendocino's beauty and its reputation as a center of craftwork continues to draw woodworkers. As the area has changed, so have the newcomers. Jim Marquardt bought his pleasant, slightly eccentric, three-story house on the coast for about $150,000 when he moved up from the Los Angeles area three and one-half years ago. The three-stall garage that he built to house his shop could have been lifted from any suburb in America. Inside, every tool is racked on pegboard, hardware and fasteners are suspended in jars on one wall, the concrete floor is spotless. I am reminded that this is Mendocino only by the ocean view out a large back window.

Despite his conventional surroundings, Marquardt is also a dropout, having given up a lucrative data-processing consulting business to turn a woodworking hobby into a vocation. "I work twice as much for a third or half the money," he told me. "But I enjoy it a lot more." Marquardt didn't burn all his bridges, however. Investments from this previous life and income from his wife's job provide a share of the family's livelihood. Marquardt augments antique restoration and refinishing with occasional furniture and cabinet commissions. After just a few years, the shop is paying its own way.

Marquardt takes his woodworking seriously, but he doesn't seem driven by it. "My number one priority in life is not working wood," he says, citing family, friends and home as at least equally important. A sensible attitude, surely, and if it isn't likely to lead to the creation of ground-breaking woodwork, I doubt that's Jim Marquardt's goal anyway. As I left Mendocino, I found myself wondering, though, if without the fervor and single-mindedness of the area's early woodworkers, people like Marquardt would have been able to come here and survive.

Jim Marquardt built his three-car garage workshop shortly after moving to the Mendocino area in 1982. He does a half-dozen or so furniture commissions a year in addition to bread and butter antique repair and refinishing.

Before visiting Mendocino, I spent a day in San Francisco at the American Crafts Council's Craftfair. One of four regional fairs sponsored every year by the ACC, the San Francisco fair was celebrating its 10th anniversary. Some 425 exhibitors, including 54 woodworkers, participated.

Craft fairs have come a long way since 1966 when 60 exhibitors were gathered in Stowe, Vt. by the ACC's Northwest Region and sold $18,000 worth of craftwork to a few thousand visitors. Last year the West Springfield descendant of that show grossed $6 million; nationwide, the four ACC shows pulled some $15 million in sales.

In San Francisco last spring, the booths had the feel of exclusive boutiques. The work was high quality and tastefully displayed to catch the eyes of the affluent clientele roaming the aisles. If the eyes belonged to a craft-gallery buyer, so much the better. Sales to galleries are the bread and butter of these shows, accounting for three-quarters of the nationwide ACC Craftfair gross last year. I wasn't surprised to find that production woodworkers—turners and boxmakers—were doing better business than one-of-a-kind furniture makers at San Francisco.

Production work conjures images of repetition, boredom and creative stagnation, and it has been looked down upon by many craft revivalists. But its attractions—repeated sales offsetting high design and technical development costs—are undeniable. In my travels, I found few furniture makers who aren't trying to design a piece producible in some quantity.

The boxmakers at the show impressed me. Nan and Bill Bolstad, for example, produce 800 to 1,000 little boxes a year in their Willamina, Ore., workshop. Sold through 60 outlets in 40 states at prices ranging from $100 to $1000, the boxes gross more than $100,000 a year, about half of which goes to support the Bolstads and their two children. It's not a great wage, given that Bill spends about 50 hours a week making the boxes (down from 75 hours with the recent hiring of a half-time assistant) and Nan logs 40 hours finishing, packing and invoicing them. They're also on the road about eight weeks a year doing shows. But the Bolstads, unlike many woodworkers, can afford health and life insurance, they take a regular two-week vacation each year, and they've got a decent chance of sending the kids to college. Though they have few romantic notions about woodworking ("I'm a businessman," Bill told me, "not an alternative lifestyle person."), they like what they're doing enough to pass up more lucrative but less-satisfying work.

Production work also has its downside, as I learned talking with Bill Hunter, a turner, at his show booth. After ten years turning for the gift market ("a $5 hair stick, four dozen a day, was one of my jobs"), Hunter found himself half-owner, manager, salesman, promoter and secretary for a five-man shop. These duties, plus 20 show dates a year, left no time for the creative woodturning that had captured his interest in the first place. "I was able to buy some property up near Yosemite, and the land payments got made," he explained, "but it was always hand to mouth—a bad show meant no money 'til the next time." He decided to change gears.

Hunter now works alone, near El Portal, Calif., producing

about 50 to 75 major pieces a year: precious objects in precious or unusual materials—amber, ivory, fossil walrus tusk, pink ivorywood—complete with registration number, title and a few of Hunter's thoughts while turning. His work fetches $400 to $2,000 from upper-middle-class buyers. People dropping that kind of money need special handling, so Hunter took a seminar that taught him, among other things, how to close a sale gracefully. Coupled with his wife's income as a jeweler, Hunter's current work affords him a comfortable, if modest, living. "Most of my successful friends aren't enjoying their work at all, though they make $50,000 to $60,000 a year," he said, adding, "I feel very lucky."

Precious objects, such as Hunter's turnings, form part of a growing glamour market in wood. Offered in toney galleries for considerable sums, these items range from the functional to the fanciful, from tiny *objets d'art* to large furniture. Makers of glamour, gallery-quality furniture, of all the woodworkers that I've talked with over the past several years, seemed to have the toughest time earning a living. I learned first-hand about their problems when I visited John Dunnigan in Rhode Island.

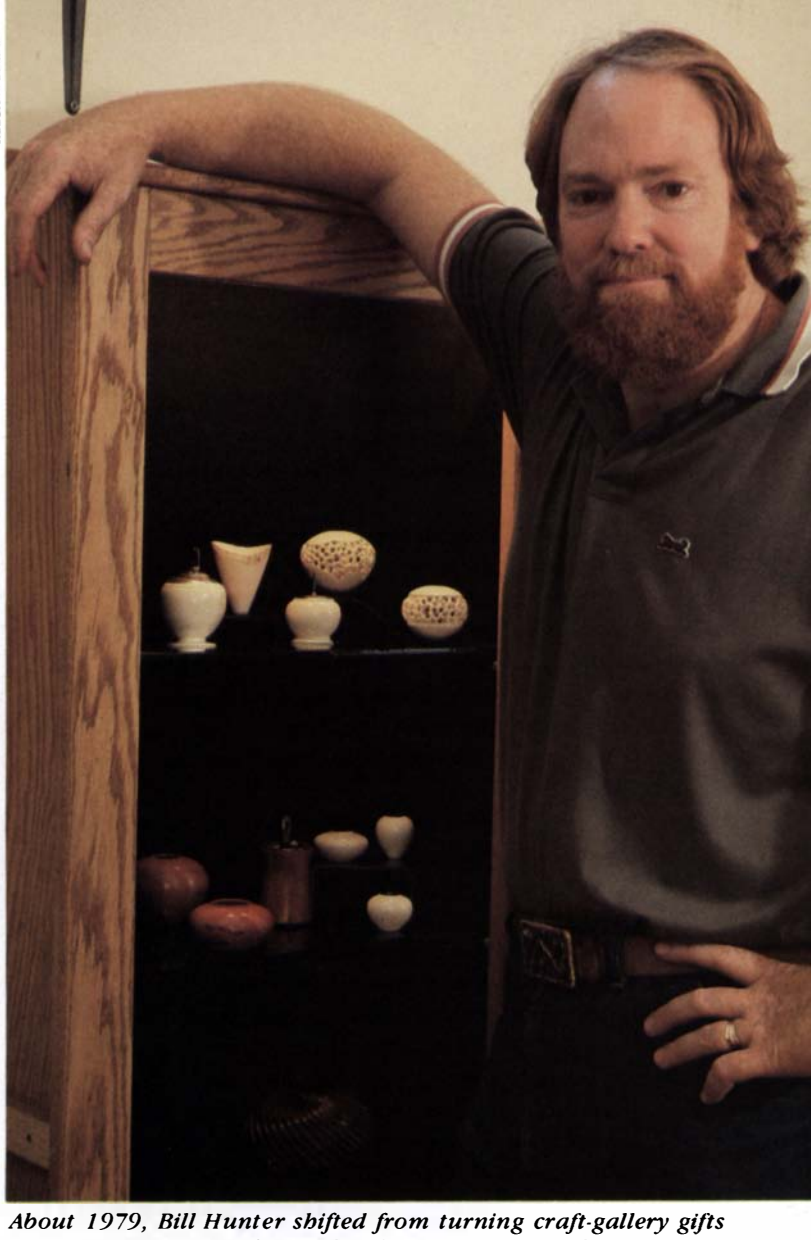
Dunnigan's furniture is sophisticated, flawlessly executed, enormously time-consuming and very expensive. He and two full-time employees make about 20 pieces a year in the basement workshop of his rural West Kingston home, and last spring he had commissions stretching well into 1986. He's just broken ground for a new, enlarged workshop. Liked and respected by his peers, looked up to by newcomers, Dunnigan is at the top of the professional heap. But this year, his 15th as a professional woodworker, the wage he pays himself won't come close to matching the union-scale earnings of a chain-store clerk.

Though the business itself is healthy and growing, Dunnigan and his wife, Tally, a professor of art history at the University of Rhode Island, wouldn't live nearly as well without her salary. Dunnigan's uncompromising approach to his work is at once the basis for his success and the cause of his problems. He may spend two days searching for the right fabric for an upholstered chair, or sweating a detail at the drawing board. Much time is consumed nurturing clients and commissions—he visits their house, they visit his, both visit the gallery go-between, and so on. To keep on top of a fickle, style-conscious market, he's constantly pushed (by himself and clients) to create something new, to outdo his last effort. It's stressful, demanding work, which, ironically, keeps him from the benchwork he enjoys.

Like every woodworker, Dunnigan has schemes for making life a little easier, paychecks a little fatter. Whether or not they come to pass may affect his bank account, but I don't think they'll affect his woodworking. Some people drive themselves to do what they do, others are driven by what they do. I think Dunnigan is one of the latter.

Glamour furniture doesn't come just in contemporary forms. There's an equally rarified market for traditional pieces—period reproductions and interpretations—of uncompromising quality. I wondered if it were any easier to earn a living the traditional way, so I headed to Boston and a talk with Gene Schultz, who's been making traditional furniture there for about 10 years.

A quick look around the 3500-sq.-ft. shop Schultz shares with his partner Steve McGrath and their three employees answered my question. There were a half-dozen repair jobs in various stages, the beginnings of two new Chinese-style tables, a stack of almost completed chipboard and melamine cabinets, a pile of sticks for *shoji* screens and a prototype for a modern chair, all ash



Robert Woolard

About 1979, Bill Hunter shifted from turning craft-gallery gifts to art-gallery collectibles, like the ivory and pink ivorywood pieces shown here. By cutting his production from thousands to dozens, he increased his take-home pay and his peace of mind.

John Dunnigan's workshop doesn't look much different than that of the average weekend woodworker, but the furniture he and his two assistants turn out there is as accomplished as any being made today.

and sharp angles. The meticulous period reproductions and interpretations I had expected to see account for only one or two of every 10 jobs they do.

Schultz and McGrath are graduates of Boston's North Bennet Street School, where the 18th century sets the standards and the methods. In 1975, they and four others set up a woodworking cooperative, sharing machines, bookkeeping and some work. Schultz built reproductions, largely by hand, sustained by idealism, enthusiasm, a small group of patrons and his wife's income. After four years, members began to drop out, endangering the shared overheads that had enabled him to survive.

"I realized I was living in a sheltered environment," Schultz said. "I wanted a taste of the real world. I wanted to prove to myself that I could survive. I could have sat back and gone on with work from those few people, but that would have been limiting my experience and development." Today, Schultz and McGrath make a roughly even mix of custom *shoji* work, antique restoration, and high-end custom building in a variety of styles for architects and designers. Schultz would like to do more reproductions, but the economics of doing so aren't promising. Rather than starve as period purists, Schultz and McGrath succeed by applying their hard-won period woodworking skills and knowledge to a wider range of work, by augmenting those skills with modern methods and by paying attention to business. They're not on easy street, but they're doing work they like and supporting themselves at it.

My trip was near its end. I'd met all manner of woodworkers and seen all manner of work, but had yet to meet someone who'd succeeded where I had failed: making moderately priced, high-quality, commissioned furniture, incorporating considerable handwork, without spending most waking hours in the workshop. I mentioned this to Dunnigan, who told me that his friend Hank Gilpin, up the road in Lincoln, Rhode Island, was my man.

Gene Schultz

Gene Schultz leans on two aspects of his business: an antique restoration and a custom one-off. The uncompromising period reproductions he was trained to make, like his mahogany block-front desk above, make up just 10% of the shop's output.

An engaging, voluble 38-year old, Gilpin lives with his wife and two young children in a converted Baptist church. His workshop, a 30-ft. by 60-ft. walk-out addition to the church basement, houses the usual array of light-industrial machinery, plus an aircraft-carrier-scale 20-in. jointer, and two or three assistants. Between 35 and 50 commissions go through the shop each year. He's got a year's worth of orders in hand, and turned down $100,000 worth of work last year.

Gilpin's explanation of his method was appropriately succinct: "Do as little of anything but work on the piece as possible." Fine, but what about everything else that needs doing? Client correspondence, for example? Postcards or telephone, answers

Gilpin. Billing? Doesn't send them. Contracts? Doesn't use them. Taxes? Half an hour a month. Portfolio? Snap shots as the piece goes out the door. Site visits, consultations, presentation drawings? Rarely has to. "Sixty to 70% of the people don't see anything 'til I deliver it," Gilpin explained, adding when he saw the incredulous look on my face, "maybe a rough sketch; finished drawings take a lot of time." On all but the largest jobs, payment is on acceptance. If the client doesn't like the result, they don't have to accept. To date, this has never happened. Despite his breezy manner, Gilpin's attitude to business is anything but cavalier—he knows exactly what his business requires and does it as quickly as possible.

Gilpin is equally efficient in the shop. Quick paper designs are fleshed out with full-scale mockups when necessary. Rather than rough, throw-away mockups, however, Gilpin carefully makes them of hardwood, then ships these off to a gallery, where they sell quickly, covering their cost and then some. Once worked out, details are likely to appear in various forms on a string of subsequent commissions. Orders for similar items are batched whenever possible; one trestle table is marginal, four make money. By using just a few woods, mainly cherry, maple and oak, and keeping large stocks on hand, he spends very little time chasing materials. He doesn't do much estimating. "If you sit down and figure it out," he told me, "you'll stop working right away because you'll see it can't be done. So why bother?"

Gilpin's no-nonsense approach owes much to his former teacher and employer, Tage Frid. After Gilpin set up in 1973, he did any kind of woodwork that would pay the bills. The hours were long, and for the first five years, the help made more than he did. Today, his pieces combine machine and handwork—all drawers are hand dovetailed, and lots of detail work is also done by hand. Handwork can be quicker than machine for small runs, it also sets the work apart from what you can buy in a store. "And," Gilpin adds, "it's a pleasure to cut a dovetail." If making the business go is Gilpin's first priority, enjoying the work is his second.

From the start, Gilpin had wanted to make high-quality, unpretentious furniture at prices his friends could afford. I could never figure out how to make that kind of furniture cheaply—my friends had as little money as I had. Looking a little farther down the road, Gilpin recognized that it would be the friends, not the furnituremaking that would change. "When I started," Gilpin recalled, "I told my wife 'we're not going to do well until our peers have established themselves.' Today almost everybody that buys from us is within two or three years of our age." And one-quarter of his clients earn under $35,000 per year.

"We don't turn down a job by price," Gilpin says. "If it's reasonable, we'll do it. Over the years we've done one woman's whole house at an average price of $400 per piece. We also allow installment payments. People say this is a terrible business practice—its a ***great*** business practice. It keeps the cash flow up... about 20% of our work is from people who can't afford the full price on delivery. It's gotten to the point where good design means expensive furniture. Good design means solving the problems. Designing a $10,000 table is easy. What about $2,000 for a table and some chairs?" Gilpin disagrees strongly with the view that business is a drag on creativity. "Why is earning a living such a negative thing?" he says. "Why do you have to do *just* what you want, why can't you do what somebody else wants your way?"

Hank Gilpin, center, and his assistants puzzle out a detail on a cherry desk. The kitchen table above, also in cherry, was designed for a family of eight.

So what did those miles of travel and hours of talk teach me? Earning a living as a craft woodworker is tough, and there is no panacea, no breakthrough that will provide a "solution" to the problem. Craft woodworking is, and I'm afraid will always be, a marginal business. It survives because people insist on doing it, not because people insist on having its products. The uncommon combination of design and technical skills, business acumen, sacrifice and sheer doggedness required ensures that financial success will always be difficult to attain.

Craft woodworkers are a stubborn, uncompromising, self-indulgent bunch. That's why there's so much good work and so many shaky businesses around. Like bumblebees, these businesses are able to fly only by the expenditure of terrific energy. Removing some self-imposed obstacles would help. If I had to select one pithy piece of advice from my travels, it would be Gilpin's: "do what somebody else wants your way." You needn't sell out to sell, but you *must* sell to survive. It's as simple, and as difficult, as that.

The best part of my trip was discovering that more professional craft woodworkers are surviving, and more comfortably, than I had expected. An accountant might disagree, but these people reinforced my belief that ledger-book definitions of success are misleading. Job satisfaction and style of life are as important to these folks as they were to me 15 years ago. To be sure, money is also important, but for most, $15,000 a year that allows them to live as they wish, doing what they wish, is worth $50,000 a year that doesn't. That's why the veterans keep at it, and that's why others will continue to join them, despite the odds. □

Roger Holmes is an associate editor of Fine Woodworking.

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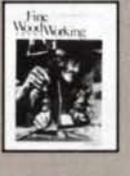

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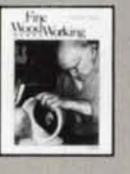

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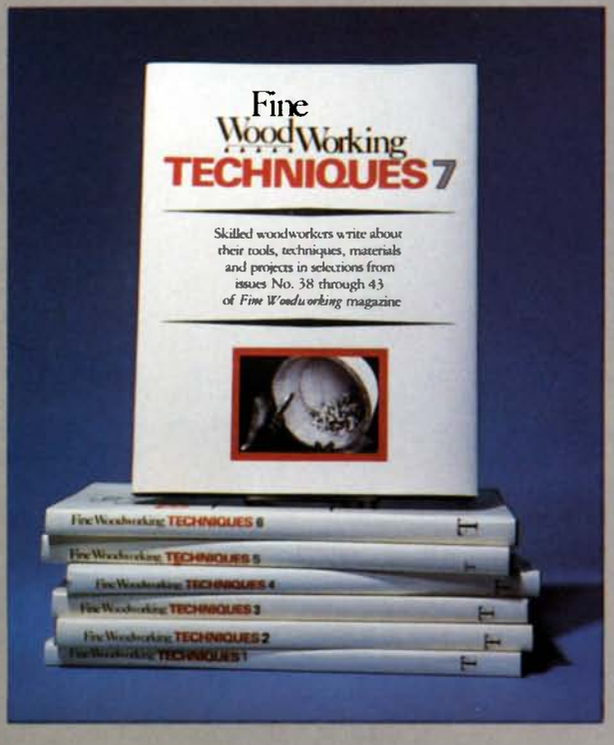

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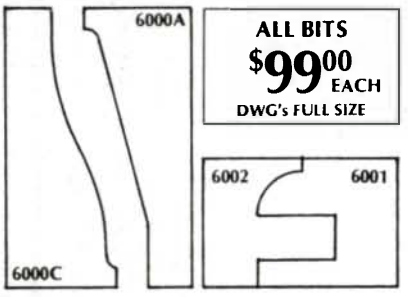

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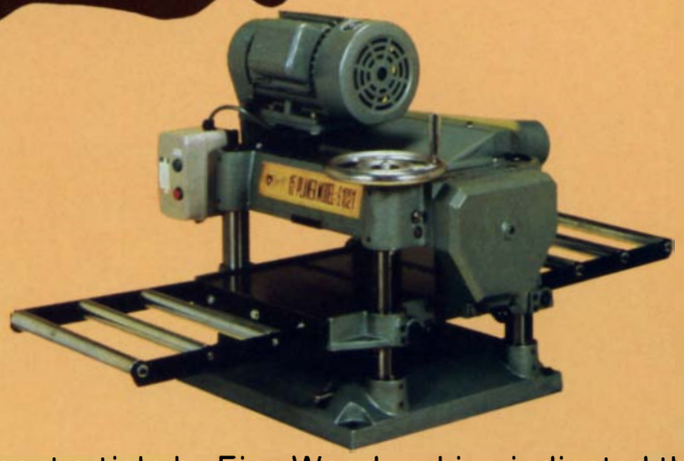

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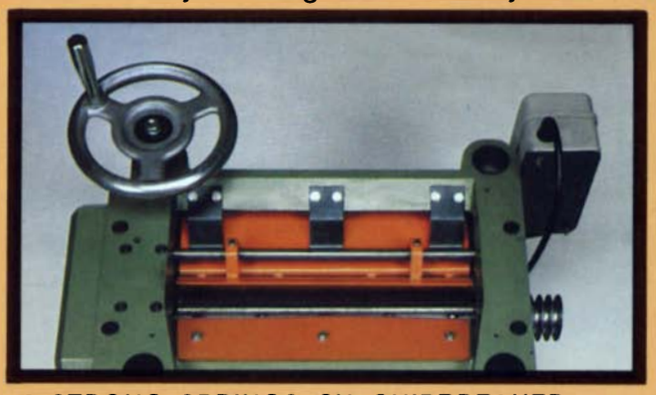

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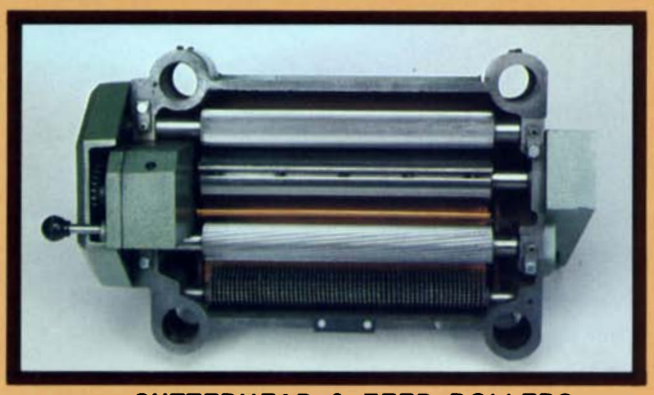

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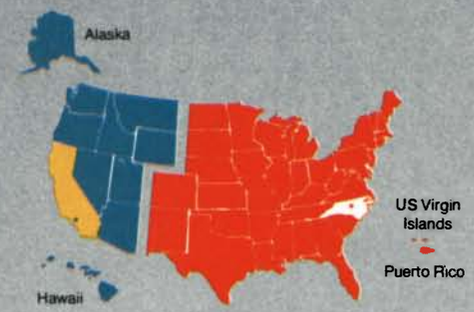

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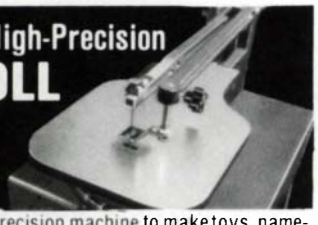

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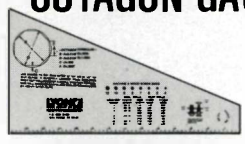

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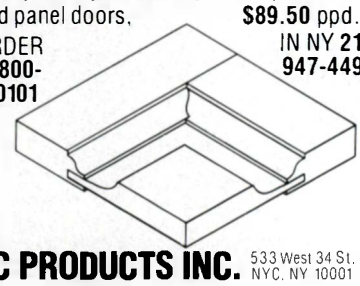

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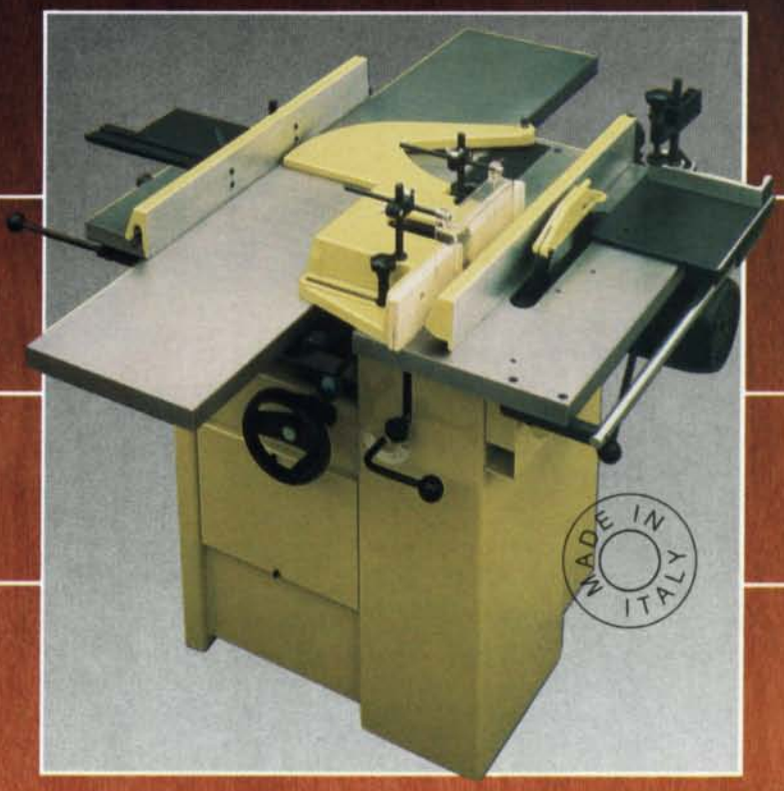

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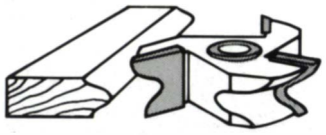

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TOOL CRIB OF THE NORTH SINCE 1948

RYOBI TOOLS

		List	Sale
S500A	3x5½ Finish Sander	70	41
SU6200	Finishing Sand. ½ Sheet	142	88
B7075	3x21" dustless Belt Sand.	179	116
B7100	3x24" dustless Belt Sand.	208	140
B7200A	4x24" dustless Belt Sand.	269	165
D100VR	3/8" VSR0-1200 rpm drill	91	49
W640	7¼" 13 amp circular saw	158	99
W740	8¼" 13 amp circular saw	171	109
JS60	Jig Saw-Single Speed	172	99
JSE60	Jig Saw-electronic v/speed	198	123
R150	1 H.P. Plunge Router	138	86
R330	2 H.P. Router	220	138
R500	3 H.P. Router	265	163
E3800	Drywall screwdriver 0-4000	126	79
L120U	3 5/8" Planer	142	89
BD1020R	3/8" 2-spd Cordless Drill w/free holster X-tra special buy	148	95
TS251U	10" Mitre Box	300	169
SG1150C	4½" H.D. Minl-Grinder	99	59

YOUR ATTENTION PLEASE!
All Above RYOBI TOOL Prices
Take Additional 10% OFF Sale Prices

MILWAUKEE TOOLS

		List	Sale
0224-1	3/8 drill 4.5A magnum	159	109
0234-1	t/2 drill 4.5A magnum	159	115
0244-1	t/2 drill 4.5A magnum	159	115
0222-1	3/8 drill 3.3A 0-100 rpm	146	99
0228-1	3/8 drill 3.3A 0-1000 rpm	129	95
0375-1	3/8 close quarter drill – NEW – 3.5 amp	175	118
0210-1	3/8 cordless drill – NEW – 2 speed	154	114
6539-1	cordless screwdriver – NEW – 190 RPM	84	64
1007-1	½" drill 4.5A D-Hdle	199	145
1107-1	½" drill 4.5A D-Hdle	204	145
3300-1	magnum rt angle drive kit	249	170
3102-1	Plmbrs rt angle drill kit	263	180
1676-1	HD Hole Hawg w/cse 2 sp	333	235
5395	3/8 sgle sp hammer drill kt	203	150
5397	3/8 var sp hammer drill kit	208	155
5371-1	HD mag. hammer drill ½"	287	207
5373	HD mag. ham. drill 3/8"	240	175
6511	2 speed Sawzall w/case	181	123
6226	port band saw 2 sp w/case	382	280
6234	TSC band saw port w/case	382	280
6365	7¼" circ.saw 13 amp.	159	109
6405	8¼" circ.saw 13 amp.	179	127
6460	10¼ " " 15 amp w/case	349	245
6377	7¼ HD worm saw 13 amp	235	155
6378	8¼ HD worm saw 13 amp	249	165
6165	12" Chop Saw 15 amp 4200 R.P.M.	267	189
6170	14" Chop Saw 15 amp 3600 R.P.M.	289	209
6255	v/sp Jig Saw 3.8 amp	199	140
6245	sgle sp Jig Saw 3.8 amp	175	125
6012	½ sheet HD Orb. sander.	159	110
6014	½ sheet HD Orb. sander.	169	115
5935	4" by 24" belt sander w/bag t0 amp	319	215
5660	1½ HP router 10 amp	256	175
5680	2 HP router 12 amp	314	220
8950	Wet/Dry 8 gal vac 6 amp	145	110

BENCH GRINDERS

4901	¼ HP 2.6 amp 24#	159	110
4921	⅓ HP 4 amp 26#	179	130
4891	½ HP 4 amp 41#	279	195
5041	¾ HP 8.2 amp 58#	379	270

DRYWALL SHOOTERS

6753-1	3.5 amp 0-4000 rpm new	115	79
6747-1	4.5 amp 2500 rpm	144	100
6750-1	4.5 amp 0-4000 rpm	129	90

MILWAUKEE Super Specials!

Model 6507 Trigger Speed Control Sawzall w/case & blades .... List 193. ★ Sale 125.

Go Cordless with MILWAUKEE

#6305 – 6¼" Cordless Circular Saw 12 volt — 1 Hour Charge Cuts (80) 2x4's (Pine)
List Price 195.00 ★ SALE PRICE 135.00

FREUD SAW BLADES

Univ. Bore — Professional Series
CARBIDE TIPPED SAWBLADES

Item No.	Description	Diam.	Teeth	List	Sale
PS203	Gen'l Purp.	7¼"	24	27.24	17.50
PS303	fine cutting	7¼"	40	32.97	20.50

5/8" Bore — Industrial Grade
CARBIDE TIPPED SAWBLADES

Item No.	Description	Diam.	Teeth	List	Sale
LU72M010	Gen'l Purp.	10"	40	68.58	34
LU81M010	Gen'l Purp.	10"	40	69.30	35
LU73M010	Cut-Off	10"	60	79.65	36
LU82M010	Cut-Off	10"	60	86.40	44
LU84M010	Combination	10"	40	70.99	36
LU84M011	Combination	10"	50	74.51	37
LU85M010	Super Cut-Off	10"	60	110.88	62
LM72M010	Ripping	10"	24	64.85	34
DS 306	6" Dado			139.00	92
DS 308	8" Dado			170.00	105
TR 100	3 blades & Dado set			399.00	255

FORSTNER BITS (ARCO)
West Germany

Model	Size	List	Sale
2121	1/4	6.40	4.00
2122	3/8	7.00	4.50
2123	1/2	7.80	5.00
2124	5/8	10.35	6.50
2125	3/4	10.95	7.00
2126	7/8	11.40	7.25
2127	1	12.25	7.75
2128	1-1/8	12.75	8.00
2129	1-1/4	13.85	8.75
2130	1-3/8	16.45	10.50
2131	1-1/2	18.15	11.00
2132	1-5/8	21.25	14.50
2133	1-3/4	23.95	16.50
2134	1-7/8	25.50	17.50
2135	2	26.25	18.25
2136	2-1/8	30.50	20.50

16 Pieces *(one of every size of above)*
List Price 254.80 ★ SALE PRICE 150.00
4 Pieces *(1/2 - 5/8 - 3/4 - 1")*
List Price 38.95 ★ SALE PRICE 25.00

MAKITA TOOLS

		List	Sale
B04510	Sander	79	43
9900B	3"x 21" belt sander	198	119
9924B	3"x 24" belt sander	188	135
9924DB	3"x 24" b/sand. w/bag	214	130
9035	⅓ sheet finish sander	79	48
9045B	½ sheet finish sander	156	90
9045N	½ " " w/bag	158	105
4200N	4-3/8 circ. saw 7.5 amp	152	95
5008NB	8¼ circ. saw 13 amp	178	105
5201NA	10¼ circ. saw 12 amp	348	215
4300BV	v/sp jig saw 3.5 amp	192	120
4301BV	orb v/sp jig saw 3.5 amp	208	125
2401BW	10" mitre saw	329	195
2400BW	10" mitre saw (for vice)	369	249
JR3000WL	2 sp recip saw w/cse	188	120
JR3000V	vs recip saw w/case	178	120
8010DWK	3/8 cordless drill w/case	152	89
5081DW	3-3/8 cordless saw kit	185	109
1900BW	3¼ planer w/case	154	92
1100HD	3¼ planer w/case	278	180
3608BK	¾ hp router w/case	132	85
3601B	1-3/8 hp router	168	115
3700B	½ hp trimmer 28,000 rpm	124	82
B04530	6" Round Sander	84	55
6710DW	Cordless Screwdriver	148	105
DA3000	3/8" angle drill	158	105
DP4700	½ v/sp w/rev " 4.8 amp	154	82
HP1030W	3/8 v.s.r. hammer drill w/case	145	98
6300LR	½" angle drill w/rev	229	152
84198B-2W	½" 2 sp. hammer drill w/case	238	150
GV5000	Disc Sander	79	53
6800DB	2500 rpm 3.5 amp	123	79
6800DBV	0-2500 rpm 3.5 amp	133	89
6801DB	4000 rpm 3.5 amp	123	79
6801DBV	0-4000 rpm 3.5	133	89
2030n	12" planer/jointer	1980	1350
2040	t 5-5/8" planer	1780	1195
1805B	6-1/8" planer kit w/case	418	285
LS1400	14" Mitre Box	578	410

★ *NEW* from MAKITA! ★

Model		List	Sale
9820-2	Blade Sharpener	235	180
6802DWK	3/8" 2-sp c/less drill kit	154	94
6010SDW	3/8" cordless drill rev	82	45
DA3000DW	3/8" c/less angle drill	172	105
JV1600	var. speed jig saw	145	89
JV2000	var. speed orb. jig saw	185	100
4300DW	cordless jig saw	158	102
5005BA	5½" circular saw 8 amp. with brake	154	98
5800DW	6¼ c/less circ/saw	224	139
9207SPC	7" var/speed elecronic sander/pollsher	209	130
9303BH	4½" sander-grinder kit	148	95
9035DW	c/less finishing sander	128	79
4014MV	var/speed blower	128	79

DELTA

		List	Sale
34-821	9" contr. saw w/o motor	500	395
34-410	10" contr. saw w/o motor	871	650
34-710	super 10" motorized saw	579	450
15-091	15" floor model D/press	487	375
15-080	15" bench model "	487	375
37-207	Saw/Jointer Combination	1018	810
37-609	6" Motorized Jointer	413	335
37-280	4" deluxe Joiner w/o motor	348	275
22-651	RC-33 — 13" Planer	1943	1450
43-122	Wood Shaper w/stand and 1 HP Motor	869	495
46-140	11" lathe, gap bed model w/stand w/o motor	407	335
52-493	1 hp motor for #34-821	170	130
62-042	1½ hp motor for #34-410	230	170
62-144	½ hp motor for #37-290	136	105
62-142	½ hp motor for #28-243 and #46-140	121	95

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SAW-A-THON by PORTER CABLE

#314	4½" trim saw	List 180	SALE 109
#348-1	6½" top hdle	List 161	SALE 100
#617	7¼" Push Hdle	List 166	SALE 103
#587	7¼" Speedtronic	List 199	SALE 125
#315-1	7¼" Top Hdle	List 186	SALE 103
#368-1	8¼ Top Hdle	List 176	SALE 110

DELTA
SUPER SPECIALS!

#33-150 SAWBUCK — List 658 — SALE 489

#28-560 BANDSAW 3 wheel — List 448 — SALE 349

#28-283 14" Band Saw with enclosed Stand and 3/4 hp Motor
List $897.00
Sale $675.00

#28-243 14" Band Saw with Open Stand without Motor
List $594.00
Sale $440.00

#22-651 13" Planer
List $1943.00
Sale $1295.00

SUPER CORDLESS SPECIALS from BLACK & DECKER

Model	DRILL KITS	List	Sale
1930	3/8" rev/ hi speed	165	110
1950	3/8" High Torque	165	110
5930	Reversible Hammer	179	120
1970	3/8 rev/hi torque screwdriver	179	120
1980	Rev/ adj. clutch Scrudrill	179	120

BRAND NEW! SUPER SPECIALS from MILWAUKEE

0214-1	3/8" c/less driver/drill	154	109
8975	H.D. Heat Gun, 11.6A Low 570°F - High 1000°F	69	49
5920	belt sander 3x24 w/o bag	289	199
5925	belt sander 3x24 w/bag	309	215
5930	belt sander 4x24 w/o bag	299	209
5935	belt sander 4x24 w/bag	319	225

BRAND NEW! BLACK & DECKER

#9425 8¼" Compound Mitre Saw
Special Sale Price — $115.00

PORTER-CABLE *(buy of the year)*

Model 821 REVERSING DRILL
3/8" H.D. var/speed-4 amp 0-1000 rpm
List 120 ..... SALE 72
6 or more $69.00 each

★★ *ROUTER RIOT* ★★ by PORTER-CABLE

Model		List	Sale
100	7/7 H.P. 6.5 amp	134	86
630	1 H.P. 6.8 amp	145	95
690	1½ H.P. 8 amp	199	125
691	1½ H.P. D-Hdle 8 amp	213	135
536	1½ H.P. Speedmatic Double Handle	295	185
537	1½ H.P. Speedmatic Double Handle	310	210
520	3 H.P. Production	435	275
518	3 H.P. Micropressor 5-sp	475	310

TRIMMERS by PORTER-CABLE

309	3.8 amp laminate trimer	120	78
310	3.8 amp laminate trimmer	180	120
312	offset base laminate trim	195	130
319	tilt-base laminate trim.	205	135

★ *X-TRA SPECIALS* ★

MAKITA TOOLS

		List	Sale
6010DL	C/less Drill w/flashlight charger & case	162	90
DP3720	3/8 drill Rev. 0-1800 rpm	90	47
6510LVR	3/8 drill Rev. 0-1050 rpm	116	67
6013BR	1/2" Drill Rev. 6 amp.	174	100
5402A	16" Circular Saw-12 amp	468	315
2414	14" Cut Off Saw-13 amp	282	168
3612BR	3 HP Plunge Router	286	175
9401	4x24 belt Sander w/bag	248	160

PORTER-CABLE

		List	Sale
696	H.D. Shaper Table	150	105
695	H.D. 1½ hp Router/Shaper	278	190
399	Drywall Cut-Out Unit	100	70
736	V/Speed *Speedtronic* Band Saw	450	330
7564	½ " X.H.D. Drill 8 amp	205	145

BOSCH TOOLS

		List	Sale
1581VS	Top Handle Jig Saw	225	128
1582VS	Barrel Grip Jig Saw	128	118
1604	1¾ H.P. Router	189	110
1942	Heat Gun 650° — 900°	99	95
1272	3x24" Belt Sander	259	159
1272D	3x24" Belt Sander w/bag	274	169
1273	4x24" Belt Sander	274	169
1273D	4x24" belt sander w/bag	289	179

DELTA

		List	Sale
34-010	Motorized Mitre Box	231	149

★ NEW LOW PRICES ★
PONY CLAMP FIXTURES

Model		List	Sale	Lots of 12
#50	for ¾" Black Pipe	11.23	7.49	80.00
#52	for ½" Black Pipe	9.36	6.16	67.50

JORGENSEN HAND SCREWS

Model	Jaw Length	Open Cap.	List	Sale	Box of 6
#50	4"	2"	11.50	7.25	39.15
#40	5"	2½"	12.45	8.10	43.75
#30	6"	3"	13.35	8.50	45.95
#20	7"	3½"	14.35	8.95	48.35
#0	8"	4½"	15.97	8.95	53.75
#1	10"	6"	18.25	11.35	61.25
#2	12"	8½"	28.94	13.50	72.95
#3	14"	10"	28.50	16.75	81.35
#4	16"	12"	34.55	23.75	128.25

JORGENSEN BAR CLAMPS
STYLE 37 — 2½" Throat 1/4" x 3/4"

Model	Jaw Length	List	Sale	Lots of 6
#3706	6"	7.88	5.50	29.70
#3712	12"	8.73	5.95	32.13
#3718	18"	8.84	6.95	37.53
#3724	24"	10.54	7.35	39.69
#3730	30"	11.76	8.25	44.55
#3736	36"	12.86	8.95	48.33

Who Has The Saws That Cut It Across The Board?

BLACK & DECKER of course!!!

Model	WORM DRIVE SAWS	List	Sale
3050	6½" 12 amp - 4600 rpm.	247	169
3051	7¼" 13 amp - 4300 rpm.	232	149
3052	8¼" 13 amp - 4300 rpm.	247	169
	SUPER SAWCATS		
3047-09	7¼" w/brake - 12.5 amp	226	149
3048-09	8¼" w/brake - 13 amp.	240	155
	BUILDERS SAW CAT		
3030	7¼" 13 amp - 5800 rpm.	155	100
3035	8¼" 13 amp - 5800 rpm.	175	125
3034	7¼" 13 amp - 5800 rpm.	162	115
3033	6½" 13 amp - 5800 rpm.	162	115
	JIG SAWS		
3157-10	var/sp orb action d/hdle	174	115
3153-10	var/speed 4.5A 0-3100	158	105
3159-10	2/sp orb action barrel grip	178	120
	CUT SAW KITS		
3103	2 sp 6 amp-2400 strokes	163	100
3105	V/Sp 6 amp-2300 strokes	170	110
3107	V/Sporb 6A 0-2300 strokes	183	119
4300	Drill Bit Sharpener	299	205
1321	½" drill 450 rpm 6 amp	175	115
4010	Palm Sander	80	48
4015	½ Sheet Finish Sander	160	105
	DRYWALL GUNS		
2034	v.s.r. 0-4000 rpm	121	79
2037	v.s.r. 0-4000 rpm	139	89

"Door Openers" from MAKITA

9501B	4" Grinder Kit	119	55
6012HDW	Cordless Drill w/Battery & Case	178	98
5007NB	7¼" Circ. Saw	158	94

MAKITA
Model 2708 — 8" Table Saw

	List	Sale
8" Table Saw	$336.00	$199.95
Holder Set	28.00	23.95
Carbide Blade	19.00	16.95
Table Saw Stand	48.00	39.95
Buy Each Piece Separately		$280.80
or Buy Total Package for		$275.00

Brand New • PORTER CABLE
Model 9629 – Electronic Var. Speed
Recipro Saw Kit w/steel case — 8 amp
List Price 189.00 ★ SALE PRICE 129.95

PORTER-CABLE

		List	Sale
9548	HD v/s bayonet saw w/case	255	179
648	HD s/s bayonet saw 3 amp	255	189
9627	2 sp. tiger saw kit 8 amp.	183	118
505	H.D. ⅓ sheet finish/sander	185	103
330	spd bloc sander ¼ sheet sz	87	54
304	Professional 7" disc sander	180	105
305	Professional 7" polisher	180	105
7511	3/8" xtra hvy v/s drill 5.2 amp	154	100
7554	½" xtra heavy drill 8 amp	205	135
309	3.8 amp laminate trimmer	120	80
310	3.8 amp laminate trimmer	180	130
312	offset base laminate trim.	195	135
319	tilt base laminate trimmer	205	140
187	block plane 2.5 amp	129	86
9652	Versa-Plane Kit	419	285
9118	Porta Plane Kit	289	195
97650	½" dual range var/speed hammer/drill kit w/case	201	130
	DRYWALL SHOOTERS		
7544	5.2 amp — 2500 r.p.m.	154	100
7545	5.2 amp — 0-2500 r.p.m.	154	100
7546	5.2 amp — 4000 r.p.m.	148	100

AEG Power Tools

	ROTARY HAMMERS	List	Sale
PHE 18RL	3.8 amp 5/8" capacity in concrete	269	175
PH 210	5.2 amp-3/4" capacity in concrete	398	260
PHE 20	Same as above — except var/sp 0-750	418	270
PHD 26	6.3 amp-1" capacity In concrete	495	320
PH 38	7.5 amp-1½" capacity In concrete	549	355

All above complete with cases

✓ **Check our low prices on Percussion Carbide SDS Bits**

SKIL TOOLS

		List	Sale
551	5½" Circ. Saw 6.5A	99	75
77	7¼" Worm Saw	240	139
367	6½" Worm Saw	238	149
825	8¼" Worm Saw	270	195
807	7¼" Skilsaw 13A-Super	153	100
808	8¼" Skilsaw 13A-Super	172	110
2016-02	3/8" Cordless Drill complete W/Charger Case & 2 batteries	199	99

buying from *Seven Corners Hdw.* ... is a good *Rule* to follow

STANLEY

Model		List	Sale
33-118	PL-318	⅝" x 18' Rule	15.95	7.50
33-320	PL-320	¾" x 20' Rule	18.95	7.95
33-425	PL-425	1" x 25' Rule	18.95	8.95
33-430	PL 430	1" x 30' Rule	20.95	8.95

CLASSIFIED

The CLASSIFIED rate is $5.00 per word, minimum ad 15 words. All payments must accompany orders; all are non-commissionable. The WOOD & TOOL EXCHANGE and SITUATIONS WANTED are for private use by individuals only; the rate is $7 per line. Minimum 3 lines, maximum 6 lines. Allow 30 letters or spaces per line, including name and address. DISPLAY CLASSIFIED rates on request. Send to: ***Fine Woodworking,*** Advertising Dept., Box 355, Newtown, CT 06470. Deadline for the January/February issue is October 25th; for the March/April issue, December 24th.

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WANTED: INDIVIDUALS/SMALL BUSINESSES to produce quality wood products (personal and designated designs) for mail order firm. Box 12, Vandenberg Dr., Tullahoma, TN 37388.

WANTED: REPRESENTATIVES for U.S.-made woodworking power tools. Involves demonstrations, shows and dealer calls. Protected areas available nationwide, excellent earnings potential. Send your resume and earnings requirements. PO Box 8527A, Orlando, FL 32856.

ENTREPRENEUR/CABINETMAKER to run a newly-formed small tool division of our established woodworking machinery distributorship. Manage all aspects of this department. Send resume including salary requirement to Scarlett Associates Corp., 5695 Eagle Dr. SE, Grand Rapids, MI 49508.

NEW ENGLAND WOODWORKERS.Quality furniture, turnings, carvings, etc. needed. Wholesale prices, photos to: The Maine Thing, 228 Crossroads, Carmel, CA 93923.

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Help Wanted

CABINETMAKER: Custom shop in central N.J. seeks individual(s) with substantial experience in wood & laminate architectural casework. Salary/benefits open. Resume to Country Cabinet Shop, Belle Mead Rd., Skillman, NJ 08558.

CALEDONIAN is seeking QUALIFIED INDIVIDUALS to fill two positions in their restoration department. The position requires a broad range of woodworking and cabinetry skills in the traditional manner and a firm background in 17th-, 18th-, and 19th-century English furniture design, construction and history. Candidates should be prepared to submit a complete resume showing job history, schooling and specialized skills. For further information please contact Caledonian, Inc., Restoration Dept., 562 Lincoln Ave., Winnetka, IL 60093. (312) 446-6566.

CABINETMAKERS: We want men who can handle wood and mica, who have contacts to get business. We have a big shop, state-of-the-art equipment, a backlog of orders to get you started in your own business. No investment necessary. Ben Rubin Designs, 100-10 91st Ave., Richmond Hill, NY 11418. (718) 441-3535.

CABINETMAKER—Excellent opportunity for experienced person in modern, fully-equipped custom cabinet shop catering to select trade including architectural. Position requires experience and/or comparable training; apprentice/journeyman background. Good benefits and compensation. Joseph Ambrozaitis, PO Box 4, Middlebury, CT 06762. (203) 758-2545.

EXPERIENCED CABINETMAKERS needed for custom furniture fabrication with progressive, growing company located in Pontiac, Michigan. Bob or Brian (313) 335-0005

Situations Wanted

Young Scottish furniture maker seeking employment in repro/commission work. Trained in England. Will relocate. Glen Solley, 698 Old Post Rd., Fairfield, CT 06430. (203) 255-1090.

American, 36, Danish shipw. papers, seeks job. Teach/restore/yard/kitchen exp. Excellent recommendations. Kohrman, c/o Morrison, 7934 Lowell, Skokie, IL 60076.

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APPRENTICESHIP in prominent studio/workshop/showroom. Individual supervision designing and building a full range of furniture from solid walnut/rosewoods using intricate wood joints and pegs—the very finest hand work. Tuition. Jeffrey Greene Design Studio, New Hope, PA. (215) 862-5530. Call, don't write, Mon.-Fri., 9:30 to 4:00.

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LEARN TO TURN. Two-day concentrated course in all aspects of lathe. Workshop located in converted 18th-century spring house. Individualized instruction. Reading and Lancaster nearby. Send for free brochure. James L. Cox Woodworking School, R.D. 2, Box 126, Honey Brook, PA 19344. (215) 273-3840. We use and sell the Myford English lathe.

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Listings are free, but restricted to happenings of direct interest to woodworkers. Our Jan./Feb. issue will list events between Dec. 15 and Mar. 15; deadline Nov. 1. Our Mar./Apr. issue will list events between Feb. 15 and May. 15; deadline Jan. 1.

CALIFORNIA: **Workshops/classes**—Numerous subjects. Hands on Wood, Building F, Fort Mason Center, San Francisco. (415) 567-2205.
Workshops/classes—Beginner and experienced woodworkers. Rosewood Tool Supply, 1836 Fourth St., Berkeley, 94710. (415) 540-6247.
Show—Woodworking World-The San Francisco Bay Area, emphasizing boatbuilding, homebuilding and miniatures, Dec. 6–8. Oakland Convention Center, Oakland.
Fair—6th Annual Christmas Woodworking Gift, Dec. 7–8. Ganahl Lumber Co., 1220 East Ball Rd., Anaheim 92805. Contact Valerie Bloom, (714) 772-5444.
Demonstrations/classes—Furniture restoration, marquetry, veneering, Allen E. Fitchett, Dec. 10–12. Constantines Wood Products, Inc., 5318 W. 144th St., Lawndale, 90260. (213) 643-9484.
Demonstrations—Veneering, hand tool sharpening, European hardware, caning, Oct. 26–Dec. 7. The Woodworkers' Store, 7876 Convoy Ct., San Diego, 92111. (619) 292-9921.

COLORADO: **Juried exhibition**—Sponsored by Woodworkers Guild of Colorado Springs, Nov. 2–Dec. 17. Pioneers Museum of Colorado Springs. Contact Guild, Box 9594, Colorado Springs, 80932.
Workshops—Numerous subjects, Sept. 21–Nov. 16. Woodworker's Store, 340 South Broadway, Denver, 80209. (303) 778-8650.

CONNECTICUT: **Exhibition**—17th American Crafts, Nov. 11–Dec. 23. Creative Arts Workshop, 80 Audubon St., New Haven, 06511. (203) 562-4927.
Juried show—Wesleyan Potters 30th Annual Invitational, Nov. 30–Dec. 15. The Wesleyan Potters, 350 South Main St., Middletown, 06457. Contact Denise Di Stefano, (203) 347-5925.
Juried exhibition—Second Annual Members, sponsored by Woodworkers Guild of Connecticut, Nov. 15–Jan. 4. Entry deadline Oct. 15. Wethersfield Historical Society, Old Academy Museum, 150 Main St., Wethersfield. Contact Guild, PO Box 7453, Bloomfield, 06002.
Seminar—The Craftsman's Artifice: Techniques of Early American Furniture Makers, Gregory Landrey, Robert F. Trent, Nov. 2. The Webb-Deane-Stevens Museum, 211 Main Street, Wethersfield, 06109. (203) 529-0612.

FLORIDA: **Demonstrations/classes**—Wood finishing, restoration, veneering, marquetry, Allen E. Fitchett, Jan 15–18. Constantines Wood Center of Florida, Inc. 1040 E. Oakland Park Blvd., Ft. Lauderdale 33334. (305) 561-1716.

ILLINOIS: **Show**—15th Annual Midwestern Wood Carvers, Nov. 2–3. Exposition Hall, 200 South Belt East, Belleville. Don Lougeay, (618) 233-5970.
Show—Woodworking World-The Chicago, Oct. 25–27. O'Hare Expo Center, Exhibit Hall E, Rosemont.

INDIANA: **Class**—Hardwood lumber grading, instructor, Dwight Lineberry, Nov. 4–8. Holiday Inn, US 231 South, Jasper. Contact Galen Wright, Southern Indiana Purdue Agricultural Center, R.R.#1, Dubois, 47527. (812) 678-3401.

IOWA: **Exhibition**—4th Annual, Nov. 22–23. Old Brick, Market St. and Clinton, Iowa City. Contact the Wood Artisan's Guild, PO Box 2863, Iowa City, 52244. (319) 643-2692.

MAINE: **Juried exhibition**—Maine Woodwork '85, Oct. 18–Dec. 21. Thomas Moser Cabinetmakers showroom, 415 Cumberland Ave., Portland. Contact Jon Clowes, Clowes Woodworking, RFD#3, Waldoboro, 04572. (207) 832-5191.
Shows—Maple Hill Gallery, 367 Fore St., Portland, 04101. Contact Lou Kimball, (207) 775-3822.

MARYLAND: **Juried exhibition**—20th Anniversary Maryland Crafts Council, Jan. 12–Feb. 28. Courtyard Galleries, Baltimore City Hall, Baltimore. $1,000 in awards. Contact Nancy Press, Maryland Crafts Council Biennial, 6206 Lincoln Avenue, Baltimore, 21209. (301) 358-7743.
Exhibition—"Designed and Made for Use," American Craft Museum, beginning January 1986. Contact "Designed and Made for Use," American Craft Museum, 45 West 45 St., New York, N.Y., 10036. Contact Susan Harkavy, (212) 869-9425.

MASSACHUSETTS: **Workshops/fair**—Extensive schedule. Calendar from Old Sturbridge Village, Sturbridge, 01566. 6th Annual, traditional crafts, Nov. 2–3. Contact Frank G. White, (617) 347-3362, Ext. 236.
Workshops/seminars—Numerous events. Contact The Woodworkers' Store, 2154 Massachusetts Ave., Cambridge. (617) 497-1136.
Exhibition—Wooden puzzles, Stewart T. Coffin, through Oct. 31. Worcester Library, Salem Square, Worcester. Contact Penny Johnson, (617) 799-1660 or Joseph Lemire, (617) 757-2124 for schedule.
Show—Small Expressions: Two Centuries of Little Furniture, through Jan. 1986. Essex Institute, 132 Essex St., Salem. Contact Sally Miller NBSS, (617) 227-0155.
Juried show—Contemporary Classics, Oct. 15–Nov. 16. Society of Arts and Crafts, 175 Newbury St., Boston. (617) 266-1810.
Show—Turned wood, both functional and sculptural, Todd Hoyer, Oct. 28–Nov. 23. Ten Arrow Gallery, 10 Arrow St., Cambridge, 02138. (617) 876-1117.
Lecture—Chair construction, Michael Dunbar, Nov. 16. Woodcraft Supply Corp., 41 Atlantic Ave., PO Box 4000, Woburn. (617) 935-5860.
Workshops—Numerous subjects, Sept. 17–Dec. 18. Woodworkers' Store, 2154 Massachusetts Ave., Cambridge, 02140. (617) 497-1136.

MICHIGAN: **Juried show**—Michigan Woodworkers Guild 5th Annual, Oct. 24–27. Somerset Mall, Troy. Contact Gregg Cornell, (517) 546-3688.

MINNESOTA: **Workshops/seminars**—Numerous events. The Woodworkers' Store, 3025 Lyndale Ave. S., Minneapolis. (612) 822-3338.
Workshops—Numerous subjects, Sept. 21–Nov. 26. Woodworkers' Store, 3025 Lyndale Avenue S., Minneapolis, 55408. (612) 822-3338.

MISSOURI: **Show**—3rd Annual Excellence in Woodworking, Nov. 2. Sponsored by Midwest Woodworkers Association. Ramada Inn, 170 and 63N, Columbia. Contact Gerald Jones, 311 Cumberland Rd., Columbia, 65203.

NEVADA: **Juried show**—KNPR Craftworks, Oct. 26–27. Reed Whipple Center, 821 N. Las Vegas Blvd.

NEW HAMPSHIRE: **Juried Exhibition**—Rocking chairs, functional and decorative, Nov. 3–Dec. 1. North River Designs, PO Box 274, Northwood, 03261. (603) 942-8184.

NEW JERSEY: **Seminar**—Technology of wood, Bruce Hoadley, Oct. 26. Brookdale Community College, Newman Springs Road, Lincroft. For information, contact Dr. Gabriel L. Longo, (201) 842-1900.
Lecture—The Impact of Crafts, Alan Lazarus, Lazarus Furniture Design, Oct. 17. Montclair Art Museum, 3 South Mountain Ave, Montclair. Contact Cathy Comins, (201) 744-5065.
Exhibition—Furniture designers '85, Richard Kagen, Peter Korn, Jack Larimour, Josh Markel and more, through Dec. 15. The Noyes Museum, Lily Lake Rd., Oceanville, 08231. (609) 652-8848.

NEW MEXICO: **Workshops**—Fall/early winter series, Sept. 14–Jan. 11. For locations contact Albuquerque Woodworkers Association, PO Box 40407, Albuquerque, 87196. Contact William Pike, (505) 265-4077.

NEW YORK: **Juried exhibition**—Crafts: National, through Nov. 15. Upton Hall Gallery, State University College at Buffalo. Contact Chairperson, Design Department, S.U.C.B., 1300 Elmwood Ave., Buffalo, 14222. (716) 878-6032.
Workshops—Handtool, Nov. 9–10; make your own shoji screen, Nov. 23–24, Robert Meadow. The Luthierie, 2449 West Saugerties Rd., Saugerties, 12477. (914) 246-5207.
Classes/demonstrations/workshops—Wood finishing, furniture restoration, veneering, marquetry, caning, Allen E. Fitchett. For fall schedule contact Constantines of New York, 2050 Eastchester Rd., Bronx, 10461. (212) 792-1600.

NORTH CAROLINA: **Class**—Timber framing course, Oct. 20–26. Location Greensboro. Contact Riverbend Timber Framing, Inc., PO Box 26, Blissfield, Mich., 49228. (517) 486-4566.
Workshops—Woodcarving/tool sharpening, Clarence Ewing; woodworking ax handles, Delbert Greear, Nov. 3–16; woodcarving, Hal McClure, Nov. 17–23. John C. Campbell Folk School, Rt. 1, Brasstown, 28902. (704) 837-2775.
Show—Woodworking World-The Carolina, Nov. 15–17. Charlotte Civic Center, Charlotte.

OHIO: **Juried show**—American Contemporary Works in Wood, through Oct. 20. Contact American Contemporary Works in Wood, PO Box 747, Athens. Dick Mulligan or Linda Comeaux, (614) 592-4981.
Exhibition—National Furniture Invitational, through Nov. 10. Sylvia Ullman American Crafts, 13010 Larchmere-Woodland, Cleveland, 44120. (216) 231-2008.
Demonstration/lectures—Including marquetry, adhesives, wooden clocks, violin construction, bowmaking, hand tool sharpening, woodturning, through Oct. 19. Renaissance Wood Tool Co., 1313 Old River Rd., Cleveland. (216) 621-9663
Workshops—Numerous subjects, Sept. 5–Nov. 22. Woodworkers' Store, 2500 East Main St., Bexley, 43209. (614) 822-3338.

PENNSYLVANIA: **Juried exhibition**—Luckenbach Mill Gallery, 459 Old York Rd., Bethlehem, through Oct. 27. Contact Janet Goloub, Historic Bethlehem, Inc., 501 Main St., Bethlehem, 18018. (215) 691-5300.
Classes/demonstrations—Basic wood joinery, October. Hand and power tools, Nov. 9, Dec. 7. Olde Mill Cabinet Shoppe, York. (717) 755-8884.
Exhibition—Wharton Esherick, sculpture, furniture, utensils, daily. The Wharton Esherick Museum, PO Box 595, Paoli, 19301. (215) 644-5822.

TENNESSEE: **Juried show**—Political Statements, reflections of social, political, economic and environmental concerns to artists, Jan. 26–Feb. 18. Entry deadline Dec. 12. Vanderbilt University's Sarratt Gallery, 402 Sarratt, Vanderbilt University, Nashville, 37240. Contact Joel Logiudice, (615) 322-2471.
Juried exhibition—Woodturning: Vision and Concept, through Dec. 7. Arrowmont School of Arts and Crafts, Gatlinburg. Contact Debbie Johnson, (615) 436-5860.
Seminar—Joinery, chairmaking, Sam Maloof, Nov. 1–3. National Hardwood Lumber Association Headquarters, 6830 Raleigh-LaGrange, Memphis. Contact Bill Cockroft, (901) 452-9663.

TEXAS: **Juried exhibition**—Annual Arts and Crafts, April 3–13. Entry deadline Nov. 15. For location and details contact Barbara Metyko, The Houston Festival, 1964 W. Gray, Suite 227, Houston 77019. (713) 521-0993.

VERMONT: **Exhibition**—Rare tools and machines, ongoing exhibit. The American Precision Museum, Windsor. (802) 674-5781.

VIRGINIA: **Show**—11th Annual Woodcarving, "Artistry in Wood," Nov. 30–Dec. 1. Marymount College, Glebe Rd. & Old Dominion Dr., Arlington. Contact Charles Schafer, 7014 Murray Lane, Annandale, 22003. (703) 256-2779.
Fair—10th Annual Richmond Craft, Nov. 8-10. Richmond Arena, Richmond. Contact Ann Vazquez, Hand Workshop, 1001 East Clay St., Richmond, 23219. (804) 649-0674.
Juried show—1985 Handcrafts, Oct. 25–27. Radisson Hotel, 601 Main St., Lynchburg. (804) 846-8451.
Show—2nd Annual International Creative Marquetry, through Oct. 27. Virginia Wesleyan College, Norfolk. Contact ICMS, 1501 Mill Dam Rd., Virginia Beach, 23454. (804) 481-4567.
Seminars—Hands-on instructions carving decorative decoy, Oct. 25–27, Nov. 15–17. P. C. English Enterprises, Inc., 906 Lafayette Blvd., PO Box 7937, Fredericksburg, 22404. (703) 371-1306.

WASHINGTON: **Show**—5th Annual Northwest Carvers Woodcarving, Nov. 9–10. Western Washington Fairground, Expo Hall, 9th and Meridian, Puyallup. Contact E. Gosnell, 115 Del Monte Ave., Fircrest, 98466. (206) 564-3278.
Workshops—Numerous subjects, Sept. 21–Dec. 11. Woodworkers' Store, Stone Way N., Seattle, 98103. (206) 634-3222.
Workshops/seminars/demonstrations—Making and retempering tools, Oct. 19; Inca owner's seminar, Oct. 26; power tool workshop, Nov. 2 and Dec. 28; Inca demonstration, Nov. 9 and Dec. 14; sharpening workshop, Nov. 12; router techniques, Nov. 16; imported tools, Robert Larson, Nov. 23; local artists in wood, Nov. 30, Dec. 7 and 21. The Wooden Boat Shop, 1007 NE Boat St., Seattle, 98105. (206) 634-3600.

ONTARIO: **Show**—Christmas Craft, one of a kind, Nov. 1985. Automotive Building, Exhibition Place, Toronto. Contact The Canadian Craft Show, 2 St. Clair Ave. East, Suite 202, Toronto, M4T 2T5. (416) 960-3680.
Exhibit—Branching Out, furniture by students and faculty of Sheridan School of Craft and Design, Nov. 7–Dec. 1. Public Library and Art Gallery, 65 Queen St. E., Brampton. Contact Shirley Morriss, 453-2444.

BRITISH COLUMBIA: **Juried exhibition**—Explorations in Wood, McPherson '86, May 5–30. Early entry encouraged. Contact Vancouver Island Woodworkers Guild, PO Box 6584, Station C, Victoria, V8P 5N7 or George Dufour, (604) 386-7527.

Woodworking week at Anderson Ranch

Nestled in the Colorado Rockies outside Aspen, Anderson Ranch gathered a blue-ribbon faculty for their annual week of woodworking seminars and workshops this summer.

It's hard to imagine many countries where, without training or licensing, a person can simply declare himself a furnituremaker, hang out a shingle and expect to succeed. Whether or not success actually follows, the possibility creates some considerable confusion over the value of formal woodworking training. If it's not necessary or mandatory, why bother? Why not just get on with the work, learning skills as you build your business?

Last summer, a group of woodworking notables and teachers gathered at the Anderson Ranch Arts Center, near Aspen, Colo., for a five-day symposium which, among other things, took a look at the role of craft education. The group was a diverse lot. Wendell Castle, Tage Frid, Ian Kirby, Colin Tipping and Rosalind Freer have years of formal teaching experience between them. Californians Sam Maloof and Art Carpenter, on the other hand, have taught by example, influencing a generation of furnituremakers. As a refreshing counterbalance to the graybeards, Anderson Ranch director Brad Miller invited Wendy Maruyama and Martha Rising, both young designers establishing themselves on the West Coast. Bruce Hoadley, a wood technologist and author, and wood finisher George Frank rounded out the group.

Jonathan Fairbanks, a furniture historian and curator of Boston's Musuem of Fine Arts, moderated the panel discussions throughout the week.

There was some lively, at times heated, discussion on how best to make a living at woodworking and whether or not to seek an education before attempting it. The panelists represented several different approaches. Castle, Frid and Kirby advocated, though not unconditionally, formal design and craft training. Maloof and Carpenter represented the bootstrappers who have succeeded without it. I liked Carpenter's advice best: get a good liberal arts education first, then move on to a woodworking school or work with a craftsman who's been at it awhile. Carpenter practices this doctrine by taking on apprentices for three-month stints in his Bolinas, Calif., shop.

There is a wide choice of training in this country for the would-be student. Some 20 schools offer full-time courses, dozens of universities have wood programs and numerous crafts centers provide everything from one-evening seminars to weeks-long workshops. Despite this wealth of formal opportunities, I'll bet more people wanting to woodwork for a living follow Carpenter's path than any other. Full-time woodworking schools are expensive and likely out of reach for a career switcher attempting to juggle familial duties against the demands of turning an avocation into a business. Craft centers are a big help to both amateurs and professionals. In this one week, for example, Anderson Ranch laid out some 30 intensive technical lectures and demonstrations in their excellent woodworking shop, in addition to panel discussions and evening slide shows—all for the bargain price of $195, plus $150 to $450 for housing. Without a ruinous investment in time or money, you can learn a great deal in a short time from some very good teachers. You can't, of course, expect a two-hour lecture to reveal all about joinery or veneering, but a hands-on demonstration is worth months of frustrating, hard-fought book learning.

Of about 70 people at the symposium, quite a few were back for their second or third year. After spending a week there myself, I can understand why they return. The ranch is located in the midst of some of Colorado's most spectacular scenery, an ideal place to combine a family vacation with a week of serious craft instruction. For more information about next year's wood program at Anderson Ranch, write Brad Miller, Box 2410, Aspen, Colo. 81612. *—Paul Bertorelli*

Cousin Fred's wonderful woodworking shop

Though I hadn't seen my cousin Fred for many years, his annual Christmas letters mentioned his woodworking hobby and his wonderful new shop. So, on a recent trip, I decided to visit Fred and to see his new workplace.

After a brief chat, Fred took me to the lower level of his house, and with a dramatic gesture, opened the doors to show me his pride and joy. I almost gasped when I saw the 30-ft. by 30-ft. room. Superbly lighted with fixtures recessed into an acoustical tile ceiling, it had oak-paneled walls and a tile floor that gleamed with wax.

Set off by windows that opened onto a patio was the largest cabinetmakers' bench I had ever seen. Nearby stood a huge tablesaw. Fred proudly showed me how easily and accurately the rip fence marched across its shining surface. An 18-in. thickness planer was next, followed by an 8-in. jointer, a 12-in. wood lathe, and other expensive new machines. Fred mentioned $1,800 for his latest acquisition. And, joy of joys, each large machine was connected to a central dust collector.

But the best was yet to come. One wall was covered with a custom-built oak cabinet fitted with wide, shallow drawers. Fred slid one out on its double-extension slides, and there, resting on green felt, each in its fitted holder, were 32 chisels, bevel-edge, mortise and paving, each crisply sharpened and oiled. The next drawer held 28 screw drivers, from tiny watchmakers' blades to a huge, gorilla model. A drawer of expensive wooden planes followed, another of pliers, then saws, hammers, measuring devices and squares, files from needle to rasp.

Later, Fred's wife and other family members joined us and moved from one tool to another with appropriate admiration. Fred followed with an orange shop rag wiping off finger prints. Finally someone asked, "Fred, what do you make in your shop?" The answer came quickly from Fred's wife, who has never been noted for tact. "He hasn't made a thing in 15 years and I know it's 15 years because

that's how long we've lived here!" Fred withered, orange rag and all.

On the long drive home I thought a lot about that wonderful shop and my own workplace. For years I had planned to enlarge my shop and update my equipment. Why not do it now? I could rationalize the expense as a retirement gift to myself.

The plans grew as the miles slipped by. I would start with a new tile floor, a dust collection system, new wiring and lights and new paint.... Next morning, anxious to start, I opened the door and surveyed the shop that had served me well for 35 years. The 9-ft. by 22-ft. room seemed tiny compared to Fred's. The plywood floor was badly scarred. The storage drawers were made of cast-off plywood. My 10-in. Sears tablesaw cost me $169.95 in 1952, and that included a 1-HP motor. How I had saved for that old saw. My 6-in. jointer made by some long forgotten company cost me $12.50, used. The 7-in. planer seemed toylike compared with Fred's giant.

I sat down on the rolling stool I'd made, when age decreed such a move, and pulled my shop log book out of a well-filled drawer. It contained a list of all my projects for the 35 years. It was always a pleasure to read it over. Six tall-case clocks, eight shelf clocks, chess boards, a cannon model, a wall cabinet that I feel James Krenov might glance at for a moment, dozens of little decorative boxes. On and on went the list, each piece made possible by faithful old tools. I know the shortcomings of each one, the rip fence that has to be squared up for each cut, the chuck that falls off the drill press.

In turn each tool knew my shortcomings. The countless mistakes, the wasted wood, the failures in design and construction. But that little shop and its well-worn tools had given me more in return than anything I had ever owned. Every day in my profession I had listened to the complaints, troubles and problems of humans. But, when time permitted, I could escape into the shelter of my shop where my tools and wood never asked for perfection, never questioned my decisions and never expected a miracle. Here one could beat on the bench in frustration and discard an error. Here one could listen to the sounds of creativity, here one could fashion something that could bring joy to others, and here one could harbor the secret hope that in a century hence someone would find a carefully hidden name and date and think that whoever made this thing did it well.

But I was determined I certainly deserved and could afford better tools, so I wrote out the order blank—one complete set, from ⅛-in. to 1½-in., of Marples chisels, the best, the ones with the boxwood handles! —*W. W. Sauer, Paxton, Ill.*

Carver's Confab

The 19th Annual International Wood Carvers Congress convened last June at the Putnam Museum in Davenport, Iowa. Five hundred carvers, dividing their entries among 52 categories in 11 groups, competed for $13,000 in prize money and other awards. Fred Cogelow's carving, "Hunts the Crying Bear," shown at left, emerged from the pack with the Best in Show ribbon and its accompanying $5,000 check. Cogelow, of Willmar, Minn., also carted home a bunch of other awards from the five-day affair: first prizes in five categories and four groups, as well as eight other awards.

The meticulously researched "Crying Bear" was carved from a single block of laminated butternut, a tricky task requiring that delicate details, like feathers, be left as oversized blocks during the carving of the body and spear. Cogelow, who works without making preliminary wax or clay models, says he carved the 42-in. high piece with "damn near anything that removes wood—chain saws, drills, adzes, chisels, knives, dental picks...."

—*Joe Dampf, Don Mills, Ontario*

Ron Germundson

Fred Cogelow's "Crying Bear" earned Best in Show at the International Woodcarver's Congress last June.

Product review

WEST SYSTEM Epoxy, *Gougeon Brothers Inc., 706 Martin St., P.O. Box 908, Bay City, Mich. 48706.*

In designing and building a traditional sleigh with laminated ash runners, my initial problem was to find a glue that would do the impossible. I needed an extremely strong glue, absolutely waterproof, and capable of setting at temperatures as low as 50° with little or no clamping. Moreover, the glue had to be a good gap filler and have a clear, inconspicuous glueline.

Polyvinyl glues obviously wouldn't do, nor would plastic resin or resorcinol. The former is only water resistant, the latter requires a high setting temperature. On the advice of a friend, I started researching one of the largest and best-known makers of marine epoxy, the Gougeon Brothers, a Bay City, Mich., boatbuilding firm that has pioneered wood-composite boat construction using their proprietary epoxy resin. Gougeon Brothers invented a series of epoxy resins and materials they have trademarked under the name WEST SYSTEM.

Essentially, the system epoxies consist of a base resin (available in quarts, gallons, 5-gallon and 55-gallon drums) mixed with a hardener. Fast hardeners (10- to 15-minute pot life at 70°) and slow hardeners (30 to 40 minutes) are available. What elevates the Gougeon's product above run-of-the mill epoxy is the wide variety of additives that allow the resin to be tailored to a particular application. A filler material called micro-balloons, for example, thickens the mixture for good gap filling. Other fillers improve gap filling but also change the color, texture or workability of the cured resin. Fillers also make it possible to shape the adhesive so that two parts joined at right angles, for instance, can be strengthened by sculpting a fillet along the intersection of the joint. In addition, Gougeon Brothers sells a complete line of metering pumps, mixing and spreading materials, glass fabric and clean-up solvents. A gallon of resin, with enough hardener to set it, costs $50.52, plus $4.50 for a pair of pumps.

Mixing the epoxy is easy. The pumps automatically dispense the correct five parts of resin to one part of hardener. When the components are mixed, an exothermic reaction takes place. The heat thus generated allows the epoxy to be used at relatively low shop temperatures. On the other hand, the reaction proceeds much faster in hot weather, so slow hardener can be used to keep assembly time long enough. Sanding and shaping can be done after 15 to 20 hours, but a full cure to maximum strength takes about five to seven days. External heat speeds the full cure. For most applications, heavy clamping is not necessary. Unlike most glues, which set under pressure, epoxy needs only contact to cure. Spring clamps, tape, rubber bands and even staples can be

used to hold the pieces together.

As most woodworkers will attest, wood is strong, stiff and relatively light in weight as construction material. But one of its serious drawbacks is its shrinking and swelling due to moisture changes and decay under some conditions. Applied as a finish, the WEST SYSTEM goes a long way toward solving these problems. Three surface coats of thin epoxy exclude a great deal of moisture and also oxygen, which discourages the formation of rot-producing fungi.

Another interesting use is for anchoring hardware. Screwholes can be filled with epoxy which is allowed to cure after the screw is inserted. The resulting bond will have greater strength than a screw driven into wood alone. If you want the screw to be removable, coat it with silicon or a similar releasing agent. Larger hardware, nuts or threaded rods, for example, can be fused directly to the wood, giving strong bonds through load distribution.

Currently, WEST SYSTEM epoxies are used predominantly for boatbuilding, but they are gaining favor in other woodworking applications. I found it ideal for laminating my sleigh runners and suspect it would solve the gluing problems of woodworkers making specialized products like sports equipment, circular stairs and railings, or any joined work that will be exposed to moisture.

—Christian Becksvoort
New Gloucester, Me.

Backyard exotics

There's a peculiar satisfaction in making something from an unusual wood you have harvested yourself. Many of our common trees and shrubs have excellent characteristics that put some of the high-priced exotic timbers to shame.

The only problem is finding out which ones are best for what. Jon Arno, a Wisconsin woodworker, who has written for us about pine, poplar, ash and other woods, has great affection for non-commercial species and wonders how many others have favorites of their own. He'd like to hear about the characteristics of the lesser-known local woods, including what they are like to cut and dry in small quantities, how they machine, and what makes them special. Arno will summarize and compare the information in a future issue.

If you feel like sharing some of your hard-won practical experience with other woodworkers, write Arno c/o *Fine Woodworking,* P.O. Box 355, Newtown, Conn. 06470. Don't send samples or photos yet—we won't know what we need until the article begins to shape up.

Japanese masters in New Hampshire

Five Japanese craftsmen, each with decades of experience in traditional Japanese woodworking tools and techniques, came to the cool, quiet forests of New Hampshire for two weeks last August to teach 50 students, from across the United States and Canada, the secrets of their crafts.

Each of the visiting craftsmen was rated as a "Master," the greatest in his field living today, by Robert Major, owner of Mahogany Masterpieces in Suncook, who sponsored the Masters Seminar in nearby Bear Brook State Park. The seminar participants, about half of them professional woodworkers agreed, almost unanimously, that Majors wasn't exaggerating a bit.

Planemaker Tanaka Hisao, at 77 the oldest of the five, showed students how to fine-tune and sharpen their planes. Miyano Dai Endo, a sawmaker, helped them flatten and sharpen their saws. Fujieda Hiro Aki, a temple carpenter, supervised the construction of a 7-meter-square tea-ceremony house. Shigeki Kageyama helped participants make *shoji* screens, while Zenji Hara, 74, Major's teacher in Japan, served as a roving coach, helping with individual problems.

Participants were free to watch or work with any of the masters, each of whom was accompanied by an interpreter. Some participants concentrated on a single project, like the tea house, while others divided their time among all the masters, or worked on individual projects.

The masters, all from Miki City, were indeed very skilled, good natured, demanding and practical—an essential attribute of mastery is working efficiently. After reading so many articles that portray Japanese joinery as precise and delicate as brain surgery, I was pleasantly surprised to see Fujieda, the temple carpenter, axing the waste out of a complex scarf. One well-placed whack eliminated a lot of unnecessary sawing.

Fujieda, 45, was on the move constantly during the day-and-a-half I watched him. He would show the participants how to lay out a joint and get them working on cutting it. Then, he would repeatedly suggest ways his workers could make more efficient use of their bodies and tools. Even in the wet pine beams we were working, the joints fit perfectly. After watching Fujieda, I began to understand some of the puzzling joinery that books had never clarified for me.

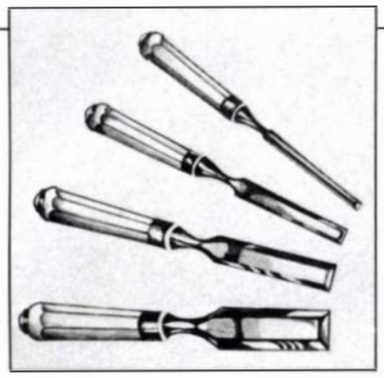
Several participants were excited by Fujieda's practical tricks-of-the-trade. His method for marking the centerline of a bowed beam, for example, was almost magical. Instead of measuring and marking a line in segments, Fujieda found the center of the beam at its midpoint, then stretched his ink line from the center of each end. For every millimeter the line was off center at midpoint, he twisted the line one complete turn. The snapped line curved along the beam's true center.

Allen Cobb, of Weare, N.H., checks the edge of a plane iron with Japanese master Zenji Hara.

Working among the trees under a plastic canopy, Tanaka kept a group of students entranced for hours. Some participants took notes, but most just watched as he sat crosslegged on a pallet chiseling plane bodies and fine-tuning the participants' personal planes. Applause greeted the long, translucent shavings spewing from newly-adjusted planes.

Everyone could practice planing by making *shoji.* Kageyama, 52, was patient, with a quick, oft-exercised sense of humor. When one of the students couldn't get a decent shaving from a *shoji* rail, Kageyama told him to sharpen the plane iron. An embarrassed silence followed, as the student groped for a diplomatic way to explain that Tanaka, the plane master, had just sharpened the iron. Embarassment ended in a roar of laughter, with Kageyama laughing loudest of all. A quick hairsbreadth adjustment on the plane sole had the student planing like a pro, and Kageyma beaming.

Kageyama said that in Japan most woodworking is now done with power tools and he was surprised at the interest in hand tools here. He said he was impressed with the intensity and single-mindedness of students to learn the tech-



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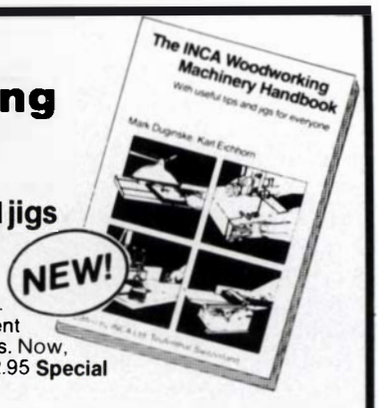

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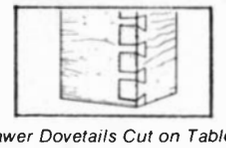
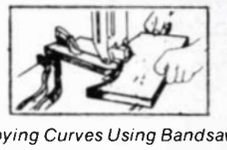


Drawer Dovetails Cut on Table Saw



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niques and tool use.

Of the five masters, I figured the 56-year-old sawmaker would have a lonely two weeks. Certainly the participants would find sharpening the fine-toothed saws as tedious as I do and just not bother. But, inspired by Miyano's skill and enthusiasm, groups of people filed and hammered blades all day long.

Despite the hefty $790 cost of the 10-day session (shorter stays cost less), everyone I spoke with felt they got their money's worth. Majors, who has made six trips to Japan to study woodworking and buy tools for his store, organized the first Masters seminar last year. He plans a two-week seminar in New Hampshire next August and a week-long Hawaiian seminar next February. *—Dick Burrows*

Aid to Artisans

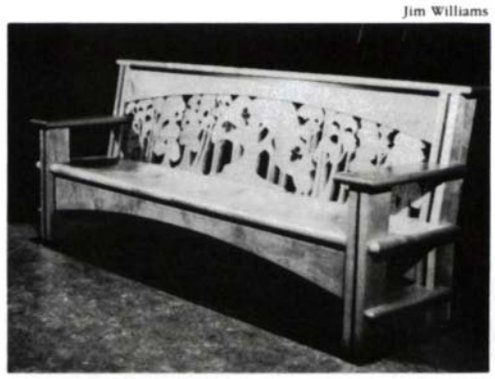
In 1977, James S. Plaut, then newly-retired as director of the World Craft Council, decided that the most urgent need of disadvantaged craftspeople around the world was for help selling their goods. With his wife and friends, Plaut set up Aid to Artisans to encourage the making and marketing of crafts. Funded first by museum-shop sales of imported third-world crafts, then by consultant fees, ATA is now offering memberships to raise money and support.

ATA grants, typically $500 to $1500, are currently working in some 27 countries around the world. Given to organizations rather than individuals, the grants have developed marketing strategies for traditional Amazonian Indian craft, helped a North Carolina cooperative purchase basketry fibers, and provided design advice to Honduran woodcarvers, encouraging them to return to more marketable Mayan designs. ATA seed money gets the ball rolling, with advice, expertise and encouragement from ATA staffers and other outside agencies. Much of the money goes to establish permanent revolving funds for the purchase of materials, and ATA encourages local people to take over from the advisors as soon as possible.

Charter memberships are available for $25 to $1,000. In return, members receive *ATA News*, a semi-annual newsletter; *First Choice*, an illustrated survey of unusual craft and folk-art objects for sale; and a guide to craft activity centers and special events around the world. Not least, members get the satisfaction of knowing that their money is helping someone—80% of membership money, Plaut says, goes directly into the grants program. For further information, write James S. Plaut, Aid to Artisans, 64 Fairgreen Place, Chestnut Hill, Mass. 02167. *—Roger Holmes*

George Siede/Donna Preis

Jim Williams



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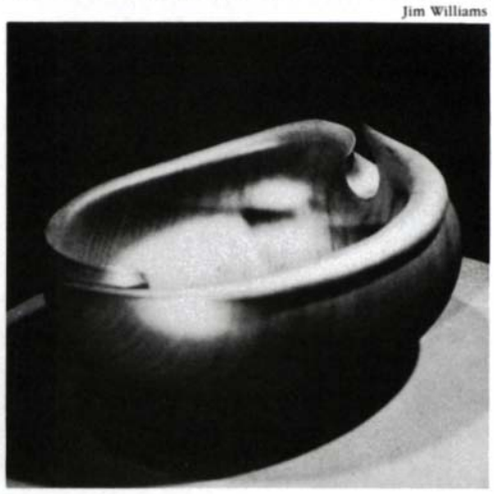

Australian woods are featured in Michael Gill's settle and Grant Vaughn's bowl (top and bottom right), shown this summer at the Sydney Opera House. Dick Wickman's blistered-maple side chair (left), appeared at Chicago's Perimeter Gallery.

Show notes

The Sydney Opera House was the prestigious venue for a June exhibition of work by members of the Woodworker's Group of New South Wales. In Australia, mass-produced reproductions, Southeast Asian teak imports and "antique" English pieces (at greatly inflated prices) are most familiar to the public. Given this environment, the Group's exhibition was a breath of fresh air, and a considerable contribution to increasing the public's awareness of the high standard of homegrown woodcraft. The visitors I talked with at the show were awed by the scope and quality of what they saw.

One of the show's most remarked upon aspects was the use of native woods. This may not seem unusual to North American residents, but only 5% of the Australian mainland is forested, so imports are often easier and cheaper to obtain. Grant Vaughn, for example, carved the bowl shown above (bottom right) from local red cedar; Michael Gill inlaid beefwood into silky oak, both native woods, for his settle, above, top right.

—Jim Williams, Dudley, NSW, Australia

One-of-a-kind fine wood objects have gained a foothold in Chicago's expanding fine-art gallery scene. Galleries previously known for art have added furniture makers and designers to their stables. Some of the most satisfying work I saw during a recent tour of wood shows was Wisconsin designer/craftsman Dick Wickman's side chairs at the Perimeter Gallery. Like many of his contemporaries, Wickman uses fiberboard and Colorcore, but rather than dominate the pieces, these materials support and highlight the exquisitely figured blistered maple and bleached redwood burl featured on his elegant designs. Wickman's work is very contemporary, but should win over all but the most avid traditionalists.

Colorcore and colored lacquer dominated entries in the State of Illinois Furniture Design Competition to furnish the Governor's reception room in Chicago's radically new state office building (dubbed Starship Illinois by local wags). Hoping to spur local designers and manufacturers, the competition restricted designs to wood construction—390 of the state's 400 furni-

Notes and Comment

What's new in woodworking in your area? Notes and Comment buys brief articles about interesting events, shows and people and welcomes all manner of commentary. Send manuscript, if possible with color slides or black-and-white photos (preferably with negatives), to Notes and Comment, Fine Woodworking, *Box 355, Newtown, Conn. 06470.*

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ture manufacturers work in wood.

The winners that emerged from the 80 entrants ranged from architects to craftsmen, designers to sculptors. The first and second place suites (sofas, chairs, table and lamps) and several individual pieces built for those awarded honorable mention were displayed at the building's dedication last spring, and can be seen at the Illinois State Museum in Springfield from Nov. 10 to Jan. 5, 1986.

So far, five of the winning pieces are going into commercial production. The pleased organizers have contacted the Governors of all 50 states detailing the competition's success, should they, too, wish to use a public space to stimulate local furniture designers and makers. A few interested Governors have responded. Just a nudge may get something similar going in your state.

—Steve Luecking, Chicago, Ill.

Rockwell fix, Delta facts

If you own a Rockwell 12-in. radial-arm saw, you may need to make a simple alteration to ensure its continued safe operation. About a year ago, according to claim manager Matt Ros, Delta International Machinery Corp. (formerly Rockwell International Power Tool Division) learned that a Rockwell 12-in. saw had tilted off its track while in use, fortunately without operator injury.

After studying the problem, company engineers decided that certain Rockwell radial-arm saws could drop off their tracks if the bearings failed. Four oversized washers above the bearings will prevent this, and Delta is offering the washers and instructions for mounting them free to owners of saws made between December 1976, and December 1982: model numbers 33-790, 33-791, 33-792, 33-793 (these four models bear serial numbers IM-7800 through LJ-1273), 33-890, 33-891, 33-892, and 33-893 (serial numbers LJ-1274 to MC-6923 and 82K04650 and 83C04616). Authorized Delta dealers will provide the Track Arm Retrofit Kit, or phone Delta toll-free, at 800-223-7278.

Meanwhile, Delta has made a play for the lucrative home-shop tool market with a new line made in—you guessed it—Taiwan. Delta set up an engineering and quality-control office in Tai Chung, Taiwan, to supervise the Taiwanese manufacturers.

The new machines—two bench-top and one floor-model drill presses, three bench grinders and a 10-in., 3-wheel bandsaw—all carry the Delta name, U.L. approval, a two-year warranty and an attractive price tag. The drill presses, for example, range from $124 for an 8-in. bench-top model to $317 for a 16-in. floor model.

News bits

The humble wood pallet consumes more lumber each year than any other product except buildings. Last year's output of 228-million pallets grossed $2 billion, and used one-fifth of all wood purchased in the United States.

Another fifth of all American wood is consumed as firewood. We burned 42-million cords worth $620 million in 1981—five times the 1971 total. Stacked 8 ft. wide and 11 ft. high, this much firewood would stretch from New York to Los Angeles. One cord, by the way, works out to:

7,500,000 toothpicks
61,370 #10 envelopes
4,384,000 commemorative stamps
460,000 personal checks
1,200 copies of *National Geographic*
30 Boston rockers
12 eight-place dining room tables

Tidbits like these appear regularly with other, more serious fare in the *Minnesota Forest Products Marketing Bulletin*, a useful and entertaining free newsletter published bi-monthly by the Agricultural Extension Service at the University of Minnesota. For information, write Tom Milton, Area Extension Agent, North Central Experiment Station, 1861 Hwy. 169 East, Grand Rapids, Minn. 55744.

Mr. Sawdust (a.k.a. Wallace Kunkel) and Forrest Manufacturing Co. parted company last May. Kunkel and a group of investors have set up Mr. Sawdust, Inc., which will market its own products as well as endorse those of other manufacturers. Forrest, meanwhile, will market the carbide-tipped sawblades previously sold under the "Mr. Sawdust" imprimatur under a new, "Woodworker," label.

Urushi's revenge

When an antique dealer recently asked me to fix up a 200-year-old Japanese temple chair, curiosity got the better of me. The chair, finished in Japanese *urushi* lacquer, was in sad shape. My client didn't want to refinish the chair in *urushi*, so I planned to strip the framework, save what I could of the original finish and recoat the rest with modern lacquer. I soon found out, however, that there's no solvent for the mysterious sap.

The binder between the brittle lacquer and the soft pine underneath was fish glue, and, like hide glue, it lifts when heated. A heat gun also lifted the lacquer off a layer of papier mâché that bridged the finger joints fastening the chair's yoke. On the white paper were blue-inked shop drawings and comments for a project long forgotten. Around the carved curls of the handrest, I found pieces of blue linen covering rough gouge marks. The wood beneath was finely grained but fragile and weightless compared to its coating.

After stripping the yoke, I disassembled the joints and started sanding the straight pieces. As I worked, I began noticing an itchy rash which, at first, I attributed to heat or perhaps poison ivy—we had just helped fence a friend's pasture. Curiously, the rash was only in front of me, on my arms and down my chest, then on my thighs where my shorts stopped. When my husband started itching too, it was time to go to the dermatologist.

I had a hunch it was the *urushi* and the doctor confirmed that *urushi* comes from a close relative of poison sumac. He said the irritant had to have been airborne because the rash was symmetrical and only in front. He prescribed cortisone cream and steroid tablets for a month. I had already spent three weeks with this creeping curse and I wasn't finished with the chair yet.

The sanding went fast once I decided to get that chair out of my life. I finished the yoke and frame separately in black nitrocellulose lacquer and reglued them carefully. It took some time to put the gold medallions and straps back correctly. I hand-sewed the silk-brocade sling from fabric chosen to match the floral design stamped on the medallions and returned the chair to the dealer.

They were thrilled. While waiting in the dealer's shop for my check, I saw some lovely red *urushi* tea cups. I bought one later, after convincing myself that the stuff was okay as long as it was dry. □

—Nancy Lindquist, Kansas City, Mo.

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A '57 Chevy dashboard, as close to art as General Motors ever got, served as a model for Lynn Sweet's Bel Air desk. The mahogany and wenge desk measures 60 in. by 45 in. The desk's legs ape the Bel Air's expansive hood.

BEL AIR DESK

In the 1950s, when Cokes were still a nickel and the door of your average Chevrolet weighed as much as a Datsun station wagon, Lynn Sweet had the uncommon good fortune to be growing up in Detroit. Happy memories of a childhood thus spent inspired Sweet to build this mahogany and wenge desk. The desk's front (the non-operator end) is a scale replica of the dashboard in a 1957 Chevy Bel Air, replete with headlight and wiper switches and idiot lights. The leg panels are styled after the Chevy's hood.

Intent on getting the details right, Sweet had the dash torched out of a junk Bel Air and kept it around his shop, calipering each part before reproducing it in wood. Bolts and threaded inserts fasten legs to top so the desk can be knocked down for shipping. Sweet heads the University of Kentucky Art Department woodshop.