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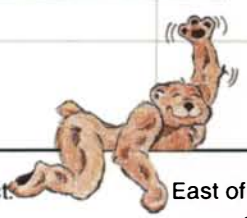

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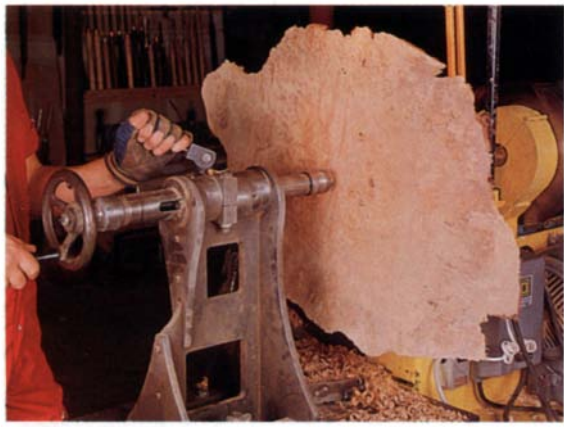

Dennis Elliott uses the tailstock to locate the center of a faceplate-mounted burl slab that he's turning into a wall-hung sculpture (article on p. 76). Cover: Furnituremaker Frank Klausz tells how he planned and built his own kitchen cabinets on p. 54.

Fine Woodworking is a reader-written magazine. We welcome proposals, manuscripts, photographs and ideas from our readers, amateur or professional. We'll acknowledge all submissions and return those we can't publish. Send your contributions to *Fine Woodworking*, Box 5506, Newtown, Conn. 06470-5506.

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DEPARTMENTS

ARTICLES

Keep on talking safety—"Before I get started I'd like to take a minute and talk about safety." As a safety professional these words are music to my ears; as a woodworker I applaud every professional who starts out a presentation with this statement.

Recently I've heard some workers comment that reminding people about wearing safety glasses or talking about safety in every class or written article is overkill. Those individuals who feel safety warnings are a waste of time, especially for professionals, don't understand human nature, and are at risk of falling victim to an accident looking for a place to happen.

Unsafe acts occur for a variety of reasons. A major one is a poor safety attitude: the belief that getting the job done is more important than doing it safely; thinking a "rush" job does not have time for safety precautions. Put that together with the belief that "it won't happen to me" and you have a walking time bomb. The problem is especially serious in an area like woodworking, where you have a wide variety of people of all ages watching "do-it-yourself" programs, buying instructional tapes, or grabbing any article they can find in hopes of becoming better craftsmen.

Another major problem that develops from a poor safety attitude is absentmindedness—workers just forget to put on safety glasses, to replace a guard or to repair damaged equipment. The most dangerous of all attitudes is to do the job the easiest, simplest or quickest way possible. Physical and mental fatigue can dull a person's reaction to danger and lead to a laxity in working safely on a job. In many cases, not using proper safety precautions can make a job a little easier or save a few minutes, but when a finger or an eye is lost, was it worth it? *—Howard Bleekman, South Wales, N.Y.*

Manufacturer responds on the Ripstrate—We would like to comment on your review of our Ripstrate (*FWW* #81), which you correctly describe as the most compact and easily adjustable of the available hold-downs. Your assertion that the wheels do not hold as tightly as some of the others needs some explanation.

The Ripstrate is not designed to work by brute force. The spring we use allows the wheels to swing up easily and the workpiece to feed freely, while providing more than enough grip to do its job. It is true that you can force the board away from the fence by deliberately pushing it sideways with your hand, but in real life this does not occur, and the Ripstrate exerts all the force necessary to hold the workpiece snugly against the fence.

Likewise, excessive friction is not required to prevent kickbacks, even though they can generate a lot of force if they are allowed to get started. A kickback is caused when the blade encounters a knot or jams in the kerf, whereupon it raises the board off the table and hurls it back like a javelin. The Ripstrate has all the power necessary to hold the board down so that the blade never has a chance to generate its throwing power by raising it off the table. In addition, the wheels lock instantly, so that the operator is not even aware that a kickback has been averted.

The self-adjusting feature of the Ripstrate is more than a time-saving convenience; it is a significant safety factor. A device which requires frequent adjustment often doesn't get used. Also, adjustments which have to be made while leaning over the saw table could cause injury if someone forgets to turn off the power or fails to wait for the blade to stop spinning. The Ripstrate sits compactly on the fence, does its job and seldom needs to be touched. It is also unique in that both wheels rise together, so that the operator does not encounter a second wheel partway into the cut, which interrupts the feed and can cause a burn mark.

We are proud of the Ripstrate's long and successful track record. It is being used every day in tens of thousands of shops, and we have received unsolicited "fan" letters telling us how much the users like the product. Ripstrates are also being used in the shops of hundreds of corporations, schools, the military, and government agencies, with names like General Motors, Boeing, AT&T, Andrews Air Force Base, Los Alamos National Laboratory, Smithsonian Institution and OSHA.

—Fred M. Slavic, Fisher Hill Products Inc., Fitzwilliam, N.H.

Accuracy is what you make it—In response to Joseph Chapline's plea for adopting the metric system (*FWW* #83), let me make an observation or two.

First, a quarter of an inch is a quarter of an inch. How accurate can it be? As accurate as you make it.

Wood products on the market today are smaller in size because someone wants to get more pieces out of a tree, not because of metrics. I don't care what the metric size is of anything. Inches, feet, yards, miles, etc., have worked just fine for a long time. Don't change the way of measuring something just because someone in another country uses another method. Let them change.

By the way, in most cases you can no longer calculate the total thickness of several pieces of wood of the same nominal size. You better measure it. *—Thomas W. Thompson, Grass Valley, Cal.*

Follow-up on Veritas guides—Regarding the comment on p. 98 of *FWW* #83 on the Veritas honing guides, there is never a need to dismantle a Veritas guide for cleaning. Any buildup of sludge from sharpening can be rinsed off. The roller shaft should have a drop of oil occasionally.

In the very first production run of the guides some five years ago, a manufacturing error resulted in defective rollers on some guides. These were replaced free of charge. Anyone experiencing a problem with a Veritas roller, should send the entire roller assembly to Veritas Tools, 12 E. River St., Ogdensburg, N.Y. 13669, and it will be replaced free of charge.

—Leonard Lee, Lee Valley Tools Ltd., Ottawa, Ont., Canada.

Find the morally superior tools—Film enthusiasts used to say that black-and-white movies represent pure cinema, while color movies are crass and commercial. Then a stranger from the east came along and threw a monkey wrench into this simplistic categorization from the universe. "Suppose color films were invented before black and white," he pondered. "Would color then be the purer medium?"

In like fashion, let us toss this reductionist nonsense into the

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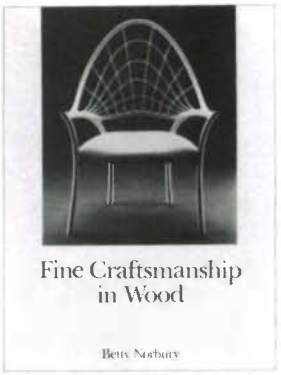

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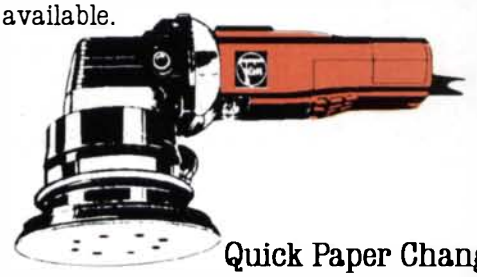

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woodworking camp and see what surfaces. "If power tools were invented prior to hand tools, would power tools be considered morally superior today?" *–David Donnelly, Boise, Ida.*

Credit for string inlay design–I neglected to credit Kurt Johanson of Westford, Mass., for the decorative stringing design used on my blanket chest (*FWW* #83). I liked Kurt's design, which I first saw when we were both students in Boston, and used it on my chest with his permission. I'd meant to include that in the article, but overlooked it in the rush to complete the piece.

–Irv Gerber, Charlestown, Mass.

More on oven cleaner as stain–I'm writing to comment on a letter in *FWW* #83 on using oven cleaner as stain. It's an interesting idea, but I feel there were several faults in the advice given. If I were going to chemically darken the tone of mahogany in this manner, I'd use pure caustic soda flakes dissolved in water, and begin with a very weak solution, carefully advancing toward the tone I wanted. I'm not sure just what's in these oven cleaners, but I'm guessing there's a propellant of some sort along with other additives that were never meant to come into contact with wood.

A more serious flaw lies in the assumption that one can simply apply a coat of finish to the treated wood after the solution has dried and the rough grain has been smoothed. A caustic solution can remain active in the wood and either bleed through the surface coating or break it down over time. It may seem fine during the dry winter months, but it may become sticky or "bloom" white when damp weather comes. (I learned this the hard way.) A safer approach is to flush the treated wood repeatedly with water or even scrub it, and then dry it off immediately. Household vinegar will also do a very nice job of neutralizing the treated surface, though a stronger acidic, such as oxalic acid, might reverse the darkening effect. Other methods for chemically treating wood can be found in George Frank's *Adventures in Woodfinishing* (available from The Taunton Press, 63 S. Main St., Box 5506, Newtown, Conn. 06470-5506).

–Tom Wisshack, Galesburg, Ill.

How can amateurs turn pro?–The other day, while showing some co-workers photographs of my woodworking projects, one asked me if I could build a gun cabinet for him. This caught me off guard. As a hobbyist with two years of experience, I have fantasized about selling my work, but never confronted the realities. I was flattered and completely unnerved at the same time. Many questions and doubts came to mind as I realized that I was not sure whether I was ready for this. Could I do it well enough? What would be a realistic time estimate? How would I figure a price (considering my skill level, the end result, prices on comparable commercially available pieces, and the fact that I want to cultivate a good reputation for quality and value?) I gracefully declined the request and have been questioning my decision ever since. I'd like to suggest you do an article, or series of articles, on common-sense strategies and down-to-earth advice for the hobbyist who would like to sell some of his/her work. Even some words of encouragement would be nice.

–Perry A. Younker, Fayetteville, Ga.

Beware of some swim glasses–Regarding a quick tip on p. 16 of issue #82 about using swimming goggles for eye protection, many of these goggles are not impact resistant and can shatter like a window into sharp-edge pieces if struck by flying debris. Stick with approved safety glasses. And remember, if you buy a comfortable pair, you are likely to use them.

–Jim Sinsky, Milwaukee, Wisc.

Chair design criticized–I doubt that there is any joint in woodworking that is more susceptible to failure than the one that connects the leg of a chair to the seat. Put a 150-lb. to 200-lb. moving and twisting body on a chair and the legs immediately become levers which exert tremendous forces on any connecting joint. That is the reason chair designs for centuries have included stretchers between the legs to add stability and to move the fulcrum of the leverage away from the seat joint, thus reducing the mechanical advantage considerably. I know that modern adhesives are very good, but I could not help wondering how long, under regular use, the joints Terry Moore is shown gluing up on the cover of issue #81 are going to last without stretchers to balance the stresses?

–Richard Hamlow, Montevideo, Minn.

Identify American toolmakers–The article "Made in Taiwan" (*FWW* #82) was quite revealing and to me somewhat disgusting. I have always attempted to buy U.S.- or Canadian-made products. But after reading Mr. Nagyszalanczy's article, I am not sure who the manufacturers are. Perhaps you could publish a list of companies manufacturing woodworking tools that are truly made in the United States or Canada. Also I am suspicious of a product labeled "made in America" when the brand name is a peel-off label. Furthermore, the statement "you get what you pay for" is no more than justification for the promotion of shoddy workmanship.

–Edward L. Fleming, Salina, Kan.

High-quality wood from Australia–This letter is in reference to Scott Landis' article "Managing a Rain Forest" (*FWW* #82, p. 78). It was very considerate of Scott to mention The Berea HardWoods Co. in his article.

I am, however, concerned that an incorrect impression may have been created. The mention of receiving poor-quality material from Australia may be interpreted as characteristic of our Australian wood. We mentioned this to Scott in the context of explaining how difficult it could be to properly develop untraditional woods. These problems are not passed on to the consumer, but fall on our shoulders. We are now receiving superior material from Australia, mostly in the form of burl or figured turning wood.

It may also be of interest to your readers to know that we are now preparing to sell a number of unusual domestics in kiln-dried lumber form, including madrone burl, highly figured/colored myrtle, myrtle burl and maple burl, among others.

–James J. Heusinger, The Berea HardWoods Co., Berea, Ohio

Alternative uses for tools–The article in *FWW* #82 on how secondhand woodworking equipment could be used to anchor your boat brings to mind one of my favorite alternatives–flattening warped phonograph records. To flatten them, I use the bed of a 12-in. jointer and my tablesaw. Set the outfeed bed above the cutter on the planer. Leaving the record in its jacket, put it on the planer bed, and set the saw on the record (upside down, of course). The mass of the two tools, along with the accurate, flat surface will easily correct any warps those old Frank Sinatra discs may have picked up. Records from the public library are especially prone to warp down here in the hot Florida sun.

When you do this, remember a few safety rules. First, remove power to both tools. Run the sawblade down below the table before you lift it up. This also protects the record. As you must remove all guards and fences, pay close attention to where your fingers are at all times. Don't strain yourself. After a day or so, the disc should be as good as new.

It's good that *FWW* points out the versatility of the tools we use. After all, we are only limited by our imagination.

–Al Pergande, Orlando, Fla.

Classic hand tools still available–Regarding the comments from Woody Pistrich in his letter in *FWW* #82, p. 4, in which

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he says that antique tools should be used, and not stored or resold, I would like to add some additional comments and hopefully some encouragement.

I, too, am an active woodworker and I also collect antique tools—not for resale, but because they are a beautiful, historical art form that can be enjoyed as well as used, and then be passed on to my children. I display my collection in cabinets that I have designed and built using both my antique and modern power tools. (I am a member of the Mid-West Tool Collectors Association, Inc.)

Yes, auction prices of tools have escalated, but not to the outrageous prices of antique toys, duck decoys or teddy bears. (The highest price for an "antique" teddy bear brought $86,000 in England!) The English auctions of David Stanley and Tyrone Roberts offer a good selection of quality tools and I have been successful in several of my bids in the past year. It is an economic fact of life that antique tools will continue to rise in price, due to people like myself buying and, where needed, restoring these tools (sorry, I'm guilty). Please know that 19th-century craftsmen often paid two weeks of their wages for a "top-of-the-line" plow plane. Not many weekend do-it-yourselfers would part with that much money today, even for power tools, unless they were serious craftsmen.

As for quality hand tools currently being manufactured, Bristol Design (Tools) Ltd., 14 Perry Road, Bristol BS1 5BG, England, offers a line of beautiful planes in both kit and finished form—for a price that reflects the quality of the product. The company also sells antique tools through its catalog.

I doubt that the attraction and desire to own and use the tools of our forefathers will ever be totally replaced by the better-quality hand tools currently on the market. The best of today's tools will always lack the "feel," "character" and sense of history that antique tools possess. *—Dwight H. Barker, Ambler, Pa.*

Will your tools to younger woodworkers—As an amateur woodworker, I sympathize with Mr. Pistrich's comments (*FWW* #82) about the disappearance of antique tools from the second-hand tool market and the high prices of such tools because of collectors. It is a shame, but it is a fact of life and I can see no lessening of the problem. I think that one possible solution is for woodworkers to will their tools to some deserving younger woodworkers. It would be like passing on a legacy to the next generation. This is what I plan to do.

—Don J. Reuter, Columbus, Ohio

M.C. Escher is the proper name—I was delighted to see the article "Marquetry" in the March/April issue (*FWW* #81). I was particularly impressed by the chest with the knights on horseback, inspired by *Symmetry Work 67* by one of my favorite artists. Imagine my surprise when I found the attribution to Cornelius Escher. The proper name for the artist is Maurits Cornelis Escher, but he is better known as M.C. Escher.

—Andrew F. Vesper, Townsend, Mass.

Warning on counterfeit Arkansas stones—I'd like to warn craftsmen looking for natural whetstones about some counterfeit hard black Arkansas stones. I was recently given a stone that had a cedar case labeled "surgical black." The stone's color is dark gray and more uniform than almost any genuine hard black Arkansas stone I have seen. The surface is slightly grainy, not perfectly smooth (almost glassy) as it should be. When I used solvent to clean away swarf after sharpening, some surface color

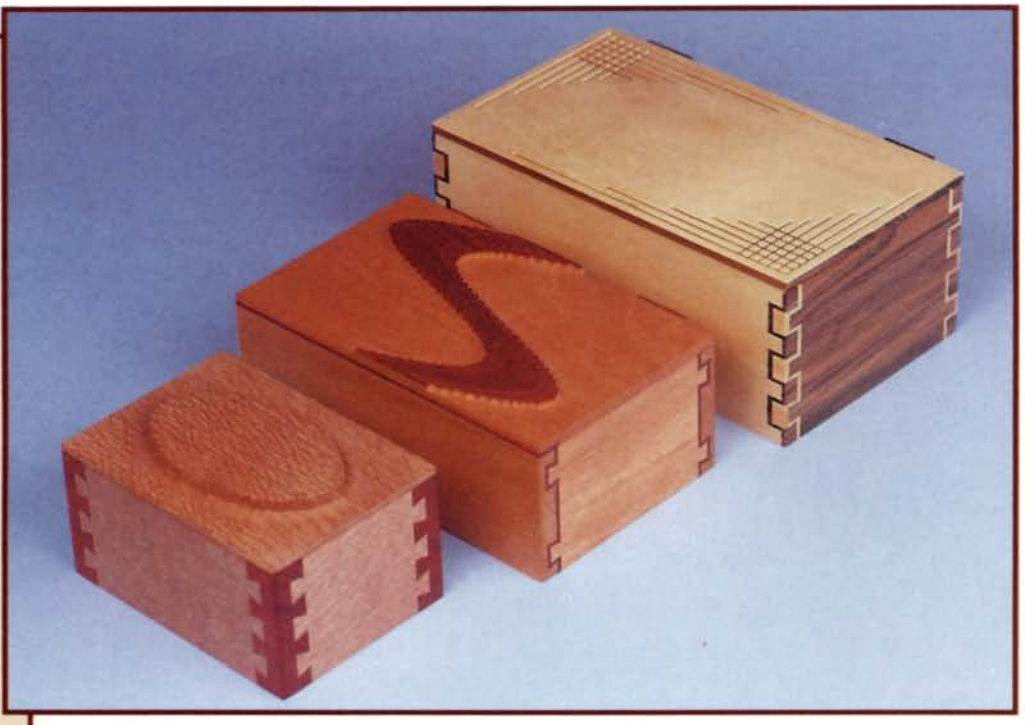
How would you make these without INCRA® JIG . . . and the INCRA Fence System, featuring the exclusive new INCRA Stop?

The astonishing work exhibited on this page is just a small sampling of the many new woodworking capabilities that INCRA JIG and the new INCRA Fence System put in your shop. More than just an accessory, this system adds a whole new dimension to INCRA JIG's already impressive capabilities.

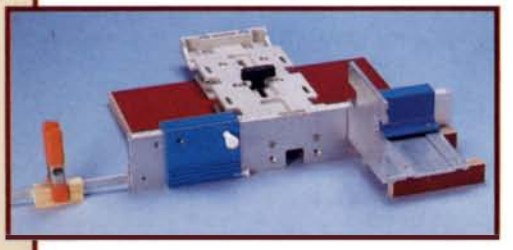
At the heart of the INCRA Fence System is the patented new aluminum **INCRA Stop.** It uses the same precision rack positioning technique found in INCRA JIG to give you all of the capabilities, and more, of having a second INCRA JIG mounted directly to your fence. Its ability to easily control the length of any cut with INCRA precision will make it the best stop block you've ever used. But that's just the beginning. INCRA Stop's elegant design lets you make an infinite variety of decorative patterns for box lids, trays, door panels, cabinet fronts, and more. To show you how, templates and plans for making the INCRA Wave pattern featured in this ad are included free with each INCRA Stop.

The 18" solid aluminum **INCRA Fence** is flat to within 0.004". Attached is a 17" sliding extender bar for clamping a stop block up to 15 inches beyond either end of the fence — extremely useful for making long mortises or slots on the router table.

The new **INCRA Right Angle Fixture,** which holds your work perpendicular to the table, is an invaluable compliment to the Fence System. It also works as a stand alone unit for non-INCRA applications. This precision aluminum fixture is perfectly square to both the fence and the table. Its intelligent design includes many special features for high functionality and ease of use.



Left to right: The Corner Post Dovetail, the INCRA Double Dovetail, and the brand new INCRA Double- Double Box Joint. The lid patterns were all made using the new INCRA Fence System.

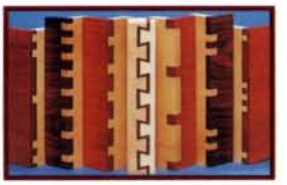


The INCRA Fence System and Right Angle Fixture, featuring the patented INCRA Stop adds a whole new dimension to INCRA JIG's already impressive capabilities. (Spring clamp not included)

A perfect mortise like the one for this wooden hinge is simple with the new INCRA Stop.

With a highly useful (and affordable) second INCRA Stop, multiple mortises are easy.

FREE templates and plans for making the INCRA Wave are included with each INCRA Stop. You can also easily make an unlimited variety of your own unique patterns.



With the Official INCRA JIG Handbook & Templates you can make all of the joints shown here plus many more.

The INCRA Fence System includes:

- 18" solid aluminum INCRA Fence, flat to within 0.004".
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- FREE INCRA Wave plans, templates, and instructions.
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The INCRA Fence, INCRA Stop, and 17" Extender can be purchased individually or as a complete INCRA Fence System.

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came off, leaving the stone paler and streaky. It is apparently an excellent hard white Arkansas stone dyed black, and doubtless sold for several times its real value.

It is essential to examine natural whetstones before buying them. I believe, though, that it would be a mistake to avoid natural stones completely just because of the danger of counterfeits. Despite the growing popularity of Japanese waterstones, natural whetstones are still the cleanest and most convenient for many honing purposes; and this is particularly true of the hard white Arkansas and hard black Arkansas grades.

—Tom Conroy, Berkeley, Cal.

Good tips for portable planers—Periodically I decide that *Fine Woodworking* has become entirely too effete and that I will let my subscription lapse. Then you produce a stunning article like "Working with Portable Planers" (*FWW* #82).

The article is extremely important to people who don't yet own a planer and are agonizing over spending a bundle on a big one or taking a chance on a small, inexpensive one. The concept of saving money and space by using the planer as a jointer is great. I loaned the issue to a neighbor who has neither a planer nor jointer and he started salivating.

I have a planer and a jointer. I commonly joint one edge for square and plane the other edge for dimension. And I commonly use an insert bed for the reasons Mr. Lego expressed so well. But I had never thought of making those hand nuts—so much better than wing nuts. Nor had I ever really figured out a bevel jig or a taper jig. *—Eugene C. Hise, Oak Ridge, Tenn.*

Airless storage for finishing—At last I've found a quick, easy and successful way to store an odd amount of finishing material, such as tung oil, which will congeal with exposure to air. I decant the leftover finish into a clean wine bottle and exhaust the remaining air with a gadget called a wine saver. It works. (And for wine, too!)

This simple device is readily available from package stores where wine trade is brisk. It is distributed by Global Wine Products, The Wine Enthusiast, 404 Irvington St., Box 39, Pleasantville, N.Y. 10520. *—John F. Harris, Bristol, Conn.*

No PVC for compressed air—I enjoyed your article on compressed-air systems in the May/June issue (*FWW* #82). However, I was surprised by the author's suggestion to use PVC piping for the air distribution lines.

I am a registered professional mechanical engineer, and have been involved in designing compressed-air systems for industrial clients for many years. I don't think PVC pipe should ever be used for this application. Although PVC may withstand the pressures encountered in compressed-air systems, it is a relatively brittle material. Stress concentrations (such as scratches in the outside surface, or the threaded adapter fittings required for point-of-use regulators, hoses or filters) can be the starting point for an explosion, sending PVC shrapnel flying. For safety, ease of installation and future modifications, and low maintenance, use type "L" copper pipe. It is strong, light, easy to cut and solder, and does not need to be supported as frequently as PVC to prevent sagging. And it will not corrode in normal shop environments.

As for oil control, a surprising amount of oil can carry over into the distribution piping from your compressor's crankcase. If you are using compressed air for blow off and cleanup, installation of a good coalescing-type oil-removal filter at the tank discharge is essential. It will prevent oil from contaminating your

distribution piping and ending up on your work.

Like so many other things in the shop, compressed air can be dangerous and should be treated with respect. Read the safety literature that comes with your compressor and compressed-air equipment, or check with compressor suppliers for safety information. *—Paul A. Mierswa-Jacobson, P.E., St. Paul, Minn.*

Design comments for futons—Gary Rogowski's futon couch (*FWW* #77) is attractive and solid. But as a futon maker and frame dealer, I think it has a defect: the slats are too few and the gaps between them far too wide. The futon will tend to fall through the gaps, causing the fibers to pull apart; the futon's life span will be shortened and the sleeper will soon be able to feel the slats.

I sell many different futon frames, and find that gaps greater than 3 in. devour futons, with the possible exception of foam-core, overstuffed models, which are fit in their cases tightly. A normal 2-in. foam-core futon will survive 2½-in. gaps, but will retain more loft if better supported. All-cotton futons require very close support: 1½ in. or less.

Just ripping each slat in half reduces the gaps from 8 in. to less than 2 in. In addition, possible cupping of plain-sawed wood will be far less obtrusive if the slats are narrower.

—Bill Carpenter, Futons by Akiko, San Francisco, Cal.

Fantasy can destroy reality—Maybe the critics are right when they insist that *Fine Woodworking* is not the proper place for discussions regarding deforestation and our consumption of wood products. I strongly disagree though. A monthly "department" of a page or two devoted to the discussion of tropical-wood substitutes, imitation staining methodologies, and a forum for wood-product consumption awareness *is* in keeping with the professionalism that *FWW* represents. My reply to "conservative" woodworkers is to simply turn the page if they find the topics disagreeable.

Americans tend to disregard the consequences of their actions, and they don't like to be reminded either. Our national debt is a prime example where we expect national services, but we don't want to pay for them in the form of taxes. (We have even attempted to hide the debt through creative financing.) The consumption of whole forest areas and the wildlife within them is a subject we would rather not discuss or be reminded of. Maybe we can resolve this issue by making South America's denuded forest a landfill for North Americans so that we may continue to consume all the goods of our desires without consideration of the consequences.

Yes, the tone of this letter is harsh. It is the tone of a wood-loving woodworker who has faced the facts and who is regretfully and painfully boycotting all tropical-wood products. It is harsh because so many of us still think we can continue on as though we live in an age gone by, and living this fantasy has serious detrimental effects on the reality we all share.

—Jim Boles, Pittsburgh, Pa.

About your safety:

Working wood is inherently dangerous. Using hand or power tools improperly or neglecting standard safety practices can lead to permanent injury or death. So don't try to perform operations you learn about here (or elsewhere) *until you're certain that they are safe for you and your shop situation.* We want you to enjoy your craft and to find satisfaction in the doing, as well as in the finished work. So please keep safety foremost in your mind whenever you're in the shop.

—John Lively, publisher

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Announcing Porter-Cable's limited-edition commemorative sander. Twenty five years ago, Porter-Cable made woodworking history with the introduction of the Model 505. . . the world's first high-speed, small-orbit, half-sheet finishing sander. For a quarter century, it's been unmatched for performance and durability.

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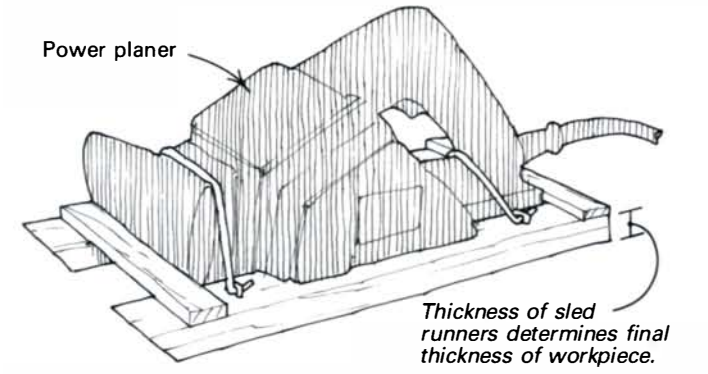
READER SERVICE NO. 21

edited and drawn by Jim Richey

Thicknessing with a power planer

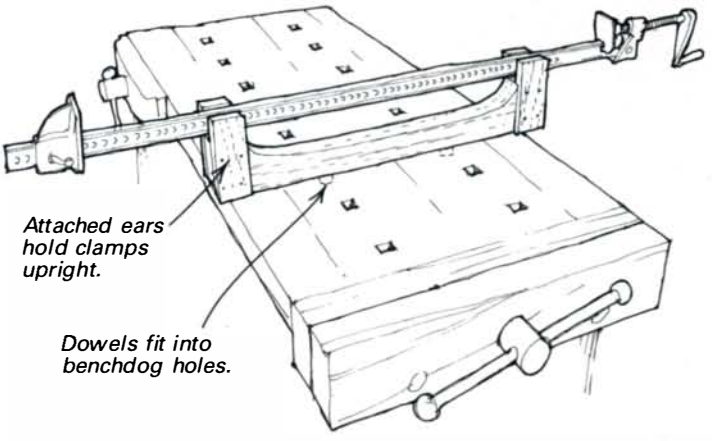


I don't have a planer. So when I needed to thickness stock for some custom moldings, I built this attachment for my hand-held power planer that makes quick work of thicknessing stock up to 3 in. wide. First, I built a wooden sled for the power planer to ride in, as shown in the drawing. The body of the plane is supported on the sled's runners and the sole drops down between them. I made the runners thick enough so that the distance from the bottom of the sole to the bottom of the runners was equal to the desired stock thickness. Two wires hooked through heavy-duty staples on the top of the sled runners hold the plane and sled together firmly.

To use the device, clamp the stock on top of a workbench between the bench's tail vise and wooden benchdogs. Then set the plane for a good heavy cut and have at it. Be sure to plane the entire length of the stock in each pass, and after a couple of passes, turn the stock over to true the other side. Continue making passes until the runners keep you from removing any more material. As you approach the last pass, the runners will automatically make the cuts lighter, leaving a smooth surface.

—Thomas Henke, Covina, Cal.

Workbench bar clamp stand

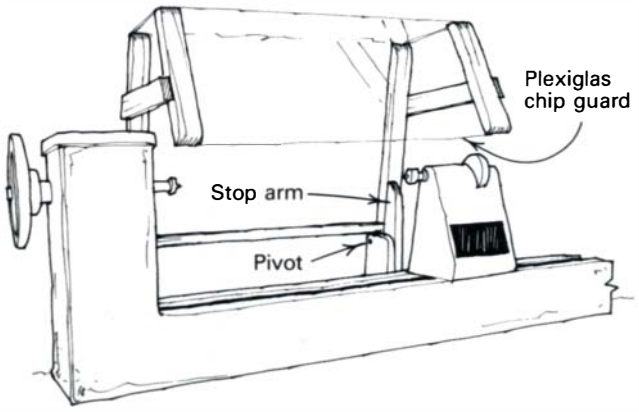


These simple little fixtures turn any workbench with two rows of benchdog holes into a clamping table. These clamp cradles reduce the wild scramble that accompanies gluing up edge joints, doors and face frames by holding a series of bar clamps ready and steady. To make one of the fixtures, cut a length of hardwood into a long U-shape, and glue or screw little ears on each end to hold the bar clamp upright (see the drawing). Then install dowels in the bottom of the cradle that fit into the benchdog holes in your benchtop. Make as many of the cradles as you'll need for your biggest glue-up. *—Tony Whitford, Norfolk, Va.*

Quick tip: To find slow leaks in air hoses or tool connections, apply liquid dishwashing detergent to suspected leaking areas. Suds and bubbles soon tell the tale.

—Robert M. Vaughan, Roanoke, Va.

Plexiglas lathe guard



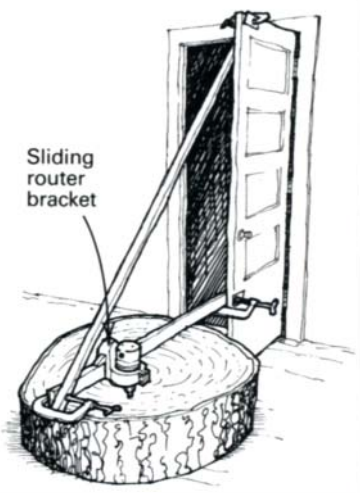
Since I couldn't find plans for a shopmade chip guard for a lathe, I built my own by adapting the best features from three of my friends' commercial guards. My guard, which consists of a hardwood frame and a ⅛-in.-thick Plexiglas shield, not only deflects the stream of chips and stops flying debris, it also makes dust collection more efficient. The guard is mounted behind the lathe on two bolts, as shown in the sketch, so it will pivot out of the way when necessary.

You can screw the wooden frame members to the plastic or attach them with contact cement. The only tricky part about building the guard is bending the Plexiglas. When you locate a local supplier for the Plexiglas, be sure to ask if the store can bend it to your specifications. If not, you can shape Plexiglas in your own shop by softening the plastic with an industrial heat gun (similar to a portable hair dryer) and then bending it over a shop-built form. Be careful not to overheat the plastic, and practice with small pieces until you get the hang of it.

—John I. Timby, Deming, N.M.

Quick tip: When sanding small parts that can't be gripped with your fingers, take a technique from the lapidary. Put a dollop of hot-melt glue on the back of the part and stick it on the end of a dowel. To remove the dowel, place the assembly in the freezer for a few minutes—the part will pop right off. This technique also works well for polishing small metal parts on a buffing wheel. *—Paul Marshall, Apache Junction, Ariz.*

Milling large surfaces



Here is the procedure I used to accurately mill the surface of a 4-ft.-dia., 288-year-old ponderosa pine section destined for a museum exhibit. I utilized the shop door as a swinging vertical axis to which I clamped a horizontal beam and a diagonal brace, as shown in the drawing at right. I made a mounting bracket for the router so it could slide along the beam and be locked in position anywhere. Marks along the horizontal beam designated increments slightly less than the diameter of the surfacing bit I was using so I would know how far to move the router after each pass.

To use the rig, I leveled the tree section on the floor near the shop door. Then, I turned on the router and swung the beam and router assembly back and forth across the workpiece, mov-

ing the router one increment after each completed pass. I got the best results by swinging the beam first from right to left and then from left to right on each pass. On the first swing, the pressure from the cut raises the router slightly out of the workpiece; then on the back swing, the router removes just a whisker, producing an accurate surface requiring only sanding. If you aren't getting a flat surface, your door jamb is probably out of plumb.

—Laurence I. Jayne, Davenport, Wash.

Quick tip: Two jam nuts that acted as a depth stop on my drill press were always vibrating loose and inhibiting spindle travel. I replaced them with a ⅜-in.-long piece of ⅜-in.-dia. tube that slides over the depth rod. I secure it with an Allen setscrew tapped into the tubing. *—Jack Rosenfield, Lakewood, Colo.*

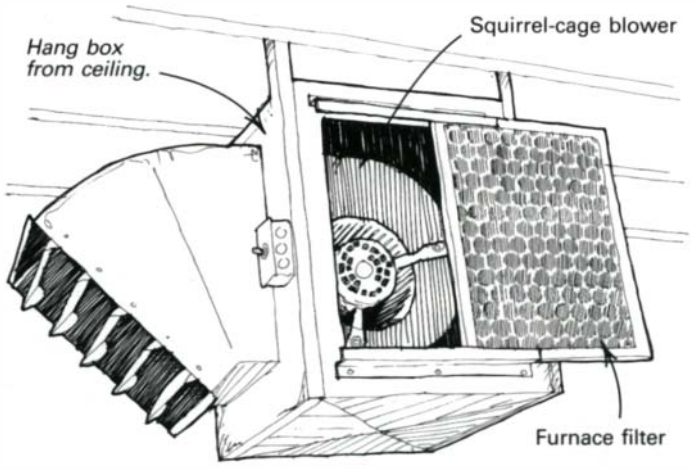
Homemade burn-in sticks

Shellac sticks are used for making minor surface repairs before finishing. The stick is heated to melting with a hot knife and then pressed into the dent or gouge. You can make shellac sticks by heating a brass rod and rolling it in any form of flaked or powdered shellac. Repeat heating the rod and rolling it in the shellac flakes until the rod is well coated. Don't allow the shellac to flame; just get it hot enough so you can easily pick up more. Use the edge of your jointer or any cold metal edge to force the shellac off the stick. When the shellac is cool enough to handle, roll it between your palms to form it into a round stick. Both button shellac and orange shellac make excellent sticks for the darker hardwoods.

To make repairs with the stick, you will need an old table knife. Hold it and the shellac stick well above a propane torch or alcohol burner, with the knife shielding the stick from the direct heat of the flame. Melt the shellac onto the knife and press the melted shellac into the defect in the wood. Smooth the repair with the flat side of the blade, and then rub out the shellac with fine steel wool or rottenstone. *—Ken Hopps, Tacoma, Wash.*

Quick tip: When facing plywood shelves with solid stock, do two at once. Glue and clamp a 1⅝-in.-wide strip of solid stock between two plywood shelves. When dry, rip down the middle of the solid strip. You'll have a ¾-in. solid facing on each shelf in less time with fewer clamps. *—Brian J. O'Connor, Wolverine, Mich.*

Squirrel-cage fan and dust filter



I was concerned about dust in my shop and had this filter setup made at a sheet-metal shop. For about $140, I got the four-speed squirrel-cage blower in a custom box with a furnace filter on each

JET

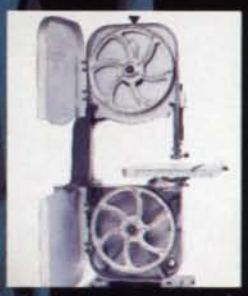
Take A Close Look...

Quick release, front locking "JETFENCE"

Conveniently located adjustment knobs

Dust chute

4" Dust chute



Hinged wheel covers

Accurate scale on Aluminum fence guide

Model JCS-10A
Retail Price: $1199

At The New "JETSAWS"

JET is introducing innovations in tablesaw and bandsaw technology that will lead the market in efficiency and accuracy.

Features on the new 10" "JETSAW" tilting arbor tablesaw can't be found anywhere else. Its unique table leveling system allows easy adjustment for precision accuracy. A newly designed, T-square type "JETFENCE" is front locking, and easily removable. The all steel body construction features a dust chute and large 27"×40" ground cast iron table and wings with a 30" right cut-off and a 12" left cut-off, T-slots, a see-through blade guard, a dual V-belt drive, and a full 2 HP motor, with cover. This saw may also be purchased with a pre-drilled Biesemeyer fence package.

The new 14" "JETSAW" bandsaws feature top and bottom hinged wheel covers that make blade changing easy and quick. The base is fitted with a dust chute—minimizing dust build up on tires and wheels. Tension adjustments are easily made because the knob is conveniently located above the top wheel cover. Precision balanced wheels maintain blade adjustments, providing smooth running. Blade guard and guides are detailed to make adjustments easy and accurate.

The JBS-14CS bandsaw features a 1 HP motor and an enclosed stand which is heavier and sturdier, providing vibration-free operation. The JBS-14OS has a ¾ HP motor and an open stand.

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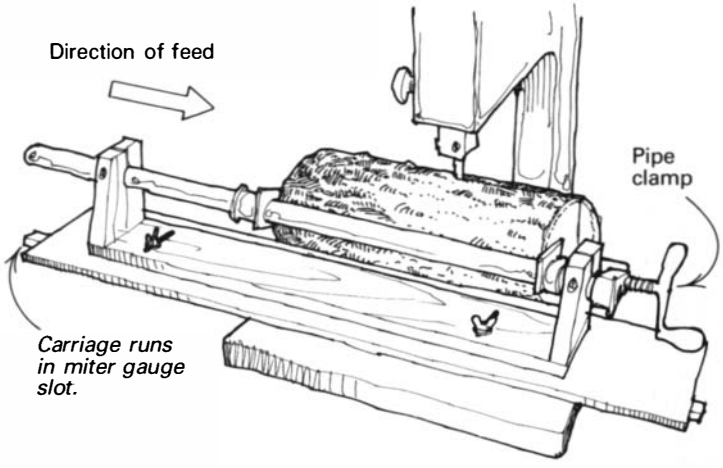
WOODWORKING

side. It hangs on the ceiling where it filters the air by removing airborne dust before it settles and then recirculates the filtered air with a whirlpool effect. *–John R. Thiesen, South Wales, N.Y.*

Quick tip: I apply liquid gun bluing to my steel tools not only to prevent rust, but also to deter "permanent borrowing." Oxpho-Blue, available from Brownells, Inc., Route 2, Box 1, Montezuma, Ia. 50171, is a good solution. *–R.S. Kjarval, Chicago, Ill.*

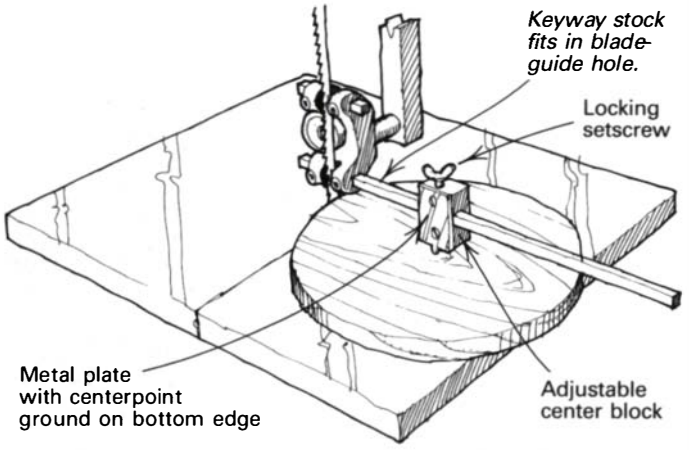
Carriage for bandsawing rough wood



I'm always looking out for interesting hardwood scraps, split firewood and small logs for turning blocks. But hand-feeding the irregular shapes through the bandsaw to cut them into usable pieces isn't safe. I developed a solution based on my recollections of a rolling log carriage used in sawmills. I used the same basic idea, but scaled down the carriage.

I mounted a 3-ft.-long pipe clamp to a 2-ft.-long U-shaped maple bracket. To allow lateral adjustment, I slotted the bracket's bottom and fastened it to the base with bolts and wing nuts. A maple track glued to the bottom of the base slides in the saw's miter-gauge slot. When making the carriage, be sure the clamp jaws clear the bandsaw blade with the bracket at its closest setting. To use the carriage, tighten the log in the clamp, adjust the bracket for the width of cut and feed the log past the blade. *–E.G. Lincoln, Parsippany, N.J.*

Integral circle guide for bandsaw



This circle guide uses a length of standard steel keyway stock, available from machine shops, as a replacement for the saw's upper right-hand blade-guide insert. Adjust the blade's thrust bearing and

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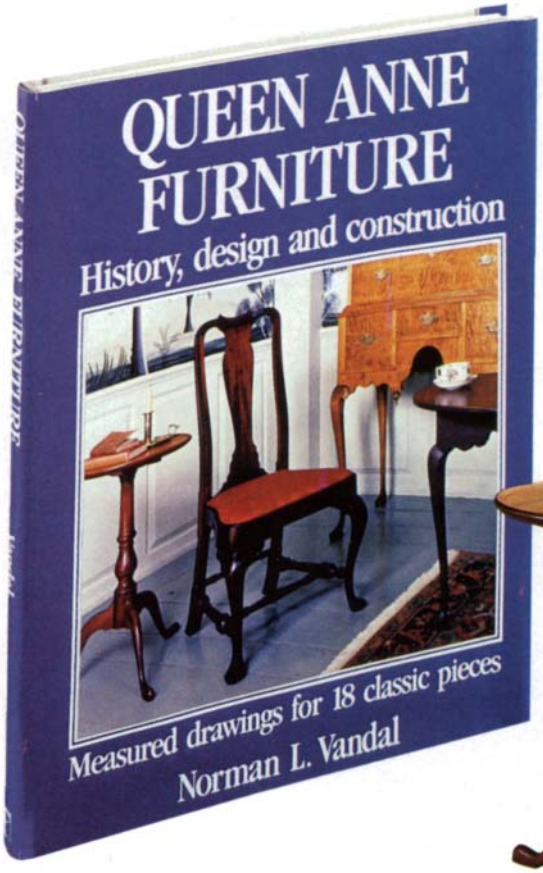

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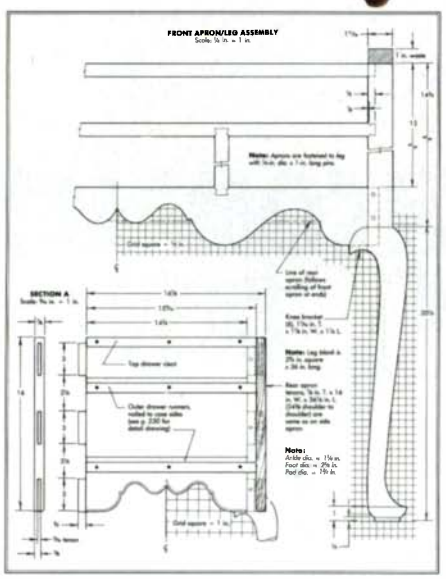

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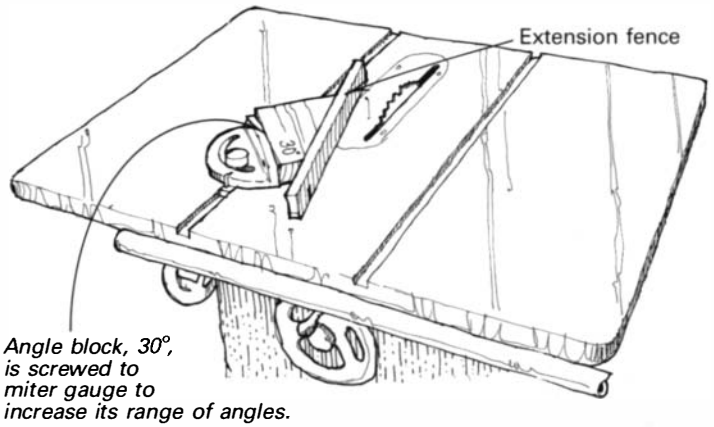
tracking to be sure the teeth aren't damaged. Notch a small wooden block to fit on the keyway stock for an adjustable center point. Drill a slightly undersize hole in the center block's top, and tap threads in the hole with a thumbscrew that acts as a locking setscrew. Cut a spur on the bottom edge of a metal plate to act as a center pivot point and screw the plate to the block's front face.

To bandsaw a circle, set the center point at the desired radius by measuring over from the blade. Then, with the edge of the workpiece bumped up against the blade, lower the upper blade-guide assembly until its center point sets into the workpiece firmly. Now turn on the saw and slowly rotate the workpiece into the blade. *—Dean Martin, Loveland, Colo.*

Expanding the range of a miter gauge



Angle block, 30°, is screwed to miter gauge to increase its range of angles.

Some of my projects require cuts at 12° or 15°, but my tablesaw's miter gauge is limited to 30° to the left or right of the 90° setting. To expand its range, I made an adapter, shown in the drawing below, left, that I screw to the face of the miter gauge. The adapter is a 2-in.-thick block of wood cut at 30°, which allows me to make acute angle cuts down to 0°. The block can be reversed on the gauge for use in the right-hand miter-gauge slot. Adding an extension fence to the block is also helpful in many situations and lets you hold long workpieces so your fingers aren't near the blade. But don't attempt to hold small pieces with your hand while cutting steep acute angles. *—Kenneth Wolfe, Wausaukee, Wisc.*

Quick tip: To ensure green wood doesn't crack or check before you get it on the lathe, keep it submerged in a tub of water. It can be preserved this way almost indefinitely. *—Earl Rice, Augusta, Ga.*

Quick tip: The cut-off bottom of a two-liter, plastic, soft-drink bottle makes a perfect mixing bowl for plastic-resin glue and similar compounds. Hardened glue will not stick to the flexible bowl. *—R.S. Kjarval, Chicago, Ill.*

Methods of Work buys readers' tips, jigs and tricks. Send details, sketches (we'll redraw them) and photos to Methods, Fine Woodworking, *Box 5506, Newtown, Conn. 06470-5506. We'll return only those contributions that include an SASE.*

Sanding turnings and moldings

A number of years ago in high-school shop class, my teenage son started building an oak sideboard. Now that he's in college, I'd like to complete the piece, which involves mostly sanding and applying a finish. Unfortunately, a lot of the sideboard's moldings and turnings are rough and tool-marked and need heavy sanding. How can I do this without spoiling the crispness of the forms? ***—Jasper Rose, Santa Cruz, Cal.***

Sandor Nagyszalanczy replies: Without seeing your son's piece, it's hard to tell how much damage you need to clean up. But it's probably safe to assume that sanding is the best way to proceed. As you are aware, while the abrasives will allow you to sand out damaged areas, they also tend to turn the crisp lines of moldings and turnings into mush. The trick is sanding carefully and selectively: On moldings, the best way I know of is to back up the rough sandpaper with a homemade custom caul that's a negative match to the shape of the molding. On a simple molding cut with a ¼-in. beading bit, this would mean making a caul from a scrap strip shaped with a ¼-in. cove bit, thus creating the matching profile. By gluing a narrow strip of the sandpaper into only the concave coved area, you will avoid sanding away the crisp, stepped edges of the bead. For more complex moldings, you must sand different sections selectively, making a different caul for each of the different parts of the molding's profile. In lieu of making your own cauls, you might find a shape that matches your sanding situation in the sanding grip set available from Woodworker's Supply of New Mexico, 5604 Alameda Place N.E., Albuquerque, N.M. 87113; (505) 821-0500, (800) 645-9292. In cases where it's impossible to sand beyond the defects, a light pass taken judiciously with the same style router bit used to create the molding may clean away the damage. This would be followed by finish-sanding.

For sanding the sideboard's turned legs, it will probably be easiest for you to rechuck the legs in a lathe, if they're not already glued to the carcase. Then you can use strips of sandpaper to remove the roughness. Sand each section of the turning carefully and work the edge of the paper right up to transition areas, like beads and rings, to keep them sharp and clean. I reinforce the backs of my sandpaper strips with strapping tape—an untearable clear tape with strong fibers imbedded in it (available from most stationery and department stores). The tape keeps the sandpaper from tearing, as well as holds its edges intact for crisp sanding. With the leg turning at about 1,000 RPM, move the strip back and forth to keep scratches to a minimum. To sand very narrow turned bands and coves, you can use abrasive sanding cord (available from Industrial Abrasives Co., 642 N. 8th St., Box 14955, Reading, Pa. 19612; 800-428-2222, 800-222-2292). If you can't sand the legs in the lathe, you can still use the strips and cord: take a half wrap around the leg and sand back and forth, as if you were shining a shoe.

[Sandor Nagyszalanczy is Associate Editor of *FWW.*]

Relieving bandsaw blade tension

Some "authorities" recommend loosening the tension of a bandsaw blade when it's not in use, especially if the blade is narrow. If this is true, should I loosen the blade tension on my 16-in. bandsaw at the end of each day's work, assuming the saw is used daily, or only when it is not used regularly? ***—Jim Tite, Fayetteville, Ark.***

Mark Duginske replies: It is a good idea to release the blade tension on any bandsaw when the saw is not going to be used for a while. If the saw is used daily, leaving the blade tensioned is not a problem, because the stress will average out. The stress comes in two forms. When the bandsaw is at rest, the tension of a narrow blade on only one side of the tire tends to compress the tire unevenly, and this eventually causes the tire to wear prematurely. This may also create a concavity in the middle of the tire and cause the blade to track erratically. Wider blades distribute tension more evenly on the tire; but since they are tensioned higher than narrow blades, they tend to flatten out the entire tire if left on an unused saw at full tension. This may increase the vibration of the bandsaw when it's used.

Another problem with leaving a wide blade tensioned on an unused saw is that high tension stresses the bearings, shafts and wheels of the saw. I heard a story of one bandsaw that was left tensioned for a long time: The alloy wheels actually changed their shape from the stress.

[Mark Duginske is a woodworker, teacher and author who lives in Wausau, Wisc.]

Was that a carpenter ant I thaw?

I recently cut a large maple log into blanks for lathe turning. While cutting the blanks on the bandsaw, a pile of black carpenter ants fell out. I didn't think much of it, since the wood had been outside in 15° weather, but after the ants heated up, they began crawling around. Now I'm wondering if storing this wood in the shop, next to my other hardwood stock, is such a good idea? ***—Tom Albrecht, Wilmette, Ill.***

Walter Tschinkel replies: Carpenter ants belong to the genus *Camponotus* and are among the largest of North American ants. They get their name from their habit of excavating nests in punky or soft wood. They are occasionally reported to nest in sound wood, or between boards, and can cause some structural damage. A nest of the species you found (probably *Camponotus pennsylvanicus*) may contain up to 2,000 or 3,000 adult workers and such a colony is probably several years old. Because they nest above ground and cannot escape winter's harsh temperatures, the ants have evolved the capacity, through several biochemical and physical adaptations, to survive even after being frozen solid.

I don't think the danger to your stored lumber or your shop is too high. The ants prefer soft, punky wood in which to nest and they also need a source of water; your shop is probably very dry. I suggest simply keeping an eye open for piles of sawdust or foraging ants, and if these become abundant or emanate from some prized piece, the colony can be killed by offering a sugar water/arsenic bait. These are available from several manufacturers and are quite effective. On the other hand, the nest galleries that result from their excavations are sometimes rather attractive and might make an interesting addition to your lathe turning.

[Walter Tschinkel is an entomologist living in Tallahassee, Fla.]

Flattening Japanese waterstones

I have a problem with the cutting action of my Japanese waterstones after I flatten and true up the surface of these soft stones. First, I dry the stones out, and then I use 120-grit sandpaper for the 800-grit stone and 220-grit for the finer 1,200-grit stone, working on the jointer bed to assure flatness. After resoaking I've noticed a lack of cutting action in both stones. In fact, another 1,000-grit stone, which had never been flattened, cut better than the 800-grit stone. How can I alleviate this problem? ***—Ron Banaszak, Falls Church, Va.***

Robert Meadow replies: When you flatten Japanese waterstones with sandpaper, the surface of the stone is dulled or glazed by the abrasive action. It is far better to rub two stones of the same or similar grit together, bringing down the high spots on one with the high spots of the other. The slurry of mud between the two stones crumbles the surface of each, exposing fresh grit. The stone will then cut much better.

Although you have to invest in a second stone in each grit to do this, there is a big savings, over time, in sandpaper. Also, when stones are left to dry and then resoaked, you may find that they have moved or warped and lost their flatness. To avoid this,

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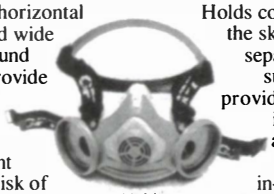

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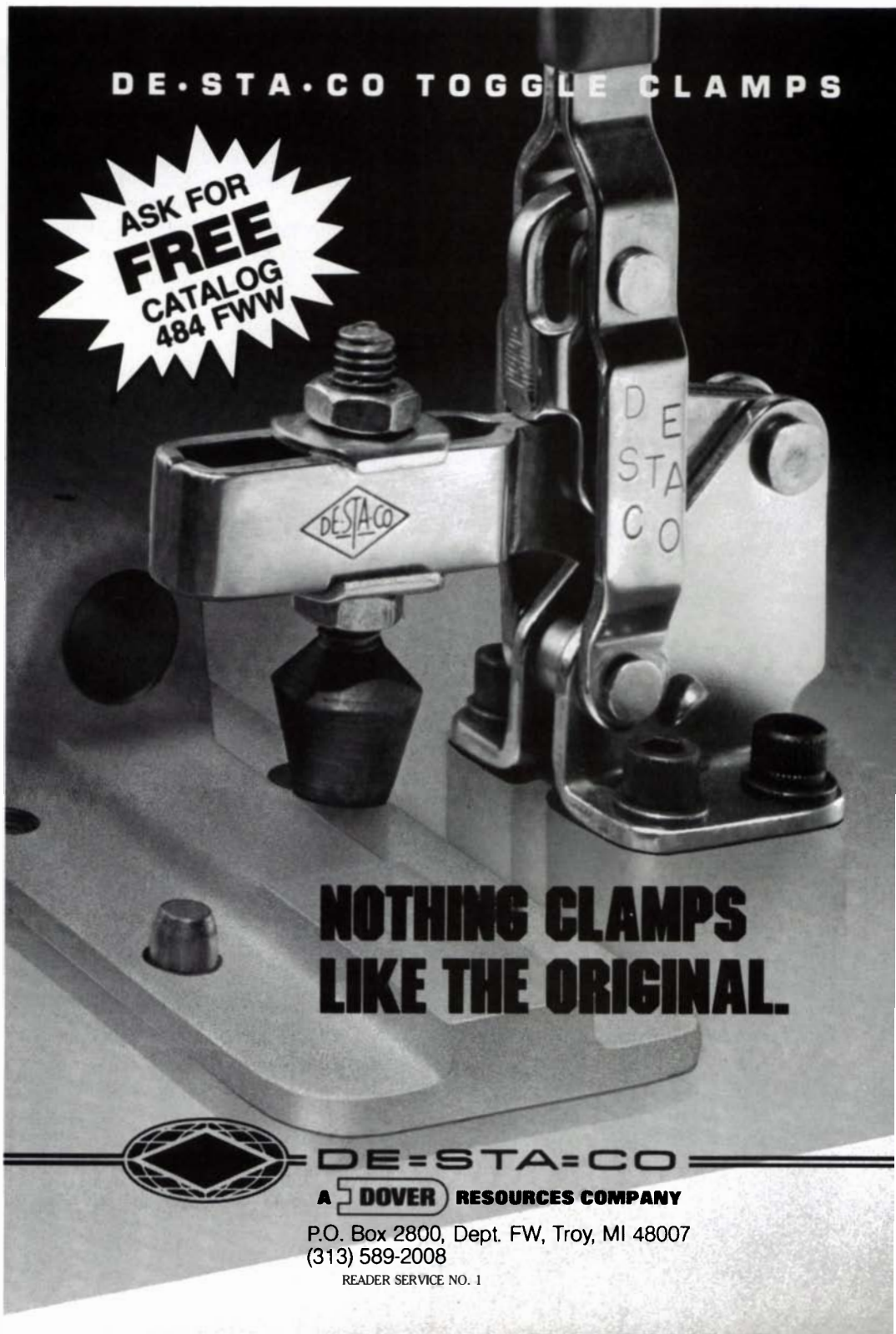

READER SERVICE NO. 1

it is a good idea to keep your Japanese waterstones wet all the time or to flatten them again after resoaking.
[Robert Meadow is a musical-instrument maker from Saugerties, N.Y. He teaches the care and use of Japanese hand tools.]

Homemade beeswax mixtures

What can I add to the wax from our beehives to make it easy to apply to wood? I'm into low-tech solutions.—Denis, Louisa, Va.

Chris Minick replies: Beeswax is a wonderful substance. It can be used as a furniture polish, a wood preservative, and it also makes a good wood lubricant. Due to its chemical makeup, beeswax is totally insoluble in water and alcohol, and only slightly soluble in other common household solvents. Therefore, beeswax makes a very good furniture polish; it's used extensively in paste-wax furniture polishes. Commercial beeswax-base furniture polishes contain mineral spirits or turpentine as solvents for the wax, and you can use the same solvents to dissolve raw beeswax from your hives. A good furniture polish can be made by adding 1¼ cup of mineral spirits or turpentine to 1 lb. of melted beeswax. Either solvent is highly explosive and the mixture should under no circumstances be heated over an open flame. After the mixture has cooled, it will have the consistency of shoe polish. More or less solvent can be added to change the consistency of the paste. Beeswax polish is an excellent finish for wooden cooking utensils and cutting boards because beeswax is non-toxic; it's even accepted by the Food and Drug Administration as a food additive.

An exterior wood waterproofer can be made by mixing mineral spirits, beeswax and boiled linseed oil in the following ratio: 1 gal. of mineral spirits; 1 oz. to 2 oz. of beeswax; and 1½ cups of boiled linseed oil. This waterproofer should be used on bare wood only and two to three coats are needed to achieve optimum waterproofing. Additional coats of the same mixture should be applied every two years to maintain optimum waterproofing.

Finally, the chemical structure of beeswax is similar to many synthetic lubricants. Hence, beeswax can be used as a lubricant for wood. A thin coating of beeswax on a sticking drawer will make the drawer slide much easier.
[Chris Minick is a product development chemist and amateur woodworker in Stillwater, Minn.]

The truth about pink ivorywood

I am considering the purchase of about 30 lbs. of pink ivorywood from a dealer in my area. The dealer said that the wood is licensed and legal, obtained from a road clearing. Someone told me that the fervor over the rareness of this wood is mostly hype, and shouldn't command a high price. Further, I've heard that the wood does not stay pink, but turns brown over time. Is there truth to what I've heard, and what should I expect to pay for this wood? —David Nevins, Gladwyne, Pa.

Jon Arno replies: Pink ivorywood is a member of the buckthorn family, *Rhamnaceae,* and it is native to the more arid regions in and around northeastern South Africa. Unfortunately, much of what you have heard about this species regarding its rarity, its high cost and the fact that some of it comes to market by way of a poacher's knapsack, is quite true. Pink ivorywood is exceptionally rare and the most pessimistic reports I've seen suggest that there may be only a *few dozen* mature trees left in the wild. However, I've also heard that seeds have been successfully germinated in arboretums outside its native range, so I would seriously question the idea that it is about to become extinct. It never has been, and doubtless never will be, a major timber-producing species. This is because like most members

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Most gauges have at least one or two main weaknesses. They either rest partially on the insert plate which is usually not the same height as the main table, or are so thin that it is difficult to ensure that teeth are being gauged at the top of the arc. This gauge is made from machined ¾" thick Aluminum and is 9" long. With ¼" graduations on one end and ⅛" on the other, it will indicate any height from ⅛" to 2". Most useful for table saws but also handy for routers. The markings are vertical on one face and horizontal on the other, so you can read them easily and accurately.

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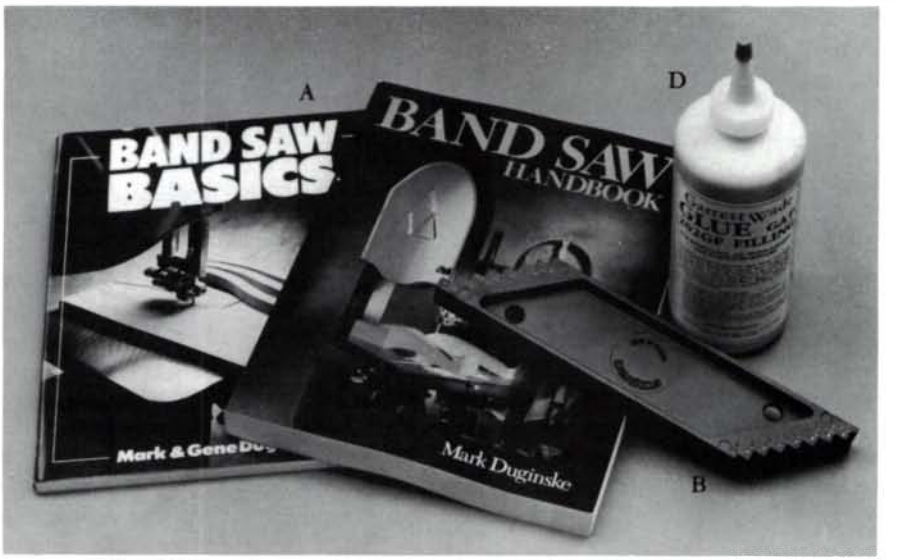

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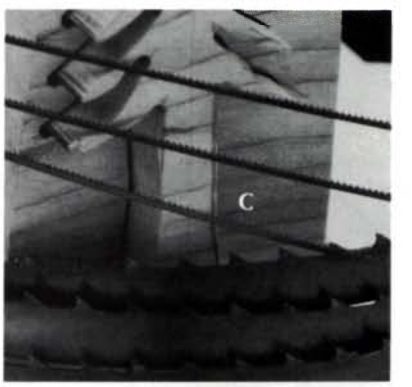

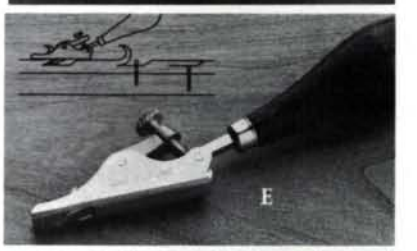

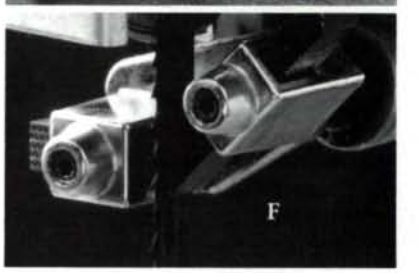

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Grand Total	

of the buckthorn family, it simply doesn't have the genes to become a well-formed, big tree. Pink ivorywood trees seldom exceed a foot or so in diameter and normally attain a height of only about 40 ft., almost never growing straight. Over the years, there has been a lot of hype surrounding this wood, because it is said to be part of an important Zulu ritual. As the story goes, only the chief is allowed to cut it at the time when his eldest son and heir attains manhood so the son may then fashion a spear shaft out of it. Anyone else caught harvesting it, at least in Zulu country, is subject to death.

While I suspect pink ivorywood might make a mighty crooked and cumbersomely heavy spear shaft, it is nonetheless a strikingly beautiful wood. Perhaps the best way to describe it would be to say that, when freshly cut, it looks very much like a piece of raw beef. The sapwood is generally quite wide, almost pure white in color and sharply demarcated from the rich, coral pink heartwood. It is an extremely heavy wood, at least as hard and heavy as our North American hickory. But it has a much finer texture and a sort of waxy feel. Like real elephant ivory, pink ivorywood has such a high surface luster that it appears almost glassy when planed. Pink ivorywood will discolor after long exposure: the sapwood tends to turn a dirty yellow shade, while the heartwood picks up a reddish-amber patina; but the wood's pigment is not particularly fugitive and a light sanding quickly restores the bright color. Also, a thin coat of clear varnish or lacquer will help to keep it looking fresh.

As for price, I have about 3 lbs. that I bought five years ago for $75. Pink ivorywood is occasionally listed in sample offerings published by the International Wood Collectors Society (IWCS, Box 1102, Chautauqua, N.Y. 14622) and the going rate is still about $25 per pound. At that price, it is obviously a wood to be used very sparingly for such things as jewelry, small turnings and inlays.

[Jon Arno is a woodworker and amateur wood technologist in Schaumburg, Ill.]

Moisture content for laminating oak

Our shop has a bandsaw mill that I used recently to cut a 10-in.-wide oak log into a stack of 1/8-in.-thick veneers. I want to use the veneers for a wood-laminated curved stairway. How dry should the green oak be before I glue the laminations together using polyvinyl acetate (PVA) glue?

—Sandy Allen, Bonny Doon, Cal.

Bill Rice replies: The best wood moisture content for gluing laminations depends both on the type of glue to be used and the service conditions (interior or exterior) of the laminated product. The general rule is that the moisture content should be at or near the equilibrium moisture-content level of the location where the product will be used. Since you plan to use PVA glue, I assume your stairway will be used indoors—polyvinyl acetates are moisture resistant, but not waterproof. In that case, the moisture content of each laminate should be in the range of 6% to 8%. If your laminated project is to be used outdoors, I recommend you switch to a resorcinol-type adhesive, which is waterproof, and dry the oak until it reaches 10% to 12%.

[Bill Rice recently retired as a professor of wood technology at the University of Massachusetts, Amherst, and is now a wood-drying consultant.]

Send queries, comments and sources of supply to Q&A, Fine Woodworking, *Box 5506, Newtown, Conn. 06470-5506. We attempt to answer all questions, but due to the great number of requests received, the process can take several months.*

by Dick Burrows

George Nakashima dies—One of the world's most influential woodworkers and designers, George Nakashima, died at his home last June at age 85.

Unfortunately, I never had the opportunity to meet Nakashima, but I felt that I knew him through his books, articles and work. My first contact was through an article published in *Fine Woodworking* way back in issue 14, January/February 1979. Woodworking teachers and mentors were scarcer back then, and so the works and thoughts of people like Nakashima, James Krenov and Tage Frid were an essential part of my efforts to teach myself woodworking.

I was not the only woodworker who noticed the article and found inspiration and encouragement from the man who thought that there was a perfect use for each piece of lumber and that the woodworker's job was to find it. For Nakashima, trees had souls and almost god-like qualities. Even those who dismissed such theories as romantic ramblings left over from the 1960s paid attention to the hard, technical details presented by Nakashima. Countless times over the years people have asked me if I recalled Nakashima describing the proper way to surface a board with a wooden plane, especially the part about "after each stroke you sharpen the blade. It's not that it's dull, but it can be sharper. It has to be a perfect edge..."

Nakashima left us a legacy of work that will be studied and admired for decades. You can see some of that in *FWW* #79, p. 97. And the soul of the man will continue to affect many of us, too. For me, the best way to sum it all up comes from the words of Nakashima himself:

"I'm an activist; in my small way I get things done...I've improved my environment and improved my life and I've done things for people that improved their lives, and created an environment out of nothing. I don't destroy anything. I don't even borrow money. I think as long as you're creating there's a legitimacy. I think the object of life is to create. I don't hurt anybody. I don't take anything from anybody. I just try to leave the world a better place than I found it."

***FWW Design Book Five* photo switch**—A pair of captions in *Fine Woodworking Design Book Five* was accidently swapped, causing two photographs to be attributed to the wrong makers.

John Kelsey, publisher of The Taunton Press books and videos, said that at the bottom of p. 27, the writing desk of plain cherry, maple and rosewood (shown in the bottom photo) was made by Jeremiah E. de Rham of Concord, Mass. The desk at the top of p. 28, of quilted cherry and rosewood (shown in the top photo) was made by Andrew Jacobson of Petaluma, Cal.

"We'd like to say that our procedures are so air-tight that it can't happen again. But we said that the last time it happened several thousand photos ago, in *FWW Design Book Three*. We're sorry."

Cutting angled tenons—After reading Tage Frid's article, "Making an End Table" (*FWW* #82), Brian Doody of Waterloo, Ont., Canada, offered an alternative method for cutting angled apron tenons. Frid used two miter gauges to cut the left and right ends, and set each gauge to precise, complementary angles, but Doody says that he thinks his method is easier to set up.

The key to a tight-fitting shoulder is the exact duplication of the leg-taper angle when cutting the shoulder on the tablesaw, Doody said. To guarantee this match of angles, he uses the leg-taper jig to produce a reference for cutting the apron shoulders. He saves one of the long tapered offcuts from the leg operation, sets the miter gauge to 90°, and puts the offcut (or a short length of it) between the miter gauge and the apron before cutting the shoulder tenon. "This effectively sets the shoulder on the apron at the same angle as the leg and ensures that the shoulder fit will be tight. To cut the complementary angle for the other end of the apron, simply flip the offcut end for end, keep it between the 90° miter gauge and apron, and make the next shoulder cut."

Photo: Dennis Anderson

Photo: Jeremiah E. de Rham

The quilted cherry and rosewood desk, shown above, was made by Andrew Jacobson of Petaluma, Cal. The writing desk shown below was built from cherry, maple and rosewood by Jeremiah E. de Rham, of Concord, Mass.

More woodworking schools—More schools have sent information to update our listing of woodworking programs published in *FWW* #81 and *FWW* #83. The latest additions include the following Canadian schools: ALGONQUIN COLLEGE OF APPLIED ARTS AND TECHNOLOGY, 7 Craig St., Perth, Ont., K7H 1X7; KEYANO COLLEGE, 8115 Franklin Ave., Fort McMurray, Alta., T9H 2H7; LAKELAND COLLEGE, Vermilion Campus, Vermilion, Alta., T0B 4M0; SELKIRK COLLEGE, Nelson Campus, 2001 Silver King Road, Nelson, B.C., V1L 1C8. Added to the list of United States schools is HARTNELL COLLEGE, 156 Homestead Ave., Salinas, Cal. 93901.

Melaleuca and skin rashes—Bob Post of Pendleton, Ind., responded to a "Question-and-Answer" column item on carving melaleuca (*FWW* #81, p. 22) with a warning for readers. He said that some species of the wood may cause some people to break out with a rash similar to poison ivy. "The melaleuca (paperbark tree) in Florida possesses this danger and I believe burning it can also be dangerous." □

Dick Burrows is editor of Fine Woodworking.

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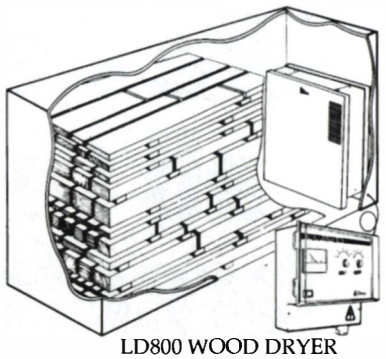

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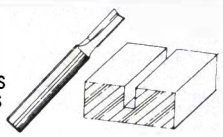

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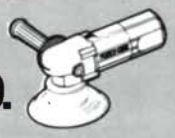

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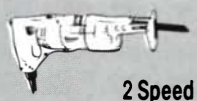

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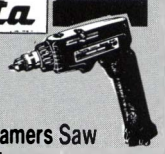

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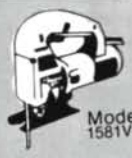

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PS203	7¼"x24T gen. purpose	17.
PS303	7¼"x40T fine cut	24.
SD308	8" Dado set	115.
EB100	Edge bander	269.
EC900	5 pc. shaper cutter set	279.
88-100	9 pc. router bit set	99.

FREUD cont'd

90-100	15 pc. router bit set	169.
FB-107	7 pc. forstner bit set	49.

MILWAUKEE

0239-1	1/2" drill, keyless chuck	135.
0224-1	3/8" Magnum holeshooter	114.
0234-1	1/2" Magnum holeshooter	115.
0375-1	3/8" close-quarter drill	129.
0379-1	1/2" close-quarter drill	149.
1676-1	Hole-hawg kit	230.
3002-1	Electricians rt. ang. drill kit	185.
3102-1	Plumbers rt. ang. drill kit	189.
5397-1	3/8" VS hammer drill kit	145.
8975	Heat gun	59.
5680	2 hp router	220.
5925	3"x24" dustless belt sander	219.
5936	4"x24" dustless belt sander	225.
6012	1/3 Sheet pad sander	109.
6014	1/2 Sheet pad sander	115.
6215	16" Electric chainsaw	185.
6226	2 speed bandsaw w/case	265.
6246	Single speed jigsaw	130.
6256	Variable speed jigsaw	140.
6507	Var. sp. sawzall w/case	129.
6365	7¼" top handle circular saw	115.
6377	7¼" worndrive saw	175.
6405	8¼" circular saw	129.
6539-1	Cordless screwdriver	69.
6543-1	VSR Screwshooter	145.
6750-1	VSR Drywall driver	95.
6754-1	VSR Magnum drywall driver	119.
6798-1	Adj. clutch screwshooter	109.

HITACHI

F20A	3¼" Plane	99.
TR6	Laminate trimmer	95.
TR8	¼" Plunge router	119.
CR10V	VS, Var. orbit recipro saw	129.
M12V	NEW! 3HP VS plunge rtr	255.
D10D	3/8" 9.6 v. cordless driver/drill	115.
W6V1	0-4000 drywall screwgun	79.
C10FA	Deluxe 10" miter saw	289.
C15FB	Deluxe 15" miter saw	389.*
F1000A	12" Planer/6" jointer combo	1599.*
CB75F	Band saw	1699.*
R100	Dust collector	559.*
P100F	12" Planer	1159.*

RYOBI

RA200	8" portable radial arm saw	259.
L120UK	3-5/8" Planer kit	99.
R500	2¼" HP plunge router	159.
R150K	1 HP plunge router kit	99.
TR30U	Laminate trimmer	79.
B7075K	3"x21" Belt sander kit	119.
S500A	Finishing sander, 1/6 sheet	36.
TS251U	10" Miter saw	185.
TS380	14" Miter saw	345.
RE600	3 HP Electronic VS Plunge Router	215.
JP155	6 1/8" VS Joint Planer	330.

MAKITA

6302	1/2" Drill	125.
6012HDW	2-Spd. cordless driver/drill kit	125.
6510LVR	3/8" Drill, heavy duty	79.
9207SPC	7" Electronic sander/polisher	155.
3612BR	1/2", 3HP Plunge router	195.
2708W	8" Table saw/carbide blade	259.
9401	4"x24" Dustless belt sander	169.
9900B	3"x21" Dustless belt sander	145.
LS1020	10" Miter saw	249.

3380	Jointer/spliner	299.
3303	HP Plunge router	159.
3304	1hp electronic plunge router	189.
4023	3x21 belt sander	195.

Call for Elu products not listed

KANGO

950S	2" Rotary hammer	799.

BLACK & DECKER

2690	7¼" Builder's saw cat	112.
2700	7¼" Worm drive saw	139.
7790	12" DeWalt cont. radial arm saw	945.*
7770-10	10" DeWalt cont radial arm saw	759.*

HBSE75S	3x21 VS Belt Sander	155.
EZ502	Cordless screwdriver	59.
OFS50	1HP plunge router	169.
SCR2-2	Drywall screwdriver	95.
EZ1381	½" VSR cordless driver/drill	145.

BOSTITCH

N60FN	Finish Nailer	339.

NORTON

85960-9	Multi-oilstone	119.

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		EA.	BOX/12
#50	'PONY' clamp fixture	7.95	89.00
#52	'PONY' clamp fixture	6.25	69.00
		EA.	BOX/6
3/0	6" JORGENSEN h/screw	8.95	49.95
2/0	7" JORGENSEN h/screw	9.95	53.50
#0	8" JORGENSEN h/screw	11.95	62.95
#1	10" JORGENSEN h/screw	12.95	69.95
#2	12" JORGENSEN h/screw	14.95	79.95
3712	12" Steel bar clamp	6.50	37.50
3724	24" Steel bar clamp	7.75	45.00

LEIGH

D1258R-12	12" Dovetail jig, blind & through	259.
D1258R-24	24" Dovetail jig, blind & through	309.

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Top-10	Deluxe hand joining machine	CALL
Standard	NEW. hand joining machine	CALL
Plates	# 0,#10,#20, 1000/box	29.

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1582VS	VS, Varorbit jigsaw w/clic	135.
3238VS	VS, Var. orbit std. duty jigsaw	105.
1654	7¼" Builders circular saw	99.
1500	16 guage shears	229.
1942	Heavy duty heat gun	75.
3268	Std. duty heat gun	65.
3258	3¼" Power plane	129.
1600	2½ HP, D-Handle router	259.
1604	1¾ HP Router	119.
1606	1¾ HP, D-Handle router	140.
90300	3¼ HP Production router	349.
1609K	Laminate trimmer installer's kil	169.
1609	Off set base laminate trimmer	119.
9164VSR	3/8" Mighty Midget VSR drill	105.
1631K	2-Spd. Panther Recipro Saw	129.
1611EVS	3HP VS plunge router	235.
1608T	NEW! tilt base laminate trimmer	109.
1632VSK	VS. Var. orbit Panther recipro saw	135.
1530	14 gauge nibbler	299.
9166VSR	1/2" Mighty Midget VSR drill	115.
1158VSR	3/8" VSR drill	69.
1198VSR	1/2" VSR hammer drill	135.
11203	1½" Rotary hammer	449.
11212VSR	¾" VSR bulldog SDS rotary hammer	195.
11304	Brute breaker hammer	1299.*
11305	Demolition hammer	695.
1272D	3"x24" dustless belt sander	175.
1273D	4"x24" dustless belt sander	179.
1273DVS	4"x24" VS, dustless belt sander	189.
3270D	3"x21" dustless belt sander	135.
1347A	4½" mini grinder, 5/8" arbor	89.

DELTA

34-761	10" 1½HP Unisaw	1295.*
32-100	NEW! Stationary Plate Joiner	399.*
34-782	10" Unisaw, w/unifence 3HP	1695.*
34-783	10" Unisaw, w/unifence 3HP	1695.*
43-375	2 Spd. wood shaper	1579.*
33-050	Sawbuck	569.
33-990	10" Radial arm saw	549.*
11-950	8" bench drill press	135.
17-900	16.5" Drill press	359.*
28-283	14" Wood band saw w/¾HP motor encl. steel std	675.*
34-444	10" Contractors saw	619.
28-245	14" wood band saw w/std. ½HP motor	495.*
43-122	Shaper, light duty, 1HP, 1PH	599.*
22-661	NEW! DC-33 13" Planer	1099.*
37-154	6" long-bed jointer w/electricals	999.*
37-350	8" long-bed jointer w/electricals	1350.*
31-730	6" Belt, 12" disc w/electricals	995.*
34-985	Production stock feeder	575.*

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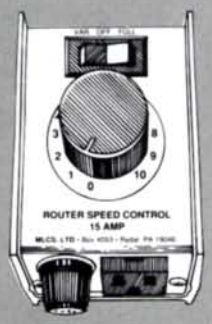

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FEATURES:

- **Speed Adjustable from Full Speed to 0 RPM**
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- **Go Back and Forth from Any Pre-Set Speed to Full Speed at the Flip of a Switch**
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- **Gives Your Router a Feature Only Available on Routers Costing Hundreds of Dollars!**
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- *Stops Burning*
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- *Less Wear on Bits*
- *Less Noise and Softer Starts at Lower Speeds*

EASY TO USE - Simply plug in Speed Control and plug your router into the Speed Control - turn dial for best results. (Speed Control has a clip that can be worn on your belt or hung on wall or left loose.)

- Reduces speed electronically without reducing torque; electronic feed-back maintains speed by increasing voltage to motor as load increases.

CARBIDE TIPPED ROUTER BITS PROFESSIONAL PRODUCTION QUALITY *GUARANTEED*

WHEN ORDERING ANY THREE OR MORE DEDUCT $1.00 EACH. ALL PRICES ARE *POSTAGE PAID*

ITEM NO.	BEST CUT BEST PRICE	DESCRIPTION	ANGLE/DEPTH/RADIUS CIRCLE DIAMETER	LARGE DIA.	CUTTING LENGTH	SHANK SIZE	PRICE
#601	Solid Carbide	1/8" Spiral Cutter	*Proper Adaptor Will Be Supplied	1/8"	1/2"	1/4" *	$ 9.00
#602		3/16" Spiral Cutter		3/16"	5/8"	1/4" *	$12.00
#603		1/4" Spiral Cutter		1/4"	3/4"	1/4"	$12.00
#903		1/4" Spiral Cutter		1/4"	3/4"	1/2" *	$12.00
#904		3/8" Spiral Cutter		3/8"	1"	1/2" *	$24.00
#905		1/2" Spiral Cutter		1/2"	1 1/2"	1/2"	$29.00
#350		1/8" Round Over	1/8" R	3/4"	3/8"	1/4"	$11.00
#351		3/16" Round Over	3/16" R	7/8"	1/2"	1/4"	$11.00
#230		1/4" Round Over	1/4" R	1"	1/2"	1/4"	$12.00
#353		5/16" Round Over	5/16" R	1 1/8"	1/2"	1/4"	$14.00
#209		3/8" Round Over	3/8" R	1 1/4"	5/8"	1/4"	$15.00
#355		1/2" Round Over	1/2" R	1 1/2"	3/4"	1/4"	$17.00
#656		3/4" Round Over	3/4" R	2"	7/8"	1/2"	$21.00
#199		Multiform Moulding	Unlimited Patterns	2 1/4"	2"	1/2"	$40.00
#340		1/8" Cove	1/8" R	5/8"	3/8"	1/4"	$12.00
#205		1/4" Cove	1/4" R	1"	1/2"	1/4"	$12.00
#206		3/8" Cove	3/8" R	1 1/4"	9/16"	1/4"	$13.00
#207		1/2" Cove	1/2" R	1 1/2"	5/8"	1/4"	$14.00
#208		3/4" Cove	3/4" R	1 7/8"	3/4"	1/2"	$26.00
#460		1/4" Bull Nose	1/4" Dia. of Circle		3/8"	1/4"	$14.00
#461		3/8" Bull Nose	3/8" Dia. of Circle		3/4"	1/4"	$15.00
#462		1/2" Bull Nose	1/2" Dia. of Circle		7/8"	1/4"	$16.00
#464		3/4" Bull Nose	3/4" Dia. of Circle		1 1/8"	1/4"	$19.00
#506		1/2" Pattern	Flush Trim	1/2"	1"	1/4"	$15.00
#507		5/8" Pattern	Flush Trim	5/8"	1"	1/4"	$16.00
#508		3/4" Pattern	Flush Trim	3/4"	1"	1/4"	$17.00
#366		1/8" Slot Cutter	3/8" Deep	1 1/4"	1/8"	1/4"	$14.00
#368		1/4" Slot Cutter	3/8" Deep	1 1/4"	1/4"	1/4"	$14.00
#204		3/8" Rabbeting	3/8" Deep	1 1/4"	1/2"	1/4"	$13.00

ITEM NO.	BEST CUT BEST PRICE	DESCRIPTION	ANGLE/DEPTH/RADIUS CIRCLE DIAMETER	LARGE DIA.	CUTTING LENGTH	SHANK SIZE	PRICE
#210		1/4" Core Box	round nose	1/4"	1/4"	1/4"	$ 9.00
#211		3/8" Core Box	round nose	3/8"	3/8"	1/4"	$10.00
#212		1/2" Core Box	round nose	1/2"	11/32"	1/4"	$13.00
#418		3/4" Core Box	round nose	3/4"	5/8"	1/4"	$15.00
#213		1" Core Box	round nose	1"	3/4"	1/2"	$17.00
#214		1/4" Straight	plunge cutting	1/4"	3/4"	1/4"	$ 6.50
#215		5/16" Straight	plunge cutting	5/16"	1"	1/4"	$ 6.50
#216		3/8" Straight	plunge cutting	3/8"	1"	1/4"	$ 6.50
#217		7/16" Straight	plunge cutting	7/16"	1"	1/4"	$ 6.50
#474		1/2" Straight	plunge cutting	1/2"	1"	1/4"	$ 7.00
#775		1/2" Straight	plunge cutting	1/2"	2"	1/2"	$14.00
#218		5/8" Straight	plunge cutting	5/8"	1"	1/4"	$ 7.00
#219		3/4" Straight	plunge cutting	3/4"	1"	1/4"	$ 9.50
#220		1" Straight	plunge cutting	1"	1 1/2"	1/2"	$11.00
#500		3/8" Flush	Trimming	3/8"	1/2"	1/4"	$ 7.00
#502		1/2" Flush	Trimming	1/2"	1/2"	1/4"	$ 7.50
#503		1/2" Flush	Trimming	1/2"	1"	1/4"	$ 8.50
#221		1/2" Flush	Trimming	1/2"	1 3/16"	1/2"	$ 8.00
#545		Tongue & Groove	Straight	1 5/8"	1"	1/4"	$29.00
#845		Tongue & Groove	Straight	1 5/8"	1"	1/2"	$29.00
#546		Tongue & Groove	Wedge	1 3/16"	1"	1/4"	$29.00
#846		Tongue & Groove	Wedge	1 5/8"	1"	1/2"	$29.00
#450		1/8" Beading	1/8" R	3/4"	3/8"	1/4"	$11.00
#451		3/16" Beading	3/16" R	7/8"	1/2"	1/4"	$11.00
#233		1/4" Beading	1/4" R	1"	1/2"	1/4"	$13.00
#453		5/16" Beading	5/16" R	1 1/8"	1/2"	1/4"	$14.00
#454		3/8" Beading	3/8" R	1 1/4"	5/8"	1/4"	$15.50
#455		1/2" Beading	1/2" R	1 1/2"	3/4"	1/4"	$17.00
#530		3/16" Edge Beading	3/16" Dia. of Circle		1/2"	1/4"	$15.00
#531		5/16" Edge Beading	5/16" Dia. of Circle		1/2"	1/4"	$15.50

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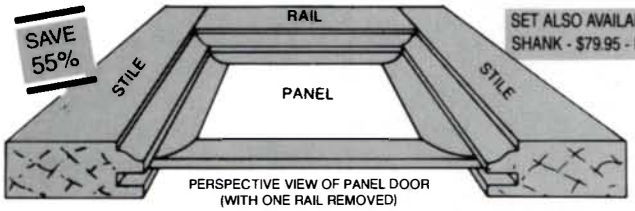

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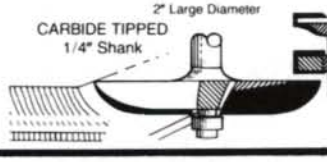

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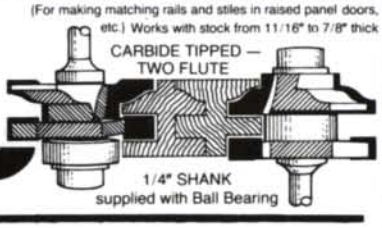

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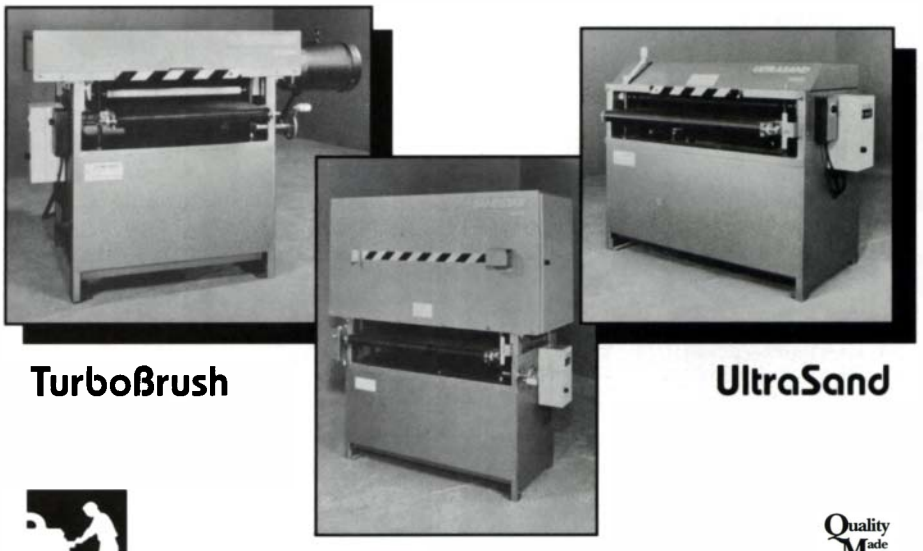

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Building a Display Cabinet

Lap-jointed frames and beveled-glass panels

by Jerry Hall

My wife and I are avid collectors of the autumn-leaf-pattern dishes from the Hall China Co. in Liverpool, Ohio. Over the years our collection has outgrown an antique cabinet, spilled over to the top of the television and the video-cassette player, and threatened the rest of the furniture in our apartment; so we had to do something. I decided to build a display cabinet worthy of the collection. It was a good idea, but not very practical, since the only place I had to work was in the driveway or in the living room.

Since I'm a finish carpenter by trade and I have been trained as a draftsman/designer, I had plenty of ideas for the piece, but the lack of a shop was a problem. Eventually, I made arrangements to use a friend's shop for planing, ripping and other stock-preparation chores. The joinery, mainly routed half laps for the carcase components and doors, was done with a hand-held plunge router and a homemade jig. I did the final detailing either on a Black & Decker Workmate bench set up in my living room or on a pair of sawhorses set up outside. The other essential tool was my hand-held dust vacuum—wood chips and dust are tough to get out of shag carpet.

The author designed this display case to have clean lines and no visible hardware that might detract from the beauty of the wood or the dishes it would store. The beveled bronze glass at the back creates a sense of depth and a dramatic background for the dishes.

Design, easy-chair style—I like to begin my designs by drawing a lot of rough sketches. Nothing elaborate is needed. In fact, most of the work is done while I'm sitting in my easy chair watching a ball game or something on television. Once I've built the piece, I render a formal, scaled drawing for future reference, in case I want to build another.

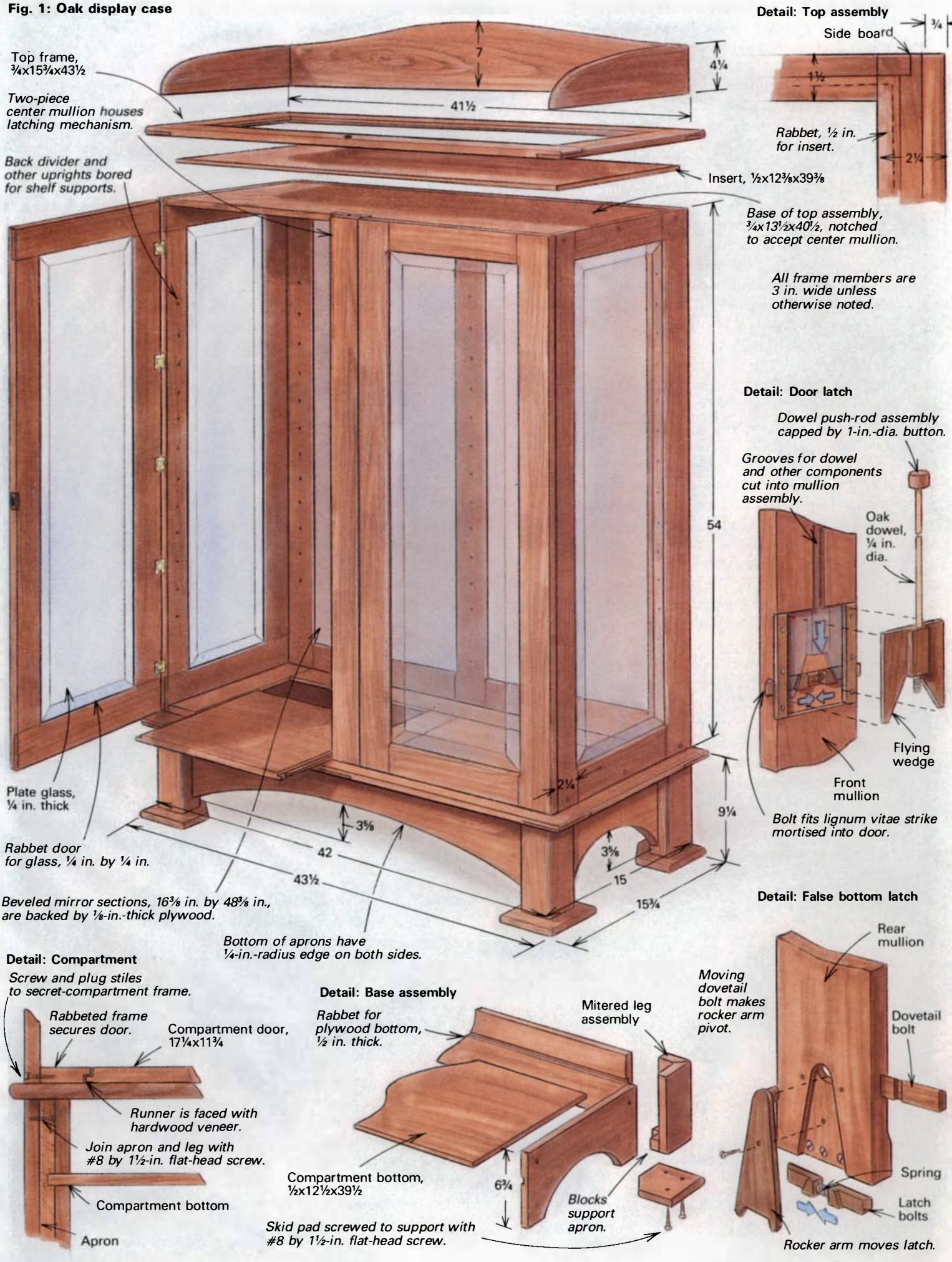
I wanted this piece to have an uncluttered look, with clean crisp lines and lots of glass panels to show off the dishes. I decided to make the doors and carcase frames from 3-in.-wide strips of white oak, finished with clear oil. I also wanted the case to slide easily on the shag carpet, and so I added large pads on the bottom of the four legs.

To simplify construction, I broke the cabinet down into three basic assemblies: the top; the center, which included stiles and rails for the glass and doors; and the base, which included the bottom, four legs and aprons. I decided to join most of the components with half-lap joints: the strongest joints I could think of that didn't require any elaborate machinery and complex cutting. Because the base and top are laminated from several pieces, as shown in the drawing, I was able to incorporate several ledges and overlapping components that could be secured with glue and screws in countersunk holes, which I later filled with oak bungs.

The simplicity of the piece demanded a no-hardware look. On some of the other display cabinets I'd seen, the hinges, latches and other hardware were the most dominant features, detracting from the beauty of the case and its contents. I chose Soss hinges (available from Highland Hardware, 1045 N. Highland Ave., Atlanta, Ga. 30306; 404-872-4466) for the doors, since they are the only type on the market that are relatively invisible and strong enough. But I had to come up with my own door-latching mechanism, which I assembled from slices of lignum vitae and a few springs, as described below.

Originally I wasn't going to put a false bottom in the case, as shown in the photo on p. 44. But I didn't want to waste the space behind the lower apron and I wanted this piece to be more than it appears. A cutting error one morning about 3 A.M. when I was finishing the door latch actually inspired my false-bottom latch. I cut the wrong angle on the bolts and this really upset me because it ruined three hours of work. I made another set of door latch bolts and was about to throw the ruined set into the jar where my wife

Fig. 1: Oak display case



Drawing: Bob La Pointe

keeps her collection of my classic errors, when I realized that this set's reverse angle would be ideal for locking the bottom. So I adapted this set, along with a sliding dovetail and rocker arm, as shown in the drawing.

Stock preparation and layout—I started with 100 bd. ft. of white oak. The rough 13/16-in.-thick boards were 8 in. to 12 in. wide and 10 ft. to 11 ft. long. After surfacing the pieces, I cut the four stiles and the center mullion from one board. As you can see in the photo on p. 42, the five pieces are fairly uniform in color; I think this is important, especially on no-hardware pieces. To achieve this look, the pieces are not located as they were cut from the board. The grain from one side of the board to the other got very busy, and so I exchanged the outside two pieces to balance it out. The top rails and the bottom rails are from one piece, to keep the color the same. This concern for color is an important part of being a carpenter or furnituremaker—you always have to work with grain and try to get the grain working for you in the design.

Assembling the base unit—The legs are mitered together and glued. The 4½-in.-sq. skid pads are joined to the legs with screws, as shown. Next, the front and side aprons are butted into the corners of the front legs, on top of the block supports, and secured with glue and #8 flat-head screws. The bottom of the compartment is ½-in.-thick hardwood plywood that slides into rabbets routed into the aprons. To prevent wood movement problems, make sure no glue gets into the rabbet when you install the plywood bottom. Now install the rear apron to the rear leg, just as you did with the front apron, to complete the leg-to-apron assembly.

Next, the sliding-door frame was screwed from underneath to the bottom frame with #8 flat-head screws. This lap-jointed bottom frame is slightly wider than the base to create an attractive overhang. The bottom frame/sliding-door frame subassembly was then secured to the leg/apron assembly with screws running through the bottom frame and into the top of the front aprons and legs. The base unit is now ready to be screwed to the side and back frames that make up the center unit and will eventually be joined to the cabinet's top assembly. Each of the frames is assembled with lap joints, as shown in the drawing. To make the assembly pleasing to the touch, I radiused the exterior of the edges with a ¼-in. pilot-bearing roundover bit.

A hidden compartment at the bottom of the case is covered with a sliding door. The door frame is laminated from two pieces after a rabbet is routed along the inside edge of the top frame. A piece of hardwood veneer glued to the lower frame minimizes wear and raises the door about 1/32 in.

Once the base unit is completed, you're ready to work on the top. The back board is a single piece, to ensure continuous grain, with rabbeted corners. Like the lap joints, I cut the rabbets with a router. The back board is in turn screwed to the half-lapped frame, as shown in the drawing. The frame itself has a routed ½-in. rabbet all around to house the ½-in.-thick wood insert, which is supported from below by the ¾-in.-thick bottom panel glued in place as shown. The back board is screwed to the assembly, in line with the panel to hide the screws. Once the top is done, it's fairly easy to screw the sides and the back panel of the center unit into place.

The lap joints for the bottom frame and the other components were all cut with a router and a flat-bottom, ½-in.-dia. straight bit. I guided the base of the router with a simple jig assembled from ¾-in.-thick plywood. One 48-in.-long, 2½-in.-wide plywood strip is screwed to a plywood base to align the rail or stile. Two other 3-in.-wide strips are screwed at exactly 90° across the first strip to form an F-shaped guide for the bushing attached to the router base. Spacer blocks are used beneath and between the crosspieces to provide a level surface to support the router base. Once I positioned the stock, I adjusted the depth of cut so the bit went to exactly the midpoint of the piece. Once everything was set, the jig made quick work of all the half laps. The lapping pieces ran slightly long, but I was able to trim off the excess with a flush-trim bit after assembly, since the bit could be set to run on the lower half of the joint.

Installing glass panels—The doors, like most of the other cabinet parts, are joined with half laps. The center mullion is actually two pieces screwed together, which makes it easy to install and, if necessary, repair the latching mechanism, shown in the center photo on the facing page. Since lap joints are easy to assemble and virtually self-centering, the doors went together without any problems; I simply clamped the pieces while the glue dried.

I installed five pairs of Soss hinges, following the manufacturer's instructions. I made a plywood jig to guide my plunge router when cutting the two different depths of hinge mortises needed. Then I installed the doors and fine-tuned the fit with a handplane.

If I were to build the piece again, I'd install a load pad under the door hinges. Without the load pad, the doors eventually sag, even with five pairs of hinges. I've put in a little pad of clear acrylic plastic as a temporary fix, but I should install a small lignum vitae pad at the corner to support the vertical load. The instructions that came with the Soss hinges warned that the hardware was not designed for vertical load; I didn't understand what that meant then, but I do now.

Next, I removed the doors and routed the back, inside edges of each frame to create the ¼-in. rabbet that holds the glass. A lot of craftsmen might not like this method, since the corner of the rabbet is cut slightly below the intersection of the stile and rail. But I was more interested in simple joint construction rather than the more complex routed half laps, and so I didn't worry about how it looked.

The ¼-in.-thick plate glass is bordered by a 1¼-in.-wide bevel and held in the rabbets with acrylic latex glazing compound, colored to match the wood. I was going to use tiny quarter-round strips, but I decided it was time to join the 20th century. Applying the glazing was a little bit of a problem, though, until I discovered a way to roll out the compound with my grandkids' rubber ball. First, with the glass in place, carefully spread an even bead of latex in the rabbets and then smooth it out with your finger, making sure the compound is stuck on both the glass and the wood frame. Let the compound set for a few hours, but don't let it harden completely—you want it to still be pliable. The actual time required depends on temperature and humidity. Then take a rubber ball

Left: The author uses a small square to check the fit of the latching components that will be concealed within the two-piece mullion assembly. Minor adjustments are made with sandpaper or a small hand file. Photo by author.

Center: The scissors-like wedge assembly makes an efficient latch, but it must be precisely cut to fit within the recessed sections of each half of the center mullion. Removing a couple of screws opens the unit, in case adjustments or repairs must be made.

Right: A beveled strip of wood fit into a dovetail slot cut on the back side of the mullion operates the latches that lock the sliding doors over the secret compartments. Moving the dovetailed strip, as shown, rotates the wedge so the latch is pulled out of the catch plate. Photo by author.

and roll it over the compound, wiping off the excess as you go along. Continue until you have an even, slightly concave bead all around. Finally, use a little bit of steel wool to clean up the frame area adjacent to the compound and then let it set up.

Like the beveled glass, the mirror was chosen to add to the beauty of the piece. Most of the antique pieces I saw had a mirror back, and I wasn't into plain plywood backs or raised-panel units. The beveled, bronze-tinted mirror creates a sense of depth and fullness inside the case. And it was also simple to install. I fit the mirrors into the rabbets routed in the back frame and glazed it into place. Then I placed a sheet of ⅛-in.-thick plywood over the mirrors before the glazing had set and weighted the assembly to hold everything in place. Once the glazing cured, the mirror was secure.

Latches and fixtures—The latches on my display case, as shown in the drawing on p. 43, grew out of necessity. The dimensions involved probably aren't as important as the principles, since you would have to adapt the system to the particular project at hand.

Initially, I was trying to work with all kinds of moving parts and it made things pretty complicated. The whole thing became remarkably simple once I came up with the idea of using a scissors action, or the flying wedge as I call it, to pull in the latches and unlock the doors. Basically the wedge gave me a way to convert up-and-down motion to right-angle motion, without dealing with close tolerances. Once I knew how to change the direction of the motion, I next had to figure out how to make it fit the shallow pockets routed in the mullion components.

First, I drew rough sketches of how the mechanism would work, guided by the principle that the fewer moving parts, the better. Then I drew out all the individual parts directly on a ⅝x6x12 lignum vitae board, using a sharp machinist's scribe, rather than a pencil, on the dark wood. I used lignum vitae because it is strong, even in the thin sections needed to fit inside the mullions, and it is oily enough to provide natural lubrication. After analyzing how much space the parts would need, I cut the recesses in the mullion with a router fitted with a ½-in.-dia. bit and guided by a straightedge. Next I cut out the individual pieces with a backsaw. You could also use a coping saw or bandsaw. All the mounting holes shown in the drawing were bored with a hand-held electric drill and various bits. After that, it was just a matter of trial fitting and making fine adjustments, which were mainly done with mill and rat-tail files. This was not hard work, but it was slow going.

When all the parts fit together and operated smoothly, I assembled the mullion. Then I aligned the doors with the mullion and located the lignum vitae strikes. After routing the rough opening, I refined the recess with a file to ensure positive locking. The process for the secret-compartment latches was very similar, except there you locate the bolt notch and cut it in, rather than rout an opening.

Finishing techniques—All the parts were sanded with 100-grit paper before the first of three coats of Minwax Natural oil was applied. All the subassemblies were finished before final assembly and before the glass was installed. This ensured complete coverage of all surfaces. I applied the first coat of Minwax and let it dry without any sanding. I applied the second coat with 220-grit wet-and-dry paper, and the final coat with 400-grit wet-and-dry paper. After final assembly, I treated the piece with Watco Liquid Satin Wax, which I applied with 600-grit wet-and-dry paper and then buffed.

I was pleased when the piece won Best of Show in an exhibit sponsored by the Colorado Springs Woodworkers Guild. It was particularly nice because the piece was relatively low tech and built without a real shop or an arsenal of tools. The cabinet has also weathered well since 1988, in spite of the dry, high-altitude climate in this section of Colorado. When I buy wood from the lumberyard, it's at about 8% MC to 15% MC (moisture content). Then I bring it up to the high altitudes near my home and the wood quickly dries even more. In winter, the relative humidity can be as low as 2% and tight joints can soon open up ⅛ in., even if you let the wood cure in the house for a couple of months. On this particular piece, the doors will rack a little when the humidity drops way down. I try to keep the house at about 70% humidity, which is generally good for all furniture and cures the racking problem on the display cabinet. □

Jerry Hall is a finish carpenter and designer in Breckenridge, Colo.

Portable planers are an affordable, as well as a carryable alternative to the stationary planers that are the staple of power thicknessing in the woodshop. The seven portable planer models shown above are, from left to right, back row: Sears Craftsman Planer/Molder, Foley-Belsaw 455, Makita 2012 and Ryobi AP-10. Front row: Sears Craftsman 12½ in., Grizzly G1017 and Dayton 6Z960.

Portable Planer Survey

Low-cost lightweights heavy on performance

by Sandor Nagyszalanczy

There was once a time when a stationary thickness planer was the single largest investment that most small-woodshop owners ever made. And if you wanted to hang up your handplane, the only choice you had to make was which brand of big, heavy planer you wanted to buy. All that changed when Ryobi introduced the first portable thickness planer, the AP-10, in the '80s. Today more than a dozen companies have introduced their own models. All of these machines are small, powerful and capable of planing wide boards as smoothly as their full-size, cast-iron predecessors. And the good news is that you don't need a forklift and a bundle of money to buy a portable planer; these mighty mites are light enough for one or two people to carry around the shop or to the job site. And they are affordably priced: expect to pay between $345 and $500 for one.

But just as when buying a new car or a washing machine, different features of the various portable planer models can be confusing. To help clear the muddle, I recently tried more than a dozen portable planers currently on the market, shown in the photos at the top of these two pages, and put them through their paces. I set up each planer right out of the carton and tried planing a variety of hardwoods, as well as pine. I also tried changing the knives in most of the planers, as well as evaluating each model's performance, determining the ease of setting the thickness of cut and making other adjustments. While all the planers proved to be capable, serious machines that could satisfy the needs of a furnituremaker, cabinetmaker or finish carpenter, there are differences that might make one model better suited to your needs than another. Some of the features are listed in the chart on p. 49, while general characteristics are discussed below, starting with the anatomy of a portable planer.

Design and construction—While portable planers are small enough to look like toys, their basic design makes them very similar to full-size stationary planers. A pair of chain-driven feed rollers moves a board past a rotating cutterhead with knives that shave the surface of the board to smooth it and to make it thinner. The thickness of cut is varied when the distance between the planer bed, which supports and guides the board, and the cutterhead assembly is changed. Most of the portable planers in the survey use beveled gears and two threaded shafts (the Grizzly employs four threaded shafts, gears and a chain) to raise and lower the entire motor/cut-

Chiu Ting makes nearly identical planers sold by U.S. companies. Left to right, back row: Penn State Super 125, Bridgewood 12 in. Center: Chiu Ting CT-318 (Sunhill). Front: Lobo WP0012, AMT 4650.

terhead assembly. On the Makita, as on most stationary planers, the bed is raised and lowered. The only disadvantage of moving the bed is that if you are using auxiliary feed tables, their height must be readjusted with any substantial change in planing thickness.

The most significant differences between portable planers and stationary models involve the construction and materials that save weight and make portables more compact: Stationary models are typically made from heavy cast-iron parts, while most portables are built mostly from cast-alloy and pressed-steel parts. Further, large heavy-duty induction motors and steel feed rollers found commonly in stationary planers are replaced by lighter universal motors and rubber-covered feed rollers. Fortunately, the differences don't render portables any less able to handle most planing tasks.

While the portable planers I tried share the same basic design, there are some important differences, as well as some striking similarities, between models. The motor/cutterhead/feed-roller assemblies on the Chiu Ting models, Dayton, Makita, Ryobi and Sears 12½ in. are supported by pressed-steel guides on both sides, limiting planing width to the length of the cutterhead. (The Grizzly employs four steel columns, which is a stronger arrangement.) In contrast, the Sears Planer/Molder and Foley-Belsaw are entirely open on one side, allowing the short, 6-in. cutterhead to plane boards up to 12 in. wide in two passes. While a variety of features differentiate most portable planers, the Sears Planer/Molder and Foley-Belsaw units (both manufactured by Foley-Belsaw) have mostly cosmetic differences. Likewise, the Taiwanese manufacturer Chiu Ting makes similar portable planers, sold by several dealers (see the supply box on the following page), and the differences between models are chiefly cosmetic (see the photo above). The Sears 12½ in. and Dayton portables, although also manufactured by Chiu Ting, sport some distinguishing features I'll discuss.

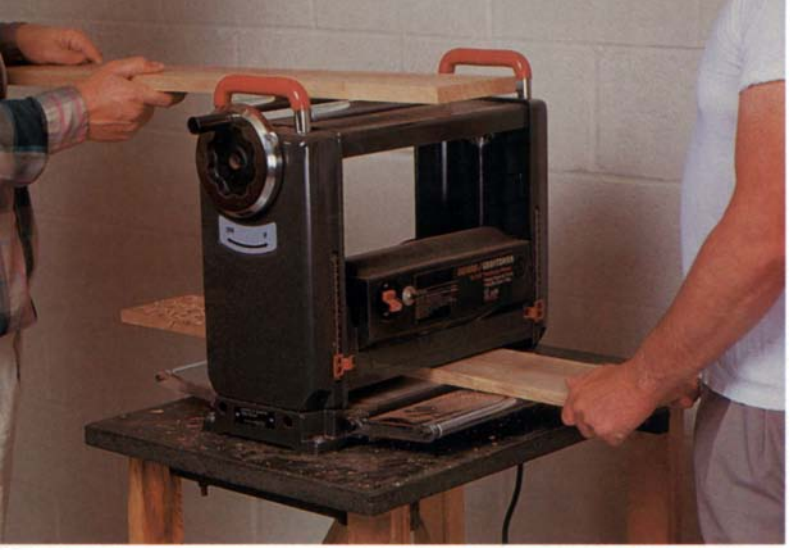
Beds and extension tables—The beds on the portables differ in both use of materials and design. The Makita, Ryobi and Grizzly portables all feature cast-alloy beds covered with a thin sheet of polished stainless steel that provided a very smooth gliding surface and allowed even rough lumber to slip through without hanging up. Although it adds considerably to the unit's weight, the Dayton features a nicely machined cast-iron bed. The Chiu Ting models and Sears 12½ in. employ a cast-alloy bed that's machined to less than a lustrous surface, but has bed rollers to keep boards feeding smoothly. These bed rollers may need occasional adjustment, but this takes only a screwdriver, a straightedge and a few minutes (see the photo below). The Sears Planer/Molder and Foley/Belsaw have particleboard beds, which I found needed to be waxed for smooth sliding. While it seems like an inexpensive alternative, it's also easy to replace the entire bed if you ding it or wear it down excessively.

To increase bed length and improve board support during planing, most of the portable planers have extension tables, which fold up for transport, at both the infeed and outfeed ends of the bed. The exception is the Dayton; its ample 20-in. bed has cast-iron extensions that don't fold. The Makita and Chiu Ting models have pressed-steel bed extensions, and the Makita's are chrome plated, for a smooth surface. The Ryobi and Sears 12½ in. have rollers mounted on their extension tables, which make feeding stock very smooth. Ryobi, as well as Penn State, sell additional roller assemblies that can be bolted to a workbench or auxiliary feed table for handling extra long stock. The extension tables on all these models are easy to adjust and they can be set flush with the bed. The Sears Planer/Molder and Foley-Belsaw don't offer extension tables. Further, these two machines require the use of small pressed-steel stock guides that need to be bolted to the bed—a hassle to remove and remount if you're planing boards of varying widths.

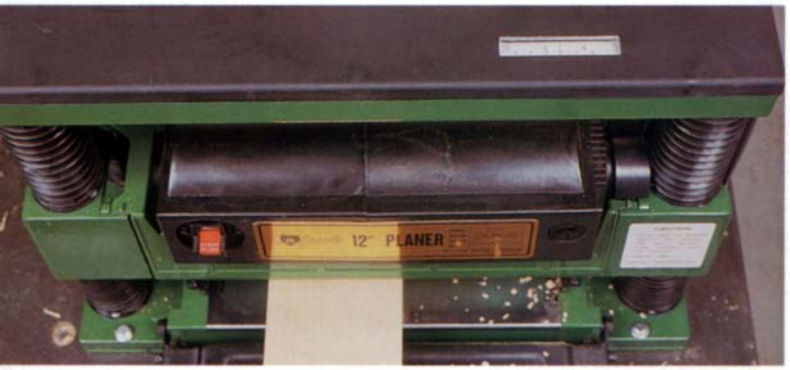
Assembly and portability—While portable planers are designed to please either shop-bound or mobile craftsmen, only one model comes ready to run directly out of the carton: the Makita 2012. The Ryobi, Grizzly, Sears 12½ in. and Chiu Ting models needed relatively little assembly: just a handle here and a chip-deflector shroud there. The Sears Planer/Molder and the Foley-Belsaw needed the most work: tables and feed guides needed to be bolted on and even knives needed to be installed into the cutterhead. These jobs weren't difficult, but it still took about 40 minutes each to get these machines up and running.

While you don't have to be an incredible hulk to schlepp a portable planer around, you may not want to carry it with you everywhere you go. Even the lightest portable in the survey, the Makita (52.8 lbs), is no featherweight. The Ryobi, Foley/Belsaw and Chiu

Several Taiwanese models, including the Chiu Ting CT-318 shown here, employ bed rollers, which can help green or rough stock move through the planer smoothly. Keeping the rollers at just the right height, a few thousandths of an inch higher than the bed, is a simple adjustment made with a screwdriver and a straightedge.



To make planing a pile of boards easier, the Dayton 6Z960 and Sears 12½ in., shown here, have top-mounted rollers to allow feeding boards over the unit on subsequent passes.



A planer is capable of accurately planing stock to a desired thickness. In lieu of a standard scale and pointer for setting the cut, the Grizzly G1017 employs a measuring tape, with markings down to 1/32 in., that shows thickness of cut through a plastic window mounted conveniently on top of the unit.

Sources of supply

The following companies manufacture and/or sell portable planers.

Dayton, W.W. Grainger Inc., 5959 W. Howard St., Niles, IL 60648; (708) 647-8900.

Foley-Belsaw, 6301 Equitable Road, Kansas City, MO 64120; (800) 328-7140, (800) 821-3452.

Grizzly Imports Inc., 1821 Valencia St., Bellingham, WA 98226; (800) 541-5537, (800) 523-4777.

Makita USA, 1450 Feehanville Drive, Mt. Prospect, IL 60056; 708-297-3100.

Ryobi America Corp., 1424 Pearman Dairy Road, Anderson, SC 29625; (800) 323-4615.

Sears, Roebuck and Co., Sears Tower, Chicago, IL 60684; (312) 875-2500.

The following distribute similar Taiwanese portable planers.

American Machine and Tool (AMT), 4th Avenue and Spring Street, Royersford, PA 19468; (215) 948-3800.

Jet Equipment and Tools, Box 1477, Tacoma, WA 98401; (800) 243-8538, (206) 572-5200.

Lobo Power Tools, 9034 Bermudez St., Pico Rivera, CA 90660; (213) 949-3747.

Penn State Industries, 2850 Comly Road, Philadelphia, PA 19154; (800) 288-7297, (215) 676-7609.

Sunhill (Chiu Ting brand), 1000 Andover Park E., Seattle, WA 98188; (206) 575-4131, (800) 544-1361.

Total Shop, Box 25429, Greenville, SC 29616; (800) 845-9356, (803) 288-4174.

Transpower, 322 Paseo Sonrisa, Walnut, CA 91789; (800) 654-7702.

Wilke Machinery Co. (Bridgewood brand), 120 Derry Court, York, PA 17402; (717) 846-2800.

Ting models all have a single, top-mounted carrying handle, which needs quite a bit of muscle to manage. The Makita and Grizzly each have two handholds. The Makita's are in the base, which makes it hard on your back when setting the unit on the floor. I liked the Grizzly's handholds in the motor/cutterhead assembly, which keep the planer's weight centered during carrying. The Sears 12½ in. and Dayton planers' twin top-mounted handles allow the units—the two heaviest in the sample—to be carried by two people, a feature you *and* your chiropractor will appreciate. In addition, this Sears model and the Dayton have two rollers mounted between the handles, which make feeding boards back over the top of the planer, to take subsequent passes, much easier (see the top photo). The Sears Planer/Molder and AMT's model don't have handles at all, making them less than convenient to carry. However, this Sears model comes complete with a sheet-metal stand, effectively making it a lightweight stationary model.

Setting the cut—Just as with the stationary models, turning a hand crank on a portable planer changes the thickness of the cut. The Chiu Ting models, Dayton, Ryobi and Sears 12½ in. all have side-mounted cranks, and the Dayton and Sears can be mounted on either side—a nice feature for lefties—while the remaining models have top-mounted cranks. All operated very smoothly, although the Foley-Belsaw and Sears Planer/Molder seemed to have a bit more backlash in the gearing than I was happy with: between three-quarters and a full turn of play. This made fine adjustments a tedious game of rotating the crank one way and then another. I liked the up/down sticker found on all the Chiu Ting models, Dayton, Foley-Belsaw and both Sears models, which made it easier to remember which way to crank for the desired setting. I also appreciated Makita's hand-crank lock knob; good insurance for getting a stack of boards to exactly the same thickness.

All the portables have a pointer and a scale to tell you how thick your board will be after planing, but not all scales are easy to read. The Makita, Ryobi and Chiu Ting models all have inch and metric readings side by side on their scales, but I found the Ryobi's scale, which was only graduated down to eighths of an inch, too coarse for precise thicknessing. The Dayton and the Sears 12½ in. feature two scales, one on either side of the bed, but the boxy, oversize pointers make the scales hard to read. My favorite scale/pointer is on the Grizzly and it consists of a measuring tape that runs below a plastic window and a cross hair mounted on top of the unit (see the bottom photo). At first it seemed like a gimmick, and it took a while to get used to the parallax between the pointer and the tape; but the scale is graduated down to 1/32 in., is accurate, conveniently located and can be easily adjusted. In addition to its scale and pointer, the Makita has a feature I wish all planers had: a depth-of-cut indicator, shown in the top photo on the facing page. This gives you a quick visual reference as to how deep your cut will be without having to measure the thickness of the board to set the depth of cut within the unit's capacity.

Cutting action—If you've been thinking about buying one of these small wonders in lieu of a full-size planer, but hesitated because you feared an inferior cut, then get out your checkbook. All of the portables produced cuts that rivaled the smoothness produced by full-size stationary models. I tested the portables' mettle with pine, mahogany, oak and even rock maple, and differences in surface smoothness were almost imperceptible between the models. While their motors ranged in size from 12.5 to 16 amps, all the models had adequate power to plane even the widest rock maple planks. (Amps are a more reliable means of comparing motor power than manufacturers' sometimes-inflated horsepower claims.) The rate at

Portable Planers

Manufacturer	Model	Weight (lbs.)	Motor (amps)	Max. Cuts Per Pass (in.)	Feed Rate (FPM)/Cuts per in.	Cutting Capacities (width, thickness min./max.)	Price	Optional Accessories
Chiu Ting models	Varies with seller	62.8	14	1/8	26.2/51	12 1/8, 1/8, 6	$345-$395	Varies with seller
Dayton	6Z960	93	14	1/8	26.2/51	12 7/16, 1/8, 6	$439.20	N/A
Foley-Belsaw	455	64	12.5	1/16-1/8*	20/54	6/12##, 3/16, 4 3/8	$399.95	Dust hood, molding cutters
Grizzly	G1017	62.8	16	1/8	26.2/51	12, 3/16, 5 1/2	$375	N/A
Makita	2012	52.8	12	3/64-3/32†	26.2/51	11 7/8, 1/8, 6	$895**	Dust hood
Ryobi	AP-10	57.2	13	3/32	26.2/51	10 3/8, 1/8, 5	$749**	Dust hood, rollers, carbide blades
Sears	Craftsman 12 1/2 in.	74	14	1/8	26.2/51	12 7/16, 1/8#, 6	$439.88	Pressed-metal stand
Sears	Craftsman Planer/Molder	62/77 with stand	12.5	1/16-1/8*	20/54	6/12##, 3/16#, 4 3/8	$382.44 inc. stand	Dust hood, molding cutters

* Maximum in hardwoods.
** List price; actual selling price is typically 30% to 50% lower.
\# Sears recommends not planing a board thinner than 1/2 in.
First number is single pass; second is double pass.
† Maximum recommended cut varies within width of board; least largest recommended cuts are listed.

which the planers fed a board through was decently quick; the Sears Planer/Molder and Foley-Belsaw were a bit slower, but have a slightly higher number of cuts per inch. The thicknessing accuracy of the portables was also very precise: The 10-in.-wide test boards I ran measured to within 1/64 in. of the same thickness along both edges. The exception was the Sears 12 1/2 in., which was off by more than 1/32 in.; but I quickly remedied this by resetting its knives.

Most of the surveyed portables sniped the ends of boards very slightly (a tendency of all planers), but I was less happy with the models with bed rollers: Even with their rollers perfectly adjusted, the Sears 12 1/2 in. and Chiu Ting models tended to snipe slightly more than the others. However, if you run a lot of green or rough stock, bed rollers will help keep the boards from sticking to the bed, and this may be worth the trade off.

All the portables are capable of handling most of the lumber you're ever going to want to plane; however, you might not be able to take as much off in a single pass as you would be able to on a stationary machine—1/16 in. seems to be the recommended maximum on hardwoods. The Chiu Ting models, Dayton, Makita, Grizzly and Sears 12 1/2 in. all are capable of handling stock that's about 12 in. wide; the Ryobi will handle 10-in.-wide stock. But not all the capacities were the same in trial as stated by the manufacturers. For instance, the Sears 12 1/2 in. will only take a 12 7/16-in.-wide board (see the chart). The Foley-Belsaw and Sears Planer/Molder have a considerably smaller cutting capacity than the others: 6 in. wide on a single pass. As mentioned earlier, these latter two models are open on one side, to increase capacity to 12 in. While this is a serviceable solution, problems arise when you plane boards with very pronounced grain direction: one side will be fine, but the other side, which must be run in the opposite direction, will tear out badly. I also had some slight problems getting the center of the board, where the cuts meet, perfectly even.

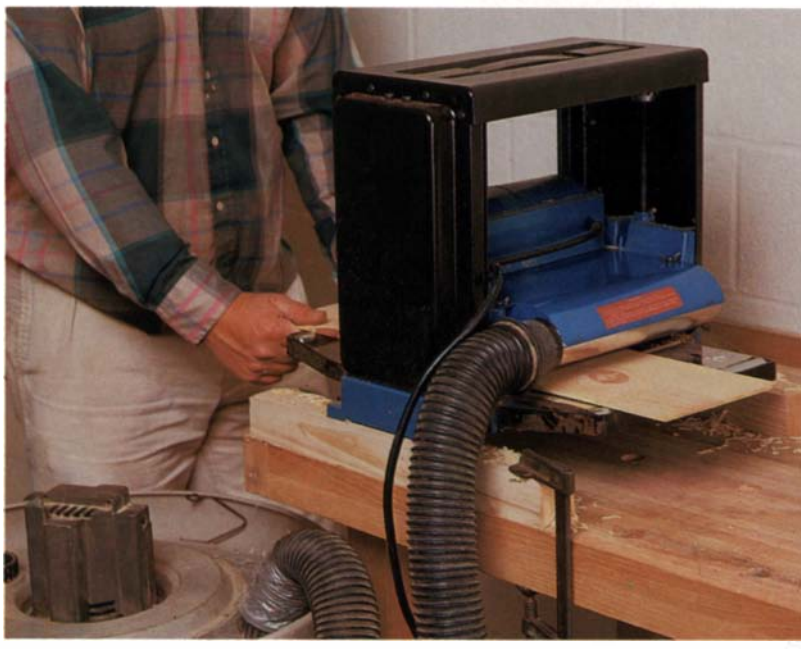
Safety, dust control and noise—The knives and other moving parts are almost entirely enclosed on all the portable planers I tried, making it difficult for you to accidentally get your fingers in harm's way. All units have a chip-deflecting shroud that encloses the cutterhead, and the Makita even has an automatic plunger that locks the cutterhead when the shroud is removed (this also locks during blade setting, described later). The Ryobi has one quirky safety feature: a thin sheet-metal plate that must be fitted between the outfeed extension roller and the bed, to prevent a hand or finger from being pinched by the exiting board. The plate must be removed before the roller can be folded up, and it was easy to knock off during planing, which I found annoying.

To prevent use by unauthorized individuals, all the planers in the survey, except the Ryobi, provide a pull-out knob or key for locking the on/off switch. (Makita even supplies an extra key.) It can make your lunch break on the job site a lot more comfortable knowing that Junior isn't thicknessing his teddy bear while you're away. Both Sears models and the Foley-Belsaw feature built-in circuit breakers, a nice bit of added protection when operating the planer at the end of a long extension cord, which can overheat the motor.

To control the steady stream of chips and dust that a planer produces, several models offer dust-collection hoods that replace the regular shroud and allow connection of a standard 2 3/4-in.-dia.

Right: To give the user a quick visual reference of the depth of cut, the Makita 2012 has a small steel pin that can be seen just above the center of the red Makita nameplate.

Below: A planer can produce a lot of chips and dust. Several models, including the Ryobi AP-10 shown here, offer an optional dust hood that replaces the unit's chip deflector and provides a connection for a shop vacuum.



shop-vacuum hose (see the bottom photo on the previous page). Once the dust hood is installed, however, the vacuum must be used while planing; otherwise the hood tends to clog with chips.

As good as these small portables are, one price you pay for performance in a small package is noise. All the models surveyed are very loud—between 100 and 110 decibels (dBA), depending on the width and depth of the cut. The U.S. Department of Labor says that a person shouldn't be exposed to sound levels of 110 dBA for more than a half hour a day; so you should plan to wear hearing protectors when planing more than just a couple of boards. Rubber feet on the Dayton, Sears 12½ in. and the Chiu Ting models helped reduce vibration and noise slightly, and the feet helped them stay put on the bench during planing (most of the planers' manuals say you should bolt the unit down before planing).

To make changing knives easy and fast, the Makita 2012 employs a system including a spring-loaded lock to fix the cutterhead, reversible, disposable knives, and a pair of magnetic handles, shown in use here. These are all designed to help you align the knife and its holder during knife removal and replacement.

While they may only sport 6-in.-long knives, the open-sided design of the Sears Craftsman Planer/Molder, left, and the Foley-Belsaw 455, right, allows some interesting possibilities. Boards up to 12 in. wide may be planed in two passes and, with the optional molding cutters installed, these planers are capable of producing over a dozen different profiles, including this picture-frame molding being cut by the Sears model.

Changing the knives—Each of the portable planers uses two blades per head, as opposed to three per head typically found in stationary planers. This is because all the units use a high-RPM universal motor, and the higher cutterhead speed translates into about the same number of cuts per inch as most stationary planers offer. Each portable model has a slightly different method for handling blade changes. The knives in the Chiu Ting models, Dayton, Grizzly and Sears 12½ in. are designed to fit into slots in the cutterhead and are then adjusted up and down before being locked in place—the standard system used on most stationary planers. The Ryobi also employs this standard system using wide, resharpenable knives, but the Ryobi's knives are screwed to a blade holder, which is then bolted to the cutterhead. A special blade-alignment gauge sets the position of the knife in the holder, so that once it's tightened, no further adjustment is necessary. This is an improvement over the slotted cutterhead system, which involves some finesse to set the knives accurately. But I felt that the Ryobi's plastic holder was a bit awkward to use; I found it hard to tell when the knife and holder were in the right position. If you commonly need to plane super-hard exotic woods or knotty lumber, which can nick a regular steel knife, Ryobi offers a set of knives with durable tungsten-carbide tips.

The Makita, Sears Planer/Molder and Foley-Belsaw differ from the other portables in an important way: they use reversible, disposable knife inserts. Each narrow knife used in this system has two edges; when one dulls, the knife can be reversed. When the second edge dulls, the knife is thrown away. While I'm not generally an advocate of disposable products, this system is very practical and eliminates having to wait for your knives to come back from the sharpener. The Makita's system of holding the blade differs from the other two planers, and I found it to be the easiest system to use. First of all, a spring-loaded lever automatically locks the position of the cutterhead as soon as the chip-deflector shroud is removed. In addition to safety, the locked cutterhead makes it easier to loosen the bolts holding the knives in place. With the bolts out, two special magnetic handles are used to remove the knife and its holder (see the top photo). These handles positively fix the alignment of the knife and its holder during knife replacement. There are no further adjustments and the entire two-knife reversal or replacement procedure takes only about 10 minutes.

The knife systems used in the Sears Planer/Molder and the Foley-Belsaw are, not surprisingly, identical and are very similar to the Makita, except that on these models, each knife locks via a channel in its holder. In turn, the holder locks via reference pins on the cutterhead, eliminating the need for any special knife-setting paraphernalia. The knife holders are well made, and the system is very accurate; unfortunately, you have to reach up and under the planer's body to change the knife, which is awkward. In addition to the regular disposable knives, these two planers also accept special molding cutters (see the bottom photo), which come in more than a dozen different patterns including three bead, ogee, glue joint, and tongue and groove. I was very pleased by the quality of the moldings that the Sears Planer/Molder and Foley-Belsaw produced, and the ability to make moldings is a feature that makes these machines versatile. It does take a bit of fussing to set the stock guides to move the workpiece smoothly by the cutters, but the trouble is definitely worth the final results. □

Sandor Nagyszalanczy is Associate Editor of FWW.

A Woodcarver's Journey

A legacy of folktales and fantasies

by J.L. Heatwole

"Where do your ideas come from?" That's the question I'm asked most when lecturing at universities, museums or community art groups about my woodcarvings. Unfortunately, the answer is not anything that the inquirer would likely want to emulate. The seeds of my creativity were sown in a childhood filled with fear and insecurity. Both of my parents were addicted to alcohol and were unstable emotionally. As an escape, I created an imaginary world of wizards, dwarfs, heroes and magic. Today my woodcarvings depicting these fantasy creatures, as well as characters from the real world made larger than life by the tales told about them, are found in numerous private collections and in public collections such as the Delaware Art Museum, Wilmington, Del.; Washington and Lee University, Lexington, Va.; and Stratford Hall Plantation, Robert E. Lee's birthplace in Westmoreland County, Va.

But I can't say for sure that my imaginary world, conjured up for my own survival, would have led to anything positive were it not for a few people who were driven to create, or to nurture the creative spark in others, and who shared their skills with me one on one.

Early creativity—By the age of 10 I had begun digging raw clay from a creek bank and forming the lumps into reasonable facsimiles of the beings living in my imagination. Although I tried to save these unfired mud sculptures, they often crumbled into pieces a few days later. But when I was about 14, I met Leonora Morrow, who was the mother of one of my friends and also a well-known sculptor/potter. With Mrs. Morrow's help and access to her kiln, I was able to give my creations some permanence. This was the beginning of my "formal" education.

Then, in high school, two industrial-arts teachers contributed to my artistic growth in an unexpected way. Mr. Brown and Mr. Litman confiscated my sketchbook one day when they caught me following one of my flights of fancy instead of their curriculum. They called me into their office the next day; to my surprise, they said that after looking at my sketchbook, they thought my time could be better spent at freehand drawing rather than mechanical drawing. For two years they gave me a private room, all the paint and Masonite I needed and unbounded encouragement. I completed three large murals for the school during that period.

I enjoyed painting and it expanded my awareness of color, but three-dimensional work had a firm hold on me. Each year throughout my teens I sold a few ceramic pieces by word of mouth, but I never worked in clay full time; I think I was intimidated by having pieces break during the firing stage. When I was 22, I turned to wood in search of a material that would not blow up.

Soon after, my wife, Miriam, saw an article about two elderly woodcarvers and encouraged me to contact them. Willard Webb and Don Stratton of Clifton, Va., (both of whom have since passed

"Conjuring," 21 in. tall, 1983. For the subjects of my carvings, I call upon ideas from my childhood fantasies and stories passed down by family and friends. The character in this carving is both ghost and wizard, and you can only guess at his power. When laying out the spiral, I drew on my furniture-carving experience, and I experimented with texture on the bird basket/pouch and the wizard's knobby hand. This piece and all others in the article are carved from linden and are colored with oil paints unless otherwise noted.

Above: **"Basket Pendant," 1 in. tall, 1987 (left). This gift to my wife was carved from mountain laurel. "Colonel MacIntosh," 4½ in. tall, 1984 (center). This is a pawn-size figure that I carved while working on a chess set. "Bellyache," 2½ in. tall, 1988 (right). This is an "end-of-the-day" piece. If I finish a piece early in the workday, I'll start a small piece and let my hands take over. If I'm lucky, I end up with a keeper.** ***Left:*** **"Laying Mash Salesman," 6 in. tall, 1984. My Great Uncle Ben Southard could sell anything. Here, he's walking from farm to farm saying, "Hello, I represent the Purina folks. We have this great new laying mash that you mix with your regular chicken feed. The chickens take a bite of it, tighten up their lips, curl up their toes and fill the atmosphere with eggs."** ***Below:*** **"This Way to Wonder," 5 in. tall, 1990. This, my first carving of 1990, points toward expanded opportunities for expression.**

on) took me under their wings. Although they were best known for a series of bas-relief wall pieces depicting Bible stories and religious motifs for a lovely local church, their knowledge of carving styles was almost limitless. I arranged to work four days a week at my job as a researcher for the U.S. copyright office in Washington, D.C., so that I could spend the other three days with Willard and Don. During the next six months, while working in the carvers' shop on a hill overlooking serene pastures, I grew to love the feel and smell of wood and the bond between eye, hand and tool. These two men opened new doors for me; Willard taught me an appreciation for color and detail, and Don instilled in me an understanding of grain and graceful form.

Who I am—At about the same time I began to re-establish contact with my father's side of the family; which helped me understand who I was and why my mind slipped into certain channels so easily. I know now that the folktales in my dreams and the faint Celtic music in my head—as well as the drive to create—ran as naturally through me as blood. My Shenandoah Valley ancestors were German, Swiss and Scots-Irish craftsmen. For more than 200 years they produced furniture, pottery, weavings and metal work and they were also prolific tellers of tales.

It was my Great Uncle Paul, to me "the king of storytellers," who put me in touch with my artisan forebearers through his stories about their lives. He also understood my conviction that I had to pursue a creative life to be complete as a person, and he supported my plan to quit my government job and move back to the Shenandoah Valley to carve wood. I have notebooks full of Uncle Paul's stories and a life that in a great part is a result of his love.

Early in 1974, with Miriam and our son David, I moved back to re-establish my roots in the valley, and I began carving for a living. I went to work as head woodcarver in a shop specializing in museum-quality reproductions of 18th-century furniture. The working conditions and pay were horrible, but showing up for work and carving nine hours a day for the next two years taught me the discipline I needed to succeed when I opened my studio in September 1976.

Getting discovered—The early years were rough and I did many things to make ends meet. By mid-1979, I was selling one or two carvings a month by word of mouth and through several galleries in Virginia, while I was waiting to be "discovered." Had I continued to wait, I fear I'd *still* be waiting. Instead, I decided to make my own opportunity. I went to Washington, D.C., and approached a buyer at Neiman-Marcus, the prestigious department-store chain. My timing was right, because this national retailer was just beginning to take notice of American craftspeople. I was commissioned to create scenes for Neiman-Marcus' Christmas windows in 1979, 1980 and 1981, which amounted to approximately 60 separate carvings over the three-year period. Store officials were pleased enough with my Christmas scenes to offer me a one-man show, the first of five shows that ran in their galleries throughout the mid-1980s. With newfound confidence I began to approach larger art galleries and museums

Above: **"Piper," left, is about 2 in. from ears to heels. He was inspired by Japanese netsuke carvings, which often portray animals in relation to everyday objects. The "Little Prince," right, is about 4 in. tall. Since small creatures have their own societies, I've always felt they should have sharp wardrobes too. Both were carved in 1989.** ***Right:*** **"The Old Trainer," 12 in. tall, 1988. When I was a child, my father took me to the horse races. I was more interested in the people than the horses. The gentleman depicted here is a composite of some of the people with knowing faces who gathered around the paddock prior to each race.** ***Below:*** **"Mid-Vision," 7½ in. tall, 1984 (left). I had always wanted to carve a fantasy frog; I had the chance when a friend, whose nickname is Frog, commissioned a piece. "Journey to a Far Place," 8 in. tall, 1982 (right). I added the skull for a little mystery on this imaginary journey.**

and, thanks in part to media exposure generated by my Neiman-Marcus connection, doors began to open. Dealing with gallery patrons taught me that people who buy art also want to own a piece of the artist; you have to communicate to your collectors a sense of what is important to you and of how the work reflects your personality.

Fourteen years after first setting up shop to carve full time, I'm still at it and I'm still learning. The flow of my imagination seems effortless, but the subtle nuances of form, movement and expression quite often have to be studied, refined and worried over until a piece is acceptable. Then there are those magical moments when I become a spectator as my hands, guided by my subconscious, take off in totally unexpected directions.

When I speak to young art students, I urge them not to let anyone knock them loose from strong, honest dreams; I urge them to learn all they can from everyone with something concrete to offer and then to apply that knowledge to their goals. I was an open vessel, willing to be filled by Leonora Morrow, Mr. Litman and Mr. Brown, Willard Webb and Don Stratton, Great Uncle Paul and many art directors and gallery owners. They have all contributed to my education and growth as an artist and as an individual. As I work today, I often feel an overpowering sense of their continuation in my life. □

John Heatwole lives and works in Bridgewater, Va. For more on his work, see "Painted Carvings," FWW #63, pp. 73-75, and "Sliding-Lid Boxes," FWW #74, pp. 47-49. He thanks the following for allowing their sculptures to be photographed: Mr. and Mrs. Ken Schuler, Bob and Brenda Holton, Dr. and Mrs. Henry Deyerle, James and Julie Swope, Joseph Hedges, Dr. and Mrs. Clarence Geier, Dr. and Mrs. George Pagel, Mr. and Mrs. Frank J. Albanese.

Building your own kitchen cabinets allows you to create the kitchen of your dreams, without having to pay for high-priced custom cabinets. New cabinets can also significantly add to the value of your home. The author's kitchen, shown here, has cherry cabinets built in a traditional style, with frame-and-panel doors, and has the modern convenience of solid-surface synthetic countertops.

Designing and Building Kitchen Cabinets

An overview from subfloor to soffit

by Frank Klausz

When my wife and I decided to buy our new house, I promised her right away that I would remodel the kitchen. Our old house had a bright, airy kitchen, and although the house we bought was only 10 years old, its kitchen was small and dark. It is hard to say which was worse: the commercially made dark-walnut-stained oak cabinets or the cheap-looking plastic-laminate countertops with particleboard that had swelled wherever it had gotten wet. We started by ripping out the old cabinets and tearing down a couple of walls to open the space. Then it was up to me to build a new set of kitchen cabinets.

Although I've been a professional cabinetmaker and furnituremaker for more than 25 years, it still took me a considerable amount of time to build the cabinets and to attend to all the details necessary in completing my new kitchen (shown in the photo above). But no matter how formidable the notion of building an entire kitchen worth of cabinets may seem, it can be a manageable undertaking if you invest a little time in carefully planning the layout, design and construction of the cabinets. While this article isn't going to tell you everything about kitchen cabinets, it will present an overview of what you'll need to know before you design and build them. In the next few pages, I'll tell you how I went about making, finishing and installing the cabi-

nets for my own kitchen, but first I'll give you some hints on laying out your kitchen cabinets and appliances.

Designing a kitchen—When you consider all its built-in features, the kitchen is, by far, the most complicated room in the house to design. Whether you hire an architect to do it or you tackle the job yourself, here are a few of the more important considerations. Begin by locating the three most-used elements in a kitchen: the sink, stove and refrigerator. It's best to situate these so that they form a triangle with a perimeter not exceeding 18 ft. The oven and refrigerator shouldn't be directly adjacent (to keep cold things and hot things separate), and there should be a hood above the stove or cook top. Plan to have a counter near the oven so that you have a place to put a hot pan. A peninsula in my kitchen provides that convenience, plus it separates the kitchen from the adjacent dining area. The dishwasher should be located next to or near the sink and below the dish cabinet, so that loading and unloading dishware is expedited. If your floor plan allows it, locate the sink below a window, and install a light above the sink.

Having enough places to put things is an issue in a kitchen, and you should involve everyone who will use this room when designing the number and location of drawers, cupboards, pullouts, spice racks, bins, etc. For instance, my wife wanted a spice rack near the cook top so she could readily add seasonings while cooking; so I built a rack on the back of an upper cabinet door adjacent to the stove.

A variety of shelves and pullouts makes best use of a cabinet's interior space. I prefer adjustable shelves to fixed ones because they allow you to change shelf spacing to accommodate different-size items. Storage for bulky things, like pots and pans, can be cumbersome; in my kitchen, I built two big pull-out drawers in the cabinet under the stove, plus built a large drawer under the oven. I used several other types of pullouts for better access to stored goods: a large rack in my pantry cabinet (to the left of the oven) holds cans, bottles and small boxes; two racks under the sink hold cleaning supplies and a garbage bag (see the photo above). I also made good use of the corner where two lower cabinets meet—space usually lost because of difficult access—by employing a half carousel, slide-out lazy Susan, which holds bulky kitchen accessories like colanders and graters. The pullouts I used are made by Amerock (Box 7018, Rockford, Ill. 61125-7018; 815-963-9631), but dozens of other pullouts, racks and bins are available from a kitchen-hardware supplier.

You should choose all the major appliances for your kitchen, as well as the sink, before you design your cabinets. There are no standard measurements for kitchen components: each major appliance will come with a specification and installation guide that gives dimensions for rough openings in cabinets and locations of electrical outlets, plumbing, ventilation ducts, etc. It's essential that you follow the manufacturers' guidelines to the letter, otherwise you're likely to run into trouble later. When I made the cabinet for my refrigerator, I fudged the placement of an electrical box by only ½ in. and yet the unit wouldn't fit properly. You may also wish to buy all your countertop and under-cabinet-mounted appliances, such as coffee makers, blenders, etc., before designing. This way you can adjust spacing between cabinets and size cabinet features, such as appliance garages, accordingly. Also you should have spec sheets for any special hardware for such things as lazy Susans, pull-out trays or bins, or electrical fixtures, so your cabinets will accommodate them.

Cabinet design—I like the look of more traditional cabinets with frame-and-raised-panel construction. However, I also wanted my kitchen to be modern and practical, and so I installed Corian solid-surface synthetic countertops, which I custom fabricated to suit my kitchen (see the sidebar on p. 59).

There are dozens of different pull-out bins, racks, lazy Susans and other hardware available to help you organize cabinet storage and make good use of difficult-to-access spaces. For his under-the-sink cabinet, the author chose a slide-out lazy Susan, a pull-out rack for cleaning supplies and a wire holder for the garbage bag.

If you buy production-made cabinets, what you get are off-the-shelf-size boxes that are configured to fit your kitchen. In a custom kitchen, you can make cabinets to the exact sizes you want and configure them in a way best suited to your needs. Using a standard 4-ft. by 8-ft. sheet of plywood as a sizing limit, you can build individual cabinets up to 8 ft. long and join them in any way you like to make longer counters, peninsulas or islands (single lower cabinets not joined to a wall). Just make sure you check the size of the doorway through which you'll be bringing cabinets into the room or you may end up tearing a cabinet apart to get it into your kitchen.

Standard dimensions for cabinets once again take the 4-ft. by 8-ft. plywood sheet into account: Lower cabinets are 24 in. deep and uppers are 12¼ in. deep (including the face frame), so that the width of a sheet has maximum yield. Standard lower-cabinet height is 36 in. to the finished top, which means the cabinet itself is somewhat shorter, depending on the thickness of the countertop used. Upper cabinets typically start 18 in. above countertops (24 in. above stove tops) and extend either to the ceiling or, as in my kitchen, to a soffit. I like soffits because they prevent upper cabinet shelves from being too far above reach for practical use.

When deciding on the arrangement of doors and drawers, any lower cabinet between 2 ft. and 4 ft. wide should have two doors; wider cabinets should have four doors all the same width or one pair of double doors and one single door, not necessarily the same width as the doubles. To provide lots of storage for silverware and utensils, lower cabinets should have a 4-in.-deep drawer above the doors wherever possible. Some people like at least one bank of drawers that increase in depth from top to bottom. To keep the look of the lower cabinets consistent, false drawer fronts are fitted wherever drawers can't be, like under the sink or stove top. For drawer guides, I use model AL1500 full-extension metal guides made by Alfit America Inc. (Box 38159, Richmond, Va. 23231; 804-222-0705), which have a white baked-on finish and an L-shaped lip on the part that screws to the drawer to support it from underneath. Although more expensive than regular guides, I prefer full-extension guides because they provide access to the entire contents of a drawer.

Irregular or leftover spaces give you a chance to be a little inventive. The microwave oven I installed under the upper cabinet just left of the sink was about 4 in. narrower than the space, and so I simply fitted one side of the cabinet with a 4-in.-wide stile. If you have a space more than 6 in. wide, you can add a small vertical

Klausz made good use of a high, narrow area next to the refrigerator by building in a small phone desk, with a pencil drawer below it and a bookshelf above it. The sides of the floor-to-ceiling cabinets on either side of the doorway to the dining room are done in the same frame-and-panel style as the kitchen doors.

compartment, with or without a door, for storing trays and baking sheets. On the wall of my kitchen opposite the sink, I had only a 26-in. space to the right of the refrigerator and decided the kitchen could use a telephone desk. So I built a cherry desktop with a pencil drawer, some open shelves for the phone book, cookbooks, etc., and a high cabinet above the shelves (see the photo above).

Story-stick measurement and layout—The first step in actually building your kitchen is to accurately measure the interior spaces the cabinets will occupy. This is especially important if you're building floor-to-ceiling cabinets, upper cabinets that must fit a soffit or lower cabinets to fit between two walls. Scribes on cabinet face frames and carcases (discussed later) allow a bit of fudging, but the best way to take and keep accurate measurements in your kitchen is to use a "story stick" (also called a story pole). A story stick is made from any 2-in.- or 3-in.-wide scrap of plywood that's as long as your biggest cabinet dimension. On one side of the stick, draw the cabinet and face-frame measurements that run horizontally, and on the other side, draw the cabinet and face-frame measurements that run vertically. You then use these references for marking and cutting out all your cabinet parts: stiles, rails, cabinet sides, etc. (see the left photo on the facing page). The stick can be used to set the fence on the tablesaw or set the stop on a radial-arm or cut-off saw.

Why a story stick instead of a cutting list? There are several good reasons. First, this method makes it almost impossible to make a cutting mistake because you're referring to a full-size pattern instead of a number. Also, using a story stick allows you to make cabinet parts in any order: you can make the doors and drawers before the cabinet as long as the parts correspond to the story stick. And more than one person can work on the cabinets (one can make the face frames, another the carcases, etc.) and all the parts will fit together.

Cabinet construction—Building kitchen cabinets isn't really much different than building any cabinet with a carcase, face frame and back. I made all my carcase parts—bottoms, dividers (also called bulkheads), rough tops and interior ends—from ¾-in.-thick hardwood plywood (either veneer core or lumbercore) and used ¼-in.-thick plywood for the cabinet backs. I prefer A-2 cabinet-grade plywood, with good hardwood face veneers on both sides; however, many people prefer Kortron, melamine or one of the other prefinished particleboards, because these sheet goods are relatively inexpensive and they are easy to clean.

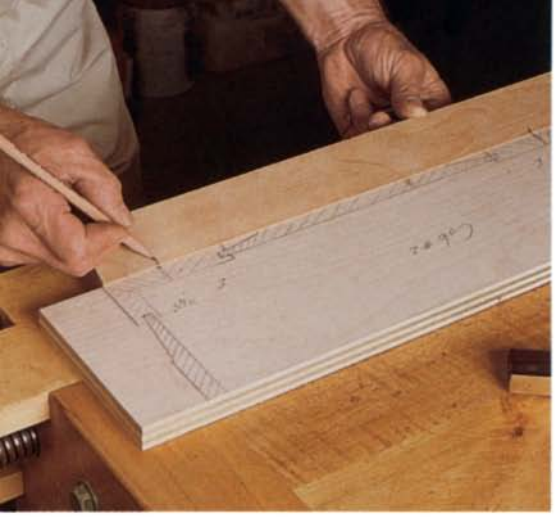
Each lower cabinet is a box-like carcase that sits atop a low plinth-style base (see figure 1 on p. 58). The 4-in.-high base supports the cabinet and provides a 2¼-in.-deep toe space, acting as a kick plate at the front of the cabinet. This separate base makes it much easier to level the lower cabinets, as I'll describe later. The carcase's exterior sides have a ½-in.-deep rabbet on the back edge, which receives the back and allows the cabinet to be scribed to the wall (see the center photo on the facing page). The corners of the carcase have tongue-and-groove joints and dividers in simple dadoes. On lower cabinets, it's best to arrange the dividers so that one side is flush with one edge of a stile. This allows the drawer guide on that side to be screwed to the divider directly and to be flush with the stile; a plywood shim brings the guide flush to the stile on the other side. Upper cabinets are built just like the lower carcases, only they have a 3-in.-wide mounting strip along the inside at the top back edge. This strip provides strength when the cabinet is screwed to the wall.

Once the cabinet carcases were done, I made and attached the face frames, which keep the cabinets from racking and provide a strong place to attach the door hinges. I made all my face frames from solid ¾ cherry and planed them to ⅞ in. thick. I ripped most of the stiles and rails to 2 in. wide, except the rails under the drawer, which I ripped to 1½ in. wide. To speed up making the frames, I used biscuits to join most frame members. Since the #20 biscuits I used are longer than the frame is wide, I cut the slots off center (see the photo at right on the facing page). The part of the biscuit that protrudes is trimmed off after the frame is glued up; on lowers, this area is either covered up by the countertop or is on the underside of the frame, and so it doesn't show. On upper cabinets where a hidden joint is needed, I used ¼-in.-dia. by 2-in.-long dowels. Once all the frames were assembled and trimmed, I glued them to the carcases and used #10 biscuits for strength and for help when aligning the plywood carcase edges. Face frames on end cabinets that will meet a wall or an adjacent cabinet should overhang the carcase so you can scribe them later.

I detailed my upper cabinets by covering the bottom surfaces with "chrome" plastic laminate (Formica brand), and I contact-cemented this on before assembling the cabinets. The chrome plastic laminate serves a double purpose. First, it's durable enough to withstand steam, moisture and heat, which tend to ruin most wood finishes. Second, the mirrored surface reflects light, making the areas under the upper cabinets less dark. To add a dramatic effect, I tacked two rows of low-voltage light strips (available from Vista Manufacturing, 52864 Lillian Ave., Elkhart, Ind. 46514; 219-264-0711) to the bottom of each upper, locating them just behind the bottom rail.

Doors and drawers—To give my kitchen a smooth, clean look, I chose to mount the doors flush with the face frames. This meant that the doors had to be made more accurately than overlay-style doors, where any error simply overhangs the face frame. However, sizing flush doors is simple using the story-stick method described earlier. I used traditional frame-and-panel construction, with mortised-and-tenoned frames fitted with raised panels. Door frames may be doweled or splined, but since I have a wonderful old hollow-chisel mortising machine in my shop, I can cut mortises very fast; I make through mortises and cut the tenons with a jig on the tablesaw, wedging them in place. For raised panels, which are put in place when the doors are assembled, a groove is cut on the inner edge of the frame with a dado blade on the tablesaw. When making raised panels, I try to select stock with similar color and figure and to orient the figure the same way on adjacent panels; this is a minor detail, but important for good appearance. To give the doors and finished ends a little accent, I chamfer the inner edges of the frame with a 45° chamfer bit in a router. The chamfer stops about 2 in. from each inside corner.

Once the doors were assembled and the through tenons were



A story stick makes cutting cabinet parts practically foolproof: There are no numbers to forget or add up incorrectly. Here, Klausz transfers marks for cutting door rails to length; the other side of the stick has all the cabinet's vertical measurements.

Tongue-and-groove joints for corners and dadoes for dividers are a simple and strong means of mating plywood carcase parts. A rabbet on the back edge of the sides provides a housing for the cabinet back and allows the cabinet to be scribed to the wall.

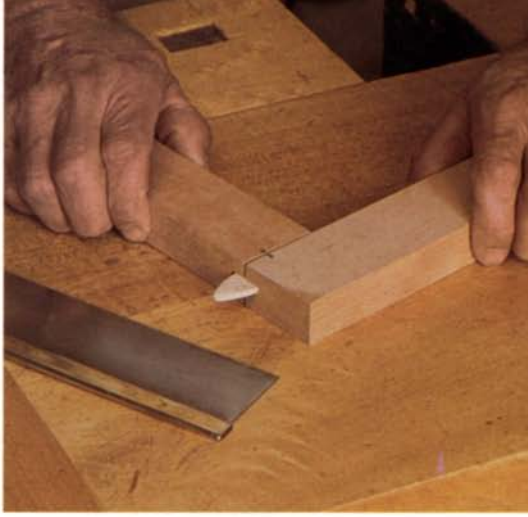


Plate-joinery biscuits used on some face-frame corner joints speed up construction. The slot is made off center because the biscuit is too wide to be completely hidden by the rail; it is trimmed afterward and can't be seen when the kitchen is complete.

wedged and planed flush, it took only a small amount of trimming to get each door to fit its opening evenly all the way around. While there are many styles of hinges that work with a flush-fitting door, I chose 2½-in. brass butt hinges because I like their traditional look. If you use butt hinges, be sure to get the kind with removable pins; they make hanging and unhanging the doors much easier. Installing butt hinges is time-consuming, since they must be mortised into both the frame and door, but using a hinge template and a guide-base-fitted router speeds up the process.

To cover up the plywood, I edged the top of each drawer side with a thin band of maple. My drawer front is a piece of ¾ solid cherry, which is screwed to the front of the plywood drawer. I built my drawer sides from ½-in.-thick white-maple plywood, joined by rabbets in all four corners, and cut the bottoms from ¼-in.-thick plywood. The 8½-in.-wide drawer located under the oven, designed to hold baking pans, was built the same as the other drawers, except its drawer front was done with frame-and-panel construction. With the Alfit drawer guides I used (as well as with most metal drawer guides), all drawers had to measure ¼ in. less deep and 1 in. narrower than their face-frame openings.

Finishing—After all the cabinets received their final sanding with 220-grit paper, I fit and trimmed all drawer fronts so they had slightly less than a 1/16-in. gap all around. I prefer to finish my cabinets, inside and out, before I install them and then to touch up any dings or mars afterward. So first I sprayed all the interior cabinet surfaces, shelves and drawers (not the drawer faces) with two coats of sealer and followed this with two coats of nitrocellulose lacquer, waxed to a silky smooth finish. I then rubbed the cabinet exterior with a natural oil finish: I applied four coats of Waterlox oil and then a final coat of a mixture of about 25% marine varnish and 75% Waterlox oil. A lot of people prefer to use a more durable finish, such as lacquer or polyurethane, but if my oil finish is properly maintained and treated with paste wax twice a year, it keeps its beauty for decades. It's my belief that nothing makes natural wood look more beautiful than a hand-rubbed oil finish.

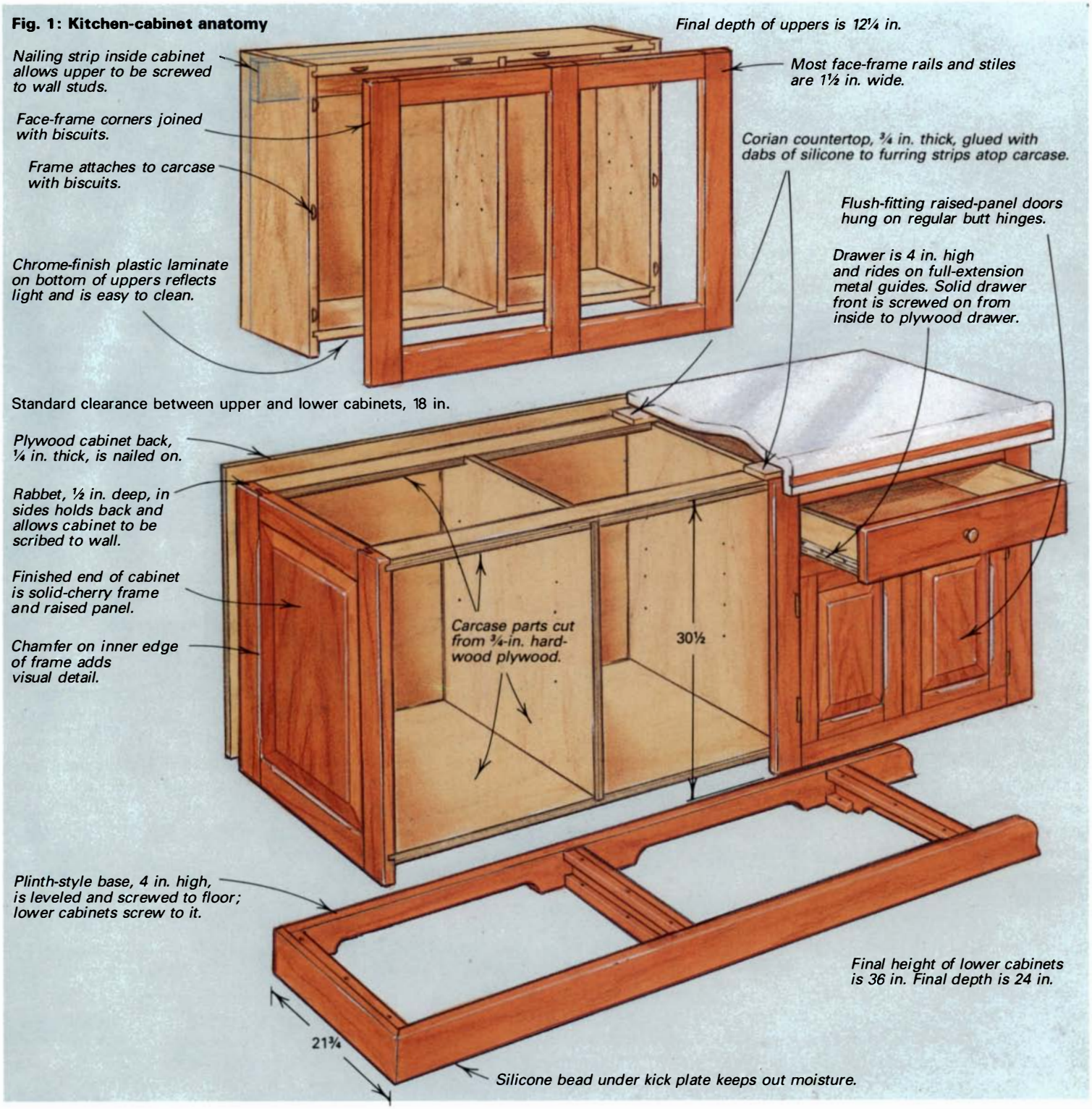
After finishing, I screwed all the butt hinges and magnetic door catches to the face frames and then hung the doors to make sure they would open and close without rubbing. Next, I screwed the metal drawer guides to the cabinets and inserted all the pullouts and drawers to make sure they would operate smoothly. Each drawer front was then aligned and attached to its respective drawer with four countersunk screws from inside. Finally, I removed all the doors (by pulling the removable hinge pins), drawers and pullouts and replaced them after the cabinets were installed. If your kitchen has a lazy Susan, be sure to mount its hardware *before* installing the cabinets; if you forget, it's a very tedious job at best.

Installing the cabinets—Before the cabinets are put in place, all the necessary electrical wiring and plumbing should be done. This includes lighting circuits, lights recessed into the soffit, under-cabinet lights, and all outlets and switches. Wiring for the range hood, stove top and oven(s) should be roughed in and duct work for the hood should be installed. Finally, water and gas pipes, such as for the stove, sink and refrigerator (if it has an ice maker), should be roughed in at the point where they enter or pass through cabinets.

The best time to install cabinets depends partially on the type of floor the kitchen will have. A linoleum or hardwood floor should be laid prior to cabinet installation and it should go from wall to wall so that leveling cabinets is easier. Expensive tile floors can be laid and grouted after the cabinets are in place, to save on materials. In either case, try to finish all painting and wallpapering prior to cabinet installation, and touch up any damage later.

The first installation task is to level all the lower-cabinet bases. Using a 4-ft. level, I started with the base of the most central lower cabinet and worked toward the end cabinets, planing material off the kick plates and feet on each base and/or adding wedges and shims as necessary. Although you may have to fuss with this, taking the time here makes the rest of the installation much easier and ensures that all drawers and pullouts will be level and door hinges will be plumb, allowing smooth operation. If the floor is very irregular, you may need to conform the kick plate by scribing and planing its lower edge. When the bases are level in every direction, screw them to the floor through the thin strips glued to the base members (see figure 1), first laying down a bead of silicone along the lower edge of the kick plate to prevent floor-washing water from seeping in and deteriorating the finish and wood. (If the floor is tile, add this bead after the tiles are grouted.) The lower cabinets can now be scribed to the walls and screwed to their bases. Adjacent cabinets are screwed together through the ends, and corner cabinets, which connect at 90° or at an angle, have butted face frames scribed and screwed together. Most dishwashers require an open space between cabinets, save the rough top and a single top stile between the face frames of adjacent cabinets.

I hung the upper cabinets next, trimming the scribe strip at the back edge of each cabinet to level it and to make it fit snugly



against the wall. Instead of holding the upper cabinet to the wall for scribing, which is an awkward job at best, I held my level to the wall, noted the amount of variance from plumb (say ⅛ in. out at the bottom) and then handplaned the scribe strip accordingly. If the wall is very irregular, hold a scrap of ¼-in.-thick plywood plumb and to the wall, scribe a pencil mark on it, and then transfer this mark to the cabinet. When the planing is complete, attach the uppers to the walls with 3-in.-long drywall screws driven through the mounting strips and into the wall studs. After hanging all the uppers, I fitted the board that will receive the overhead light between the cabinets on either side of the sink. Then I nailed on the valance strip, which is a piece of cherry with a decoratively scroll-sawn lower edge, and nailed ¾-in.-thick by ¾-in.-wide molding, mitered at the corners, around the top of each upper. This covers any seam between the soffit and tops of the upper cabinets. Finally, the countertop and built-in appliances were installed, leaving my wife and I only one thing left to do: cook up a big pot of Hungarian goulash to christen our new kitchen. □

Frank Klausz makes furniture and repairs antiques at his shop in Pluckemin, N.J. For more information on traditional kitchen cabinets and cabinet joinery, see Building Your Own Kitchen Cabinets *by Jere Cary, or* Making Mortise-and-Tenon Joints, *a video by Klausz. Both are available from The Taunton Press, 63 S. Main St., Box 5506, Newtown, Conn. 06470-5506.*

Drawings: Aaron Azevedo

Building a Corian countertop

Despite the traditional-style cabinets I built for my new kitchen, I made my countertops from a modern alternative to wood, tile and even plastic laminates. I built them out of Corian, a synthetic or "solid-surface" material made by Du Pont that's very popular in kitchens and bathrooms.

Solid-surface materials have many advantages over conventional countertops: They are durable, waterproof, and heat and scratch resistant. Further, they're easy to cut or shape with carbide blades or cutters, they can be sanded, and using a special glue that's the color of the material, you can mate pieces together without noticeable gluelines. And since the color goes all the way through the material, you can repair the surface by scraping or sanding out burns, dings and scratches. Corian is only one of several solid-surface counter materials, such as Surell and Avonite, and it comes in a variety of colors and thicknesses. (For solid-surface materials, look under "countertops" or "kitchen cabinets" in your local yellow pages.)

I chose ¾-in.-thick white Corian and used matching 2-in. edging that gets glued on and then shaped with the router for a non-drip lip. I started by carefully measuring the cabinet tops: I had to make a U-shaped top to fit around my kitchen. I cut the sheet of Corian to length and width on the tablesaw, using a triple-chip carbide-tooth blade. Cutting Corian is quite messy: the white shavings make it look like it's snowing. After cleaning up the sawmarks with a sharp, low-angle block plane (you may find it easier to do this with a hand-held power plane or with a flush-trim bit in the router), I trial-fit the joints dry and left the top in three pieces. They will be glued together during installation.

I cut the edging and glued it on the perimeters of the counters, leaving ¼ in. above the surface for the lip. You must glue the edging with special two-part joint adhesive (colored to match the Corian) and mix it following the instructions on the package. It is important to clean the joints well with denatured alcohol before gluing. Also, remove all dirt and pencil marks: Anything left on the faces of the joints will show through the translucent Corian. Although the glue has gap-filling abilities, the tighter the joint is, the less visible the glueline will be. Apply the glue in a single pass and with an even motion, just as if you're caulking a seam. Take care because repeated passes can cause voids or air bubbles. Now pull the joint together, clamping the pieces the same way you would clamp a wooden panel, and let the excess glue set up without cleaning.

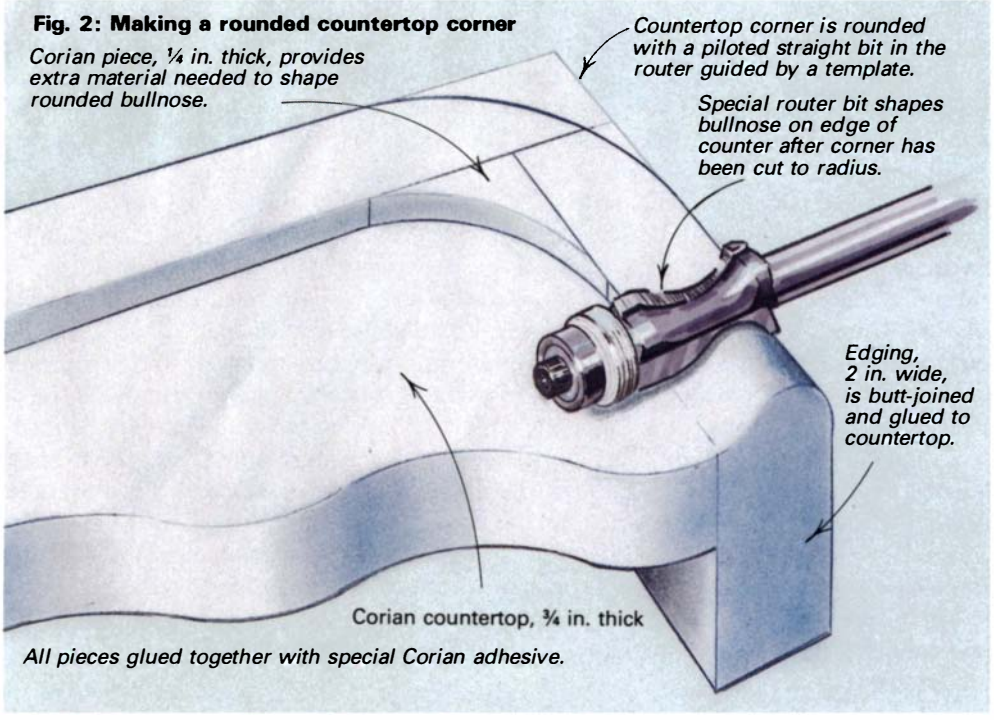
I wanted nice rounded corners on the ends of my peninsula (see the photo on p. 54), and when my supplier told me I couldn't have both a non-drip edge and rounded corners, I decided to fabricate my own. Once the corner pieces were glued together, as shown in figure 2 below, I shaped the corner with a router, using a flush-trim bit against a template, and then I sanded it smooth. A special router bit, available from Fred M. Velepec Co., Inc. (call 800-365-6636 for your local dealer), shapes the lip on the corner and the edge around the countertop. I held the router horizontally, with the guide bearing on top of the counter, and worked it carefully around the corner; then I cleaned up the shaped edge with sandpaper. To visually tie in the countertop with the cabinets, I inlaid the edging with a strip of ¼-in.-wide cherry, glued with silicone into a groove made with a kerf-cutting bit in the router.

Next, I marked the exact location of the sink and stove top with a template, and cut out the openings with a plunge router and a single-flute straight bit guided by a template. I left ½ in. extra around the opening of the undermount sink for trimming later. Whenever you cut this solid-surface material, be sure you round the corners; sharp corners invite cracking.

With the lower cabinets leveled and screwed in place (see the main article), I tacked two narrow strips of plywood at the front and back edges of the rough top. Corian should never be installed over a solid underlayment because heat may accumulate and cause cracking. Then I glued the first section of counter to the strips with dabs of silicone about every 10 in., and I left a 1/16-in. clearance between the Corian and back splash because Corian expands and contracts just like wood. You don't have to clamp down the Corian; its own weight is enough. At the same time the counter is being siliconed to the cabinets, each of the other counter sections must be glued together with the joint adhesive to form a continuous counter. This can be hectic, since the setting time of the silicone is only about 15 minutes, but it's necessary since a large countertop shouldn't be moved after the sections are glued together. Do not clean the excess adhesive until it sets; then plane the joint area flat and sand it smooth.

Top-mounted appliances, like the stove top, can now be siliconed in place, with all mounting screws run into wood blocks glued to the Corian (screwing directly into Corian may cause cracking). When gluing the undermount sink in place, apply enough adhesive to squeeze out all around. After it cured, I trimmed and shaped the sink cutout with a ¾-in.-dia. roundover bit in the router, which yields a nice soft edge. For final cleanup, I smoothed all rough areas with an orbital sander, starting with 220-grit paper and finishing with 320-grit. For a back splash, I chose ceramic tile and caulked the gap between the countertop and tile with a bead of silicone. —*F.K.*

Fig. 2: Making a rounded countertop corner



All pieces glued together with special Corian adhesive.

A Kentucky Quilt Rack

Shaping and joinery with a router and jigs

by Kelly Mehler

This walnut quilt rack has only six parts and can be built with just a few patterns and jigs. It blends tradition with contemporary styling and fits in the decor of most any room. The curved rails complement the flat ends, which are accented with wedged tenons.

You can build this quilt rack with curved rails and wedged mortises and tenons in one day from a single walnut board. I've made hundreds of them using production techniques that require only a bandsaw, a tablesaw and a router. Simple pieces like this rack, which was designed by my former partner Peter Blunt, provided steady income and helped establish our fledgling furniture shop years ago. Having to make a living from these small production runs also taught us how to make efficient jigs and fixtures like the ones discussed here. You can make just one quilt rack by simply following the dimensions in figure 1 on the facing page. But if you take the time to make a few simple patterns and jigs, you will ensure symmetry, reduce trial and error, and be set up to make another quilt rack whenever you want.

Shaping with patterns and jigs—I make a pine or plywood pattern for each part and then use these patterns to lay out the components on the rough stock and to make templates for shaping jigs. You can make the patterns for the end and the side rail from the scaled drawings in figure 2 on the facing page and from the dimensions given in figure 1. When making the patterns, I bandsaw close to the line and then file and hand-sand the edges smooth. As you do this, take care to achieve a fair line, because the pattern is the exact shape of the part. I draw the tenons on the stretcher and rail patterns, but I don't cut the tenons to width; later I mark their width on the workpiece with a separate tenon pattern. The mortises and handhold should be cut in the pattern for the end pieces, so that you can easily orient the pattern to avoid defects when you lay out parts on your stock. Rout the mortises in the end patterns by guiding the base against a straightedge fastened to the pattern stock. I limit mortise length by stopping the cut at pencil marks on the patterns. To cut the handhold, drill a hole and cut close to the line with a coping saw or jigsaw, and then smooth the edges with a rasp and sandpaper.

After making the patterns, I use them to make shaping and mortising templates. I made the shaping templates 1/16 in. undersize to accommodate the 1/16-in. setback between the router's 5/8-in.-OD guide collar and the 1/2-in.-dia. straight spiral bit that I use to shape and mortise the parts. The guide collar is screwed to the router base and follows the edge of the template. Because of the setback between the collar and the bit, the template's guide holes must be 1/16 in. *larger* in radius than the bit for interior cuts, such as the mortises, as shown in figure 3 on p. 62. The handhold cutout must also be 1/16 in. larger all the way around.

Preparing stock—To give the quilt rack a pleasing, uniform look, I like to make it from one board that's wide enough to yield

Fig. 1: Quilt rack

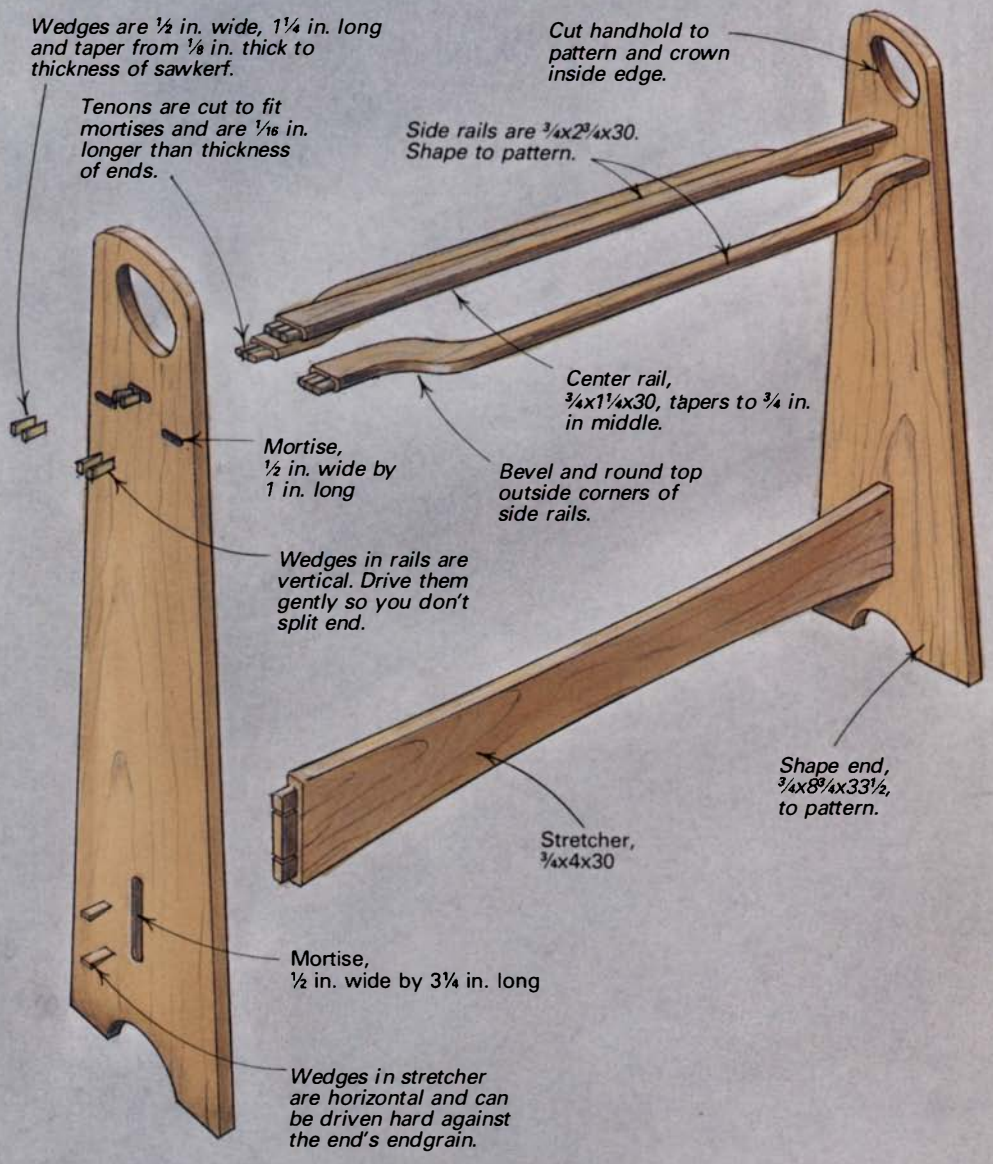
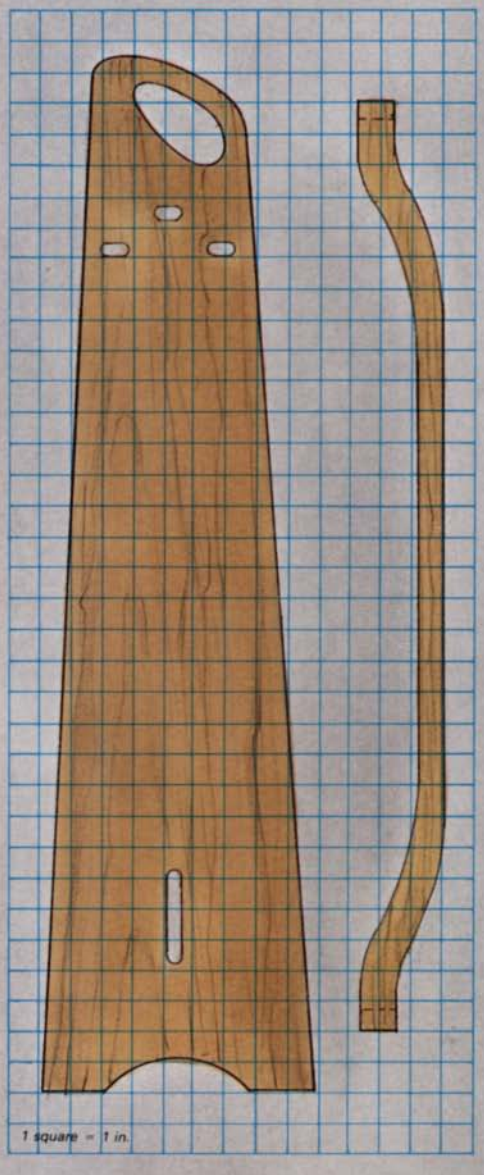


Fig. 2: Patterns for ends and side rails



both ends. If you start with a ¼ walnut board, 11 in. wide and 10 ft. long, you should have enough stock for one quilt rack. Lay the patterns on the board in the most economical way, but avoid defects, such as knots, that could weaken thin parts. Minimize short grain in the curve of the narrow side rails by orienting their patterns to take advantage of the board's grain direction.

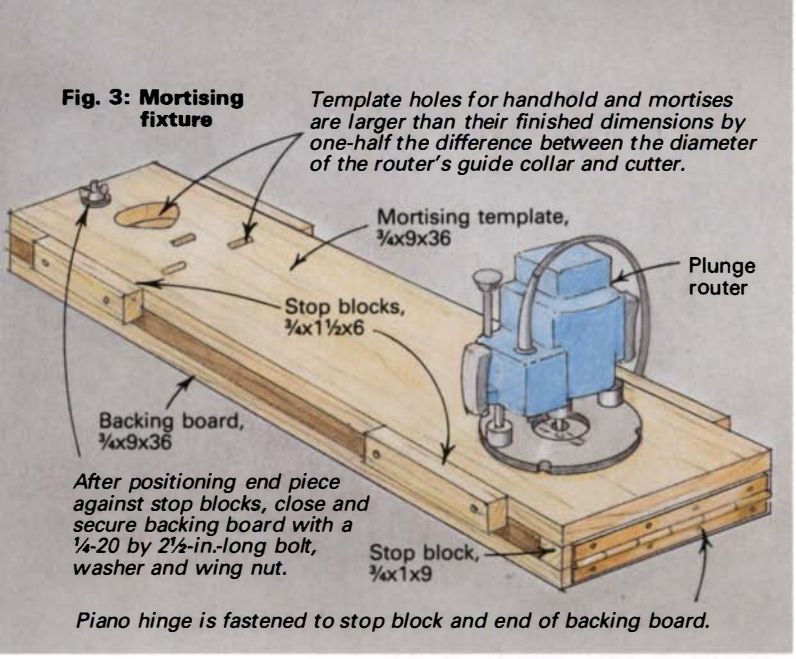
I cut my walnut board into easily handled 3-ft. lengths, flattened one surface and jointed one edge of each piece. Then I planed everything to ¾ in. thick. Next I ripped the individual parts to width on the tablesaw: the end pieces to 9 in. wide, which is their largest dimension at the bottom; the stretcher to 4 in. wide; the side rails to 2¾ in. wide; and the center rail to 1¼ in. wide. Crosscut the bottom of the end pieces square (the top is sawn to a pattern line and need not be square) and label the outside on the bottom of both pieces so you don't confuse them later. Then I set a stop on my tablesaw's sliding table and crosscut the stretcher and rails to the same length. Save the end scraps for test-cutting joints and for making repairs, if necessary.

Routing mortises and handholds in the ends—During production runs, I rout mortises and handholds in up to 20 end pieces. So to simplify setup, I made a mortising fixture that combines a template and a backing board, which are hinged together at the bottom end (see figure 3 on the next page). The backing board eliminates tearout on the back side of the workpiece when through mortises are cut. Register the workpiece against stop blocks on the template, and then close and fasten the backing board with a bolt and wing nut to sandwich the workpiece tightly between it and the template. Then I clamp the fixture between dogs on my workbench and rout the mortises and handhold. Don't try to cut all the way through the workpiece in a single pass because the bit may overheat. Instead, make two or three plunge cuts at increasing depths. The backing board will cause chips and sawdust to become trapped in the mortises, preventing the router's guide collar from bearing against the template. As you make each pass, stop and blow or vacuum out debris. When cutting the handhold, be sure you move the router clockwise, the same direction that the bit is cutting. And before removing the end from the fixture, be sure all the mortises are cut cleanly and completely. Finish the ends by bandsawing their taper and top shape to the pattern line, and then joint their long edges. I clean up the top on a stationary disc sander and smooth the bottom of the cutout on a drum sander.

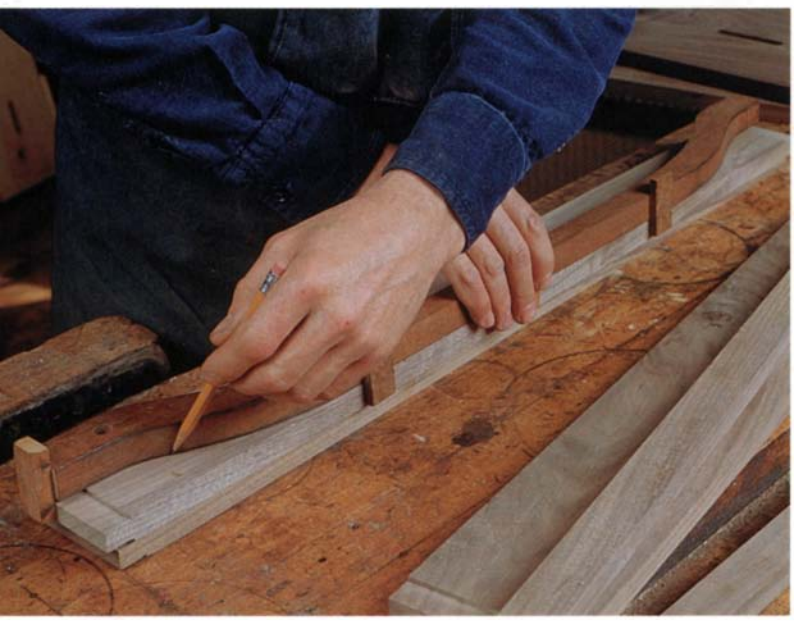
Cutting tenons—You should cut the tenons on the ends of the stretcher and rails before you shape them so you can work from straight, square edges. I cut the tenons in a three-step process: cross-

Drawings: Bob Goodfellow

Fig. 3: Mortising fixture



***Above:** The author crosscuts shoulders on the stretcher and rails by using a sliding table with a stop set for the tenon length.*
***Below:** Mehler traces a side rail from a pattern that has stops on its side and end. This way he can locate the rail on the workpiece.*



cut the shoulders on the tablesaw; rout the cheeks on a router table; and round the edges of the tenon while fitting them in the mortise.

First, set up the tablesaw and crosscut the shoulders on the faces of the parts. I set the blade height at ⅛ in. by making test cuts on a 4-in.-wide scrap piece and check that I left a ½-in.-thick tenon. Then I clamp a stop block on the sliding table, setting it to accurately crosscut the shoulders at the tenon's length, which should be 1/32 in. longer than the thickness of the end piece. Letting the tenons protrude in this way helps you ensure that glue doesn't get into the tenon's endgrain and discolor it. After assembly, I belt-sand the protruding tenons flush with the surface.

Second, I remove the guide collar and fasten the router under a table to form the tenon's cheeks. My table sits atop a 55-gal. drum—the latest in high-tech stands. Make test cuts in the scrap piece to set the straight bit's height to ⅛ in. (leaving a ½-in.-thick tenon) and to set a fence so that the bit cuts just short of the crosscut shoulder. When the setup checks out on the scrap piece, I use the scrap as a push block to guide the narrow ends of the rails against the fence, thereby eliminating tearout on the workpiece and making these cuts safer.

Since the corners of the rails are rounded and to conceal the joint, all the tenons (including the stretcher's tenons) needed four shoulders and cheeks. To cut the shoulders on each tenon's edge, leave the stop block set at the tenon length on the tablesaw's sliding table and rest the blade height to leave the rail tenons 1 in. wide and the stretcher tenons 3¼ in. wide. Be sure the blade is square when cutting the 1⅝-in.-deep outside shoulder on the unshaped side rails. I then bandsaw the cheeks on each tenon's edge, stopping the cut just short of the crosscut shoulders.

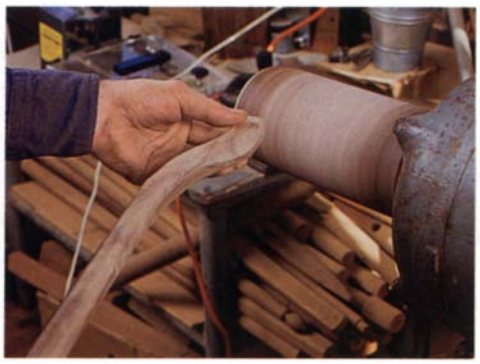
Third, round the tenons' corners and fit them to their mortises. I first chamfer the corners with a chisel and then bullnose them. I do this by wrapping a strip of coarse sanding cloth (I use a 1-in.-wide strip of 60-grit sanding belt) around two of the corners at a time and by sanding in a shoe-shine motion. Clean up the corners near the shoulders with a chisel and fit each tenon to its mortise to be sure you have an easy, albeit close, fit.

Cutting and shaping the stretcher and rails—After tracing the finished shapes of the stretcher and rails from my patterns (as shown in the bottom photo), I rough out the parts on the bandsaw. Then I trim them to final size on the router table. To do this, I reinstall the guide collar, continue to use the ½-in. bit and clamp the parts in the shaping jig to ensure uniformity. Each jig, like the one in the top photo on the facing page, consists of a template that follows the router's guide collar, several stops that position the workpiece on the jig's template, and fixture clamps that secure the workpiece to the jig. The fixture clamps must be attached to the jig where they won't be an obstruction to cutting.

To shape the roughed-out pieces, position and clamp them in the jig and hold the template against the router's guide collar as you feed the workpiece against the rotation of the cutter. To avoid cutting against the grain and to eliminate tear-out in the sharp curves on the side rails, you must flip the rail end for end in the jig after cutting both sides of one end. After shaping all the rails and the stretcher, round over all four corners of the rails with a ⅜-in.-radius bearing-guided roundover bit in the table-mounted router. Instead of rounding over the corners of the stretcher and the end pieces, I just sand their corners dull. Then I sand the edges of all the parts on my pedestal drum sander. And to give the side rails a lighter look, I thin and bevel over their top, outside curve (see the bottom photo on the facing page).

Before assembly, I scrape and sand both sides of the stretcher and the insides of the ends, and I crown the inside edges of the

***Above:** Mehler shapes a side rail on a table-mounted router using a jig and template following a collar on the router table. After shaping one end of each side rail, he reverses it in the jig for shaping the curves without cutting against the grain.* ***Below:** The edges of all the pieces are smoothed with a pedestal drum sander. Mehler gives the side rails a lighter look by beveling and rounding their top, outside curve.*



Mehler assembles the rack with slow-setting hide glue, as Ginger watches patiently. This clamping jig applies pressure close to the tenons, but allows room for him to drive in their wedges.

handholds with a file and sandpaper. I hand-sand the rails and belt-sand the outside of the ends after assembly. Lastly, I bandsaw two kerfs in all the tenons for wedges, and then bandsaw the wedges from a ½-in.-thick walnut board. As shown in figure 1 on p. 61, the wedges' wide end should be just a bit thicker than the kerf.

Assembling the pieces—Before assembly, carefully lay out the parts so you won't put them together upside down or inside out; in the rush of assembly, it's easy to make a mistake. I use liquid hide glue (available in small quantities from hardware stores) because its slower setup gives me more time to assemble the quilt rack and clean up excess glue. With a small brush, I apply the glue to all four sides of each tenon (but not to the shoulders' endgrain), and then I brush it in the mortises, working from the outside surface of the end pieces, where clean up will be easier.

With one of the ends laying on blocks on the bench and with paper protecting the bench from drips of glue, I insert the stretcher and rail tenons in their mortises in first one end and then in the other. Then I stand the rack on the floor and secure the ends together with the aid of a clamping jig, as shown in the above, right photo. This jig was designed to provide clamping pressure near the tenons while still leaving them exposed so the wedges can be inserted.

Since I broke the rules by orienting the rails' wedges so they press against side grain rather than endgrain, I'm careful not to drive them in and split the end piece. But the wedges expand the tenons enough to hold the rack together; so I remove the clamps. I wipe away excess glue with warm water, and handsaw the wedges flush with the tenon ends. When the glue has set (usually overnight), I belt-sand the protruding tenons with 120-grit and then finish-sand everything by hand.

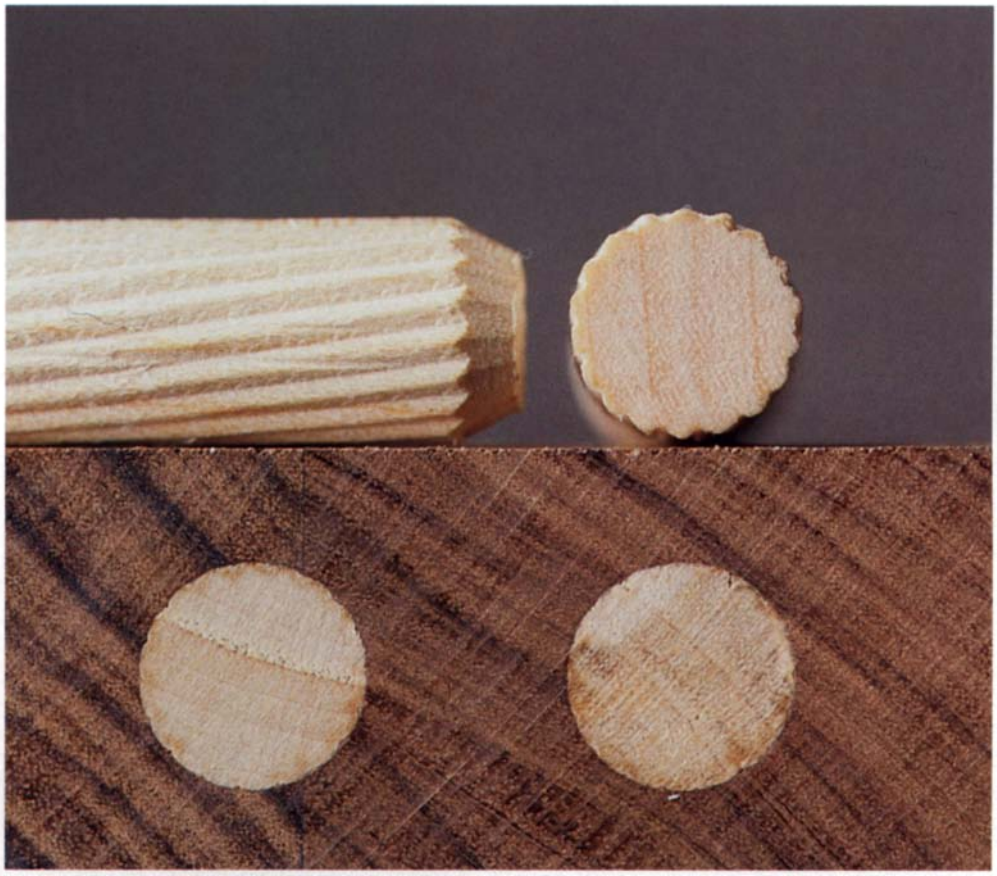
I usually finish my quilt racks with a light coat of tung oil and allow it to dry for three to seven days. The oil enhances the wood's color and helps fill its pores. When the oil has dried, I sand the rack with 220-grit paper and then spray it with lacquer sanding sealer. When that is dry, I sand with 280-grit before spraying it with two or three coats of moisture-resistant, high-gloss lacquer. Finally, I rub the surface with 0000 steel wool until it has a satin finish. If you plan to use the quilt rack as a towel rack, you should use a moisture-proof finish, such as spar varnish. □

Kelly Mehler operates Treefinery Woodshop and Gallery in Berea, Ky. His video Build a Shaker Table *is available from The Taunton Press.*

Dowel Joinery

Pressed grooves for improved gluing

by Mac Campbell



Dowel pins with grooves pressed into their surface greatly improve the strength and efficiency of typical dowel joints. Even though these dowels still push most of the glue into the hole's bottom, the grooves give the glue an escape route, which relieves pressure inside the hole and ensures even glue distribution around the dowel. The moisture in the glue then causes the pressed grooves to expand, as shown in the cutaway dowels, thereby adding to the mechanical strength of the joint.

The humble dowel joint is often overlooked by furnituremakers. This is largely because it has been used in the wrong place so often by commercial furniture manufacturers that it is now associated with failed joints. But when dowel joints are properly applied and executed, they are very useful additions to a woodworker's repertoire.

Dowels have been used in furniture construction in one form or another since people first started using joinery to assemble chairs and tables. Early on, they were most often used as pins to lock tenons into mortises or used on the ends of stretchers and on turned spindles in chair construction. Dowels were not used in place of standard tenons until after the industrial revolution in England (around 1850), when large furniture manufacturers began using them almost exclusively as their all-purpose method of joinery. After all, a joint that could be made just by drilling mating holes lent itself perfectly to mass production, and eliminating tenons simplified cutting lists and reduced the amount of wood required. Unfortunately, this shift away from tenons often resulted in dowels being used where they were not really up to the task. When used on high-stress joints, such as the side-rail-to-back-leg joint on a dining-room chair, the dowels and the amount of glue surface they provide are insufficient to handle the strains that will be applied to the joint. A few years down the road the joint fails and the dowels are blamed. But improvements in how dowels are manufactured, coupled with a better understanding of where to use them, could restore their good name and make their bad reputation a thing of the past.

Problems and solutions—The most common objection to dowel joints is the lack of good gluing surface. With the exception of rarely used end-to-end joints (which I don't recommend), at least one end of the dowel will have its grain running across the grain of the piece into which it is glued. This is where the problems begin, because a hole drilled across the grain has only two areas suitable for a good glue joint: the sides, which are long grain.

Since the amount of good gluing surface within the hole is limited, you should use a sharp drill bit to avoid leaving torn fibers, which will further impair the glue bond. I prefer a brad-point bit powered by a high-speed portable electric drill. Brad-point bits are available from most woodworking-tool suppliers, but you can grind your own brad points from machinist's bits (see *FWW* #82, p. 74). In addition to the bit being sharp, it must also be accurately sized. If possible, buy the bit from a dealer that also sells micrometers, such as an industrial-supply house, and ask the salesperson to actually measure the bit's diameter. Top-quality bits should vary by no more than three or four thousandths of an inch; garden-variety bits sold in hardware and discount stores may vary by as much as 0.030 in., and this is enough to make a joint either very weak or almost impossible to assemble. I suggest buying a high-quality bit and reserving it for doweling because repeatedly sharpening a brad-point bit can move the point off center and thereby enlarge the hole size. As an additional measure to ensure a crisp, clean hole, I use a positive depth stop—a piece of oversize dowel with a hole drilled in it (see the top, left photo on p. 66)—so that the bit can be inserted and withdrawn quickly and smoothly without burning or enlarging the hole.

Another problem often associated with dowel joints is that the dowels tend to wipe the joint clean of glue as they are inserted, leaving a severely starved joint. To make matters worse, the glue

that was supposed to hold the joint together is pushed down to the bottom of the hole, and then as the dowels are driven home, they act like hydraulic pistons and generate tremendous pressure, often splitting the wood. To solve these problems, dowel choice is critical.

For years, I, like most woodworkers, made my own dowels by cutting up 3-ft.- or 4-ft.-long dowel stock. But random dowel stock, besides being generally oval in cross section, can vary from stated size by up to 0.060 in., which just isn't good enough to produce a strong and durable joint. I've also formed pins by driving rough-size stock through a hole in a steel plate. Both of these methods produced small pieces of wood that were approximately round and more or less the right size, but they did nothing to solve the problem of starved joints and hydraulic pressure.

Fortunately, help is at hand. Most woodworking-supply stores now sell accurately sized pins that are made of hard maple or birch and that have spiral grooves compressed (not cut) into them. These pins offer several advantages over homemade varieties: They are made from dense hardwood, whereas random dowel stock may be made from softer (and weaker) species; their accurate size ensures a better joint; and the spiral grooves improve the glue bond significantly. Even though these pins also force most of the glue into a pool at the bottom of the hole, the glue is forced up through the grooves when the pin reaches the pool. This ensures almost perfect glue distribution, while at the same time relieves hydraulic pressure. Because the grooves are compressed into the dowel surface, the moisture in the glue causes the grooves to swell, thereby returning the assembled dowel almost to its original fully round shape (shown on the facing page). This swelling maximizes the mechanical strength of the joint, as well as the glue bond. Of course, in order for the dowels to expand, a water-base glue must be used.

Finally, as with all other facets of woodworking, the potential for wood movement must be considered. The larger the dowel's diameter, the greater the problem with expansion and contraction. In *FWW* #77, pp. 60-63, there's a good discussion of addressing this problem by paying attention to grain orientation of both the dowel and the mortise stock. For typical dowel joints in face-frame and carcase joinery, you can minimize wood-movement problems by using ⅜-in.-dia. dowels almost exclusively. For ¾-in.-thick stock, ⅜-in.-dia. dowels correspond to the rule of thumb I use for tenons; the tenon should be about half the thickness of the piece it's attached to. For fine work and for alignment only, I sometimes use ¼-in.- or 5/16-in.-dia. dowels; for large stock, I just use more ⅜-in.-dia. dowels. Using ⅜-in.-dia. dowels not only minimizes swelling and shrinking problems, but also reduces the number of different size pins I have to keep on hand. In recognition of potential movement in the cross-grain member of the joint, I limit each dowel's penetration across the grain to about ¾ in. For most applications, 1½-in.- or 2-in.-long dowels work just fine; they allow a ½-in. to ¾-in. penetration across the grain and at least 1 in. with the grain. When the dowel is inserted in endgrain, the entire gluing surface is long grain and so 1-in. penetration is ample.

Building a cabinet with dowel joints—The small commode at right is a good example of just how useful dowel joinery can be. This cabinet incorporates three of the most common applications for dowel joints: carcase joinery, face-frame construction and aligning pieces for edge gluing. Most other applications for dowels can be developed from the principles outlined here.

The first step in doweling a carcase together is cutting all panels exactly to size and absolutely square. Making a cutting list is somewhat simplified because there are no allowances for dovetails or tenons. When all pieces are cut to final size, I mark a triangle across their edges to designate up/down and left/right. These markings are particularly helpful when orienting the shopmade doweling jig that I make specifically for each job (see the left photo on the next page). I bore the holes in the jig with the drill press and then use the jig as a guide when boring the dowel holes in the parts to be joined. The jig should be made from a dense hardwood, like maple, so that it will remain accurate when drilling the hundreds of holes required to join a carcase. Rip a piece for the jig the same thickness as the stock to be joined and at least ¾ in. wide, which provides a good drilling guide. Cut the jig as long as the width of the widest piece to be joined, which in cabinet construction is usually the side or top. Shelves or partitions are often narrower because they are set back to provide clearance for the doors or the back. Make a note of these setbacks on the jig by squaring a line around it that is the appropriate distance from its front end or back end. For the commode, the jig was cut as long as the top's width and then was marked for the ¾-in. setback in the front for the sides and partition. Since the partition stops short of the back, the jig was also marked for a ¾-in. setback at its back end. Don't forget to mark a triangle on the jig's front end to indicate its up/down and left/right orientation.

You can now lay out the dowel spacing directly on the jig. I generally space ⅜-in.-dia. dowels about 1 in. apart across the middle of the panels and somewhat closer toward the ends, where the strain from a panel trying to cup may be a bit greater. Referring to the triangle you drew on the jig's front end, lay out the holes on the top of the jig. You want the holes to be as perpendicular as possible, and so you should use a drill press if you have one. Clamp a fence to the drill-press table so that the holes are centered in the jig. But don't fuss too long with this because it won't matter if they're slightly off center, as long as you pay close attention to the orientation of the jig when drilling the dowel holes in the parts. If you don't have a drill press, you can use a commercial doweling jig to make your carcase jig. It will ensure perfectly straight and centered holes, even though it will be much slower because you will have to keep moving it along the jig's length. Drill the holes in the jig with the same bit you will use to drill the dowel holes, and then change bits and drill and countersink a hole near each end for

Photo: Keith Minchin

This mahogany commode was built to match and support an antique silver chest. The carcase is joined entirely with dowels, as are the face frame and framed-panel doors. The dovetailed drawer is the only part of the cabinet that does not rely on dowel joints.

***Left:** When using his shopmade jig to drill the end-grain holes, Campbell clamps a strongback to the drawer partition to flatten out any cupping. The triangle on the jig's front end coincides with the portion of the triangle drawn on the front edge of the partition, ensuring proper orientation of the jig. The marks drawn around the jig near both ends, register the jig on the partition to accommodate a setback for the face frame and cabinet back. A positive depth stop is taped to the drill chuck. **Center:** After spreading glue in the end-grain holes, the author quickly taps the dowels to full depth using a simple gauge. **Right:** Campbell uses a doweling jig for drilling holes in face frames. A white label with a line designating the center point between holes is stuck to the jig so that he can simply line up this mark with a single pencil line drawn across the joining parts.*

mounting screws. Exact placement of the mounting screws isn't critical, but on a long jig, you may also want one near its center.

You're now ready to drill the dowel holes. With a pencil and framing square, draw a line on the side panels to mark the desired locations of the partitions. Mark one edge of the partition, rather than the centerline of the joint, so you can use it to place the jig accurately. It doesn't matter whether you mark the top or the bottom edge, but be consistent and mark an X on the joint side of the line so you don't misplace the jig. Corner joints need not be labeled since the corner is the location mark. Make sure the triangle on the front of the jig is pointing in the proper direction, and then reference the jig on one of the location marks and screw it to the workpiece. If the side panel is cupped at all, clamp on a strongback to hold it flat during the drilling process. Chuck the bit in your drill and determine the length depth stop you will need. The depth of the hole is critical because you want the dowel to force the glue that will collect in the hole's bottom back up along the grooves. Since the bottom of the hole left by a brad-point drill is domed, I drill the hole deep enough to leave 1/16 in. between the top of the dome and the bottom of the dowel. You can make a depth stop out of any scrap that's handy, but using large-diameter dowel stock will save bruised fingers if the stop suddenly decides to begin rotating with the bit. Drill through the stop's center and then proceed to drill *all* of the dowel holes; it's very easy to miss one hole and not notice it until everything is coated with glue and ready for assembly. Before removing the jig, insert a pencil or nail into each hole to be sure you didn't skip one.

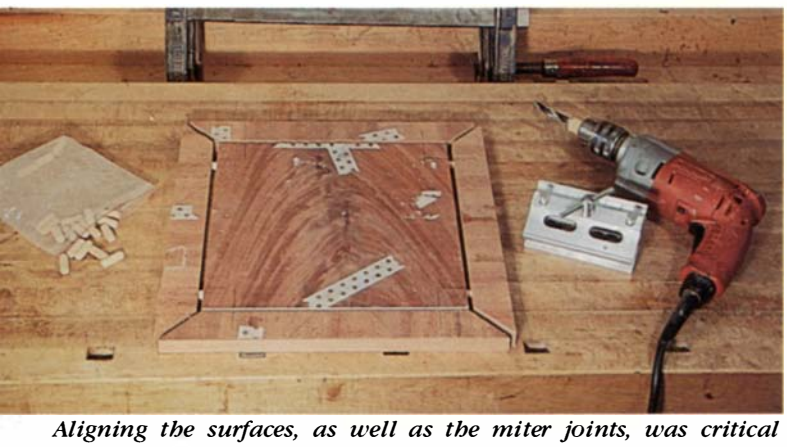
Drill all the cross-grain elements of the joints and then move on to the end-grain holes. The procedure is much the same, except you will need a different depth stop, and cupped panels may be more of a problem since you're mounting the jig on the end of the panel (see the top, left photo). Clamp a strongback in place to flatten out any cupping, and again check that all drilling has been completed before removing the jig.

Gluing up a dowel-joined carcase—After all of the mating holes have been drilled, it's advisable to dry-clamp the whole assembly to make sure you have all the clamps and cauls you'll need at glue-up. When dry-clamping, only use two or three dowels per joint; otherwise, disassembly may be very difficult and could possibly result in damage to the pieces.

Before rushing into gluing up the cabinet, give some thought to the order of assembly; you don't want to be left with the central partition in your hand after everything else is assembled. When gluing up with these grooved dowels, it's even more important than usual to make sure all the clamps and cauls are at hand. You must work as quickly as possible because the dowels' grooves expand and lock almost immediately when the glue hits them.

To avoid inadvertently gluing dowels into both portions of mating holes, I only glue them into the end-grain holes. Squirt some glue on a piece of 3/16-in.-dia. dowel and spread it around the inside of three or four holes at a time. Don't spread glue on the dowels because it will cause them to swell and will make insertion difficult, if not impossible. Besides, if your holes are drilled the proper depth, the dowel will force the glue back up along the pressed grooves. Tap the pins in place with a hammer and use a shopmade depth gauge to make sure all dowels are fully inserted, as shown in the center photo. Tap gently, especially when the

Photo: Author



Aligning the surfaces, as well as the miter joints, was critical when gluing the crossbanded-and-mitered frames around the veneered center panels of the doors. Inserting two alignment dowels in each edge made glue-up a simple task.

Drawing: Aaron Azevedo

dowel approaches full depth, because pounding too hard can cause the panel to split if the glue that's been forced into the bottom of the hole can't move up the dowel's grooves fast enough to relieve the pressure. Pay attention to how much glue squeezes out on the first few dowels that you insert and adjust the amount of glue until the squeeze-out is negligible; this way you won't have to clean up the excess glue before assembly.

After you glue dowels into the end-grain holes of all the parts, spread glue in all the cross-grain holes involved in the first phase of assembly and quickly mate the parts. For the commode, I glued the two horizontal partitions to the sides first and added the top in a second glue-up. Use clamping pressure to pull the parts together and then tap the joints with a rubber mallet to loosen any dowels that might have begun to lock into the holes prematurely. Work your way around the piece until everything is drawn up snugly. Check the assembly for squareness, and shift some clamps or apply diagonal pressure if necessary. If the holes were accurately drilled, a doweled carcase will usually square itself after clamping pressure is released; however, it is better to clamp everything square in the first place.

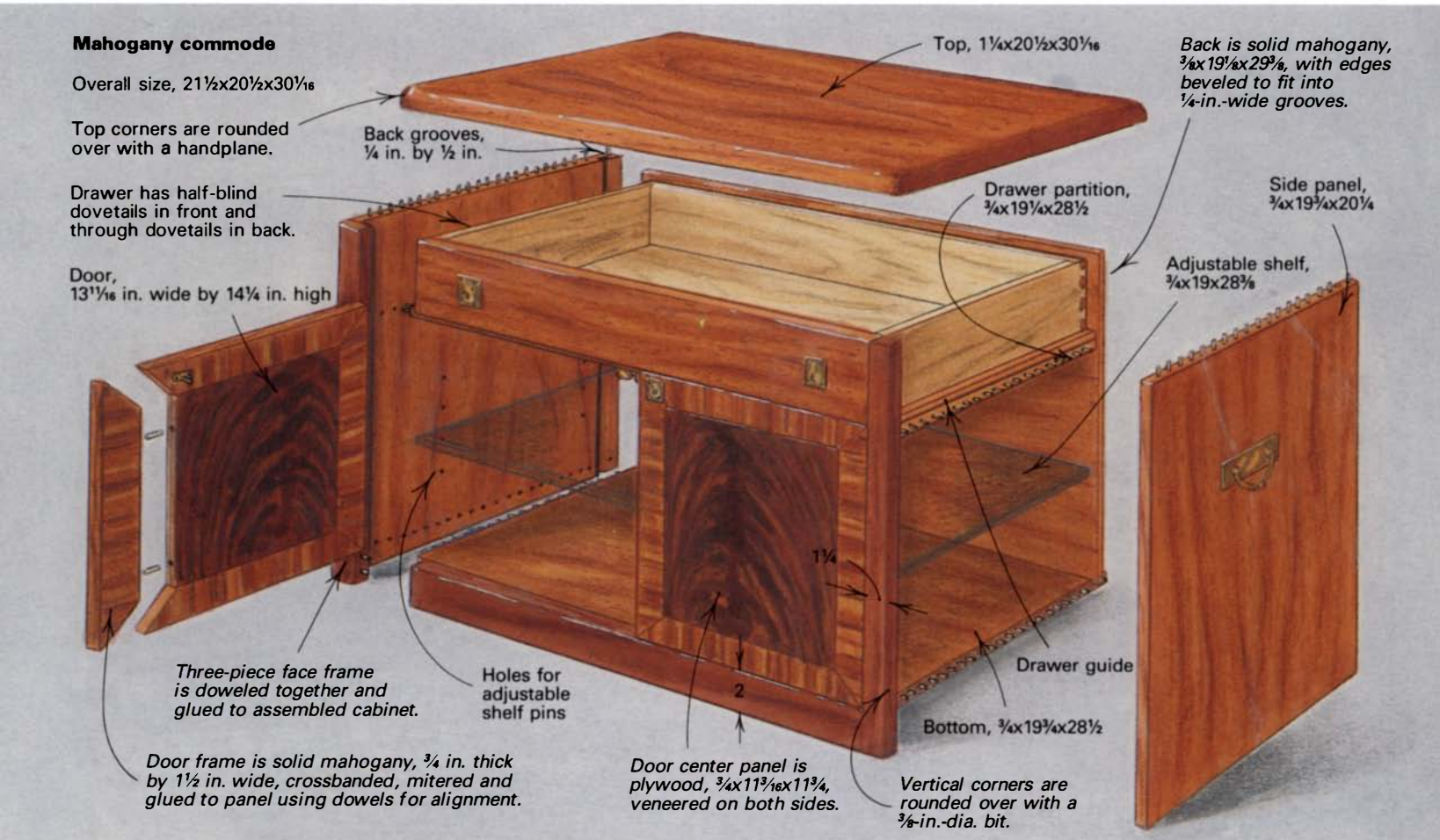
Doweling the face frame—To dowel face frames together, I use a Dowl-It 2000 jig, available from many Ace and True Value hardware stores. This jig aligns two holes, just under ¾ in. apart, along the centerline of the piece being drilled. It is fast, accurate and a great time-saver for face-frame work. As supplied, the jig does not have a mark for the centerline between the two holes. I applied a blank white label to the jig and marked both the hole centers and the centerline between the holes (see the photo at right on the facing page). This increased the usefulness of the jig considerably.

To make the face frames, first cut all stock to exact dimensions. Where practical, lay the assembled cabinet on its back, and place the face-frame components directly on the cabinet face, clamping them as required to ensure alignment. Using a straightedge, draw a perpendicular pencil line across each joint, registering the placement of each frame member. These registration marks need not be centered on the joint, but should be close since they will be used to align the doweling jig. Before removing the frame for drilling, make sure all the frame pieces are marked to indicate their location.

One by one secure each frame piece in a vise and clamp the Dowl-It jig to the piece so that the centerline between the jig's two holes aligns with the joint registration line that you drew on the wood, as shown in the photo at right on the facing page. Make a depth stop that will give the bit the desired penetration, and drill both holes. Assembly follows the pattern outlined for carcase doweling: test-fit all pieces, glue in all the end-grain pins, and then glue and clamp the frame together. To complete the cabinet, glue the assembled face frame to the front edges of the carcase.

Doweling for panel alignment—In order to avoid the potentially difficult and awkward process of gluing the mitered and crossbanded frame around the veneered-plywood door panels, I used dowels to align all the pieces accurately. After I veneered both sides of all the parts, I cut the miters on the frame pieces and dry-clamped them around the central panel. Then I marked for two dowel locations on each frame piece, as shown in the bottom photo on the facing page, unclamped the parts and used the Dowl-It jig to drill for the dowels. During glue-up I didn't worry about gluing the dowels because they are really just for alignment. With the dowels in place, it was easy to get the five pieces of wood, all coated with slippery glue, precisely lined up and clamped. This technique can easily be adapted for edge gluing long boards where aligning their surfaces is critical. □

Mac Campbell operates Custom Woodworking in Harvey Station, N.B., Canada, specializing in furniture design and construction.



Vacuum-Bag Veneering

Using the atmosphere as a low-cost press

by Gordon Merrick

For the first seven years of my career, I thought building with solid hardwoods was the only way to produce real furniture. But the prospects of a lucrative commission from a client who wanted a very ornate period piece opened my eyes to veneering. I was not far into the project, however, before I knew I had entered a whole new area of woodworking with its own set of rules, tenets and Murphy's laws. And all the cumbersome forms required for bending laminations and the plethora of clamps for pressing veneers only gave Murphy more opportunities to intercede. As this project progressed, I was continually impressed by the design freedom possible with veneering. But I was also having numerous problems every time I tried to maintain the alignment of the veneers to each other and to the substratum during glue-up and clamping. So I began trying various presses and clamping systems, searching for more efficient and effective ways to work.

Photo: Ed Chappell

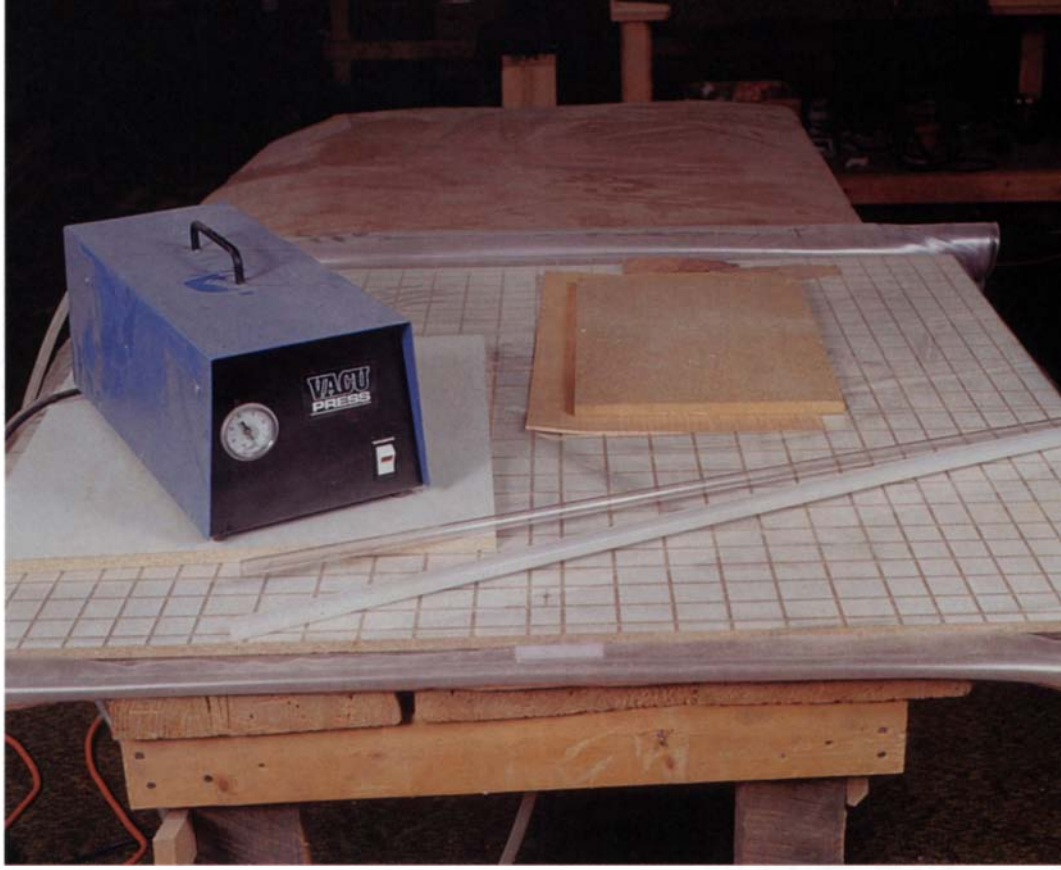
A vacuum-bag veneer press makes it easy to laminate large flat surfaces, like this desktop made by Merrick. Shaping and laminating its curved pedestals was also greatly simplified.

The early days—My first crude veneer press—some crowned 2x4s for battens, a couple of pieces of plywood for cauls and more than 75 clamps—was a nightmare of components and inefficiency. I soon switched to a shop-built 5-ft. by 10-ft. hand-screw veneer press. After investing three weeks and $3,000 in construction, the press solved some of the logistical problems with cauls, clamps and battens, and increased my success rate from 70% to about 80%. But veneers still slipped, causing misalignment and gaps, and I still found occasional air bubbles. And although the press was quicker and easier to use, I spent a lot of time and energy preparing it and cranking down the hand screws and then about 30 minutes recovering from the exertion.

In spite of these shortcomings, I veneered a lot of pieces with this press before I met Darryl Keil, a Freeport, Maine, woodworker who showed me the system he had made for using vacuum pressure to apply veneer. In the vacuum-veneering process, the veneered piece is placed inside a vinyl bag and a vacuum pump exhausts the air from the bag. Atmospheric pressure bears uniformly on all surfaces of the bag, as nature tries to eliminate the vacuum. Sealing the bag and turning on the pump is considerably easier than clamping down a mechanical press, and the even pressure yields greater success than is possible with other systems.

Developing a vacuum system—I was originally introduced to vacuum veneering by Greg Elder's article in *FWW* #56, in which he described the process for making a heavy-vinyl bag and placing the piece to be veneered inside. Once the vacuum is established, the pressure on the veneer can exceed 1 ton per square foot. Although intrigued by the prospects of this perfectly distributed pressure, I was skeptical that such a simple system could really work and so I dismissed the idea as just a pipe dream. But my attitude changed when I met Keil, who was inspired by Elder's article enough to develop his own vacuum press. His enthusiasm and claims of 100% success persuaded me to take a closer look. I was impressed, and Keil's willingness to help me design and build a system convinced me to set up a vacuum-bag press in my shop.

Because of my increasing interest in veneering, we designed the system shown in the left photo on the facing page to meet my then-current demands and future needs. The rack of 2x6s effectively doubled my capabilities and operated in the same amount of space required by the hand-screw press. A manifold with four outlets and a shutoff on each line provides the capacity to add two more bags to the original two-bag system. We also included a mercury switch to control the pump, automatically maintaining a vacuum of 20 in. to 22 in. of mercury (Hg), which translates into an atmospheric pressure of 1,400 lbs. to 1,550 lbs. per square foot.



***Above:** This two-tier vacuum-bag setup, with a 4-ft. by 8-ft. bag on top and a 5-ft. by 10-ft. bag below, doubles the author's veneering capacity. Clamps and battens seal the bag and a mercury switch on the wall maintains a constant vacuum.* ***Right:** The VacuPress can be set up easily and disassembled quickly. Ideal for the small shop with limited production, the quality and durability of this unit make it equally suited to full-time veneering operations.*

One drawback to this type of switch, however, is that it must be kept level and perfectly stationary, which means your setup can't be moved easily. With this system, I was able to laminate panels as large as 5 ft. by 10 ft. with just six clamps and two battens holding the end of the bag closed (see the left photo). Whereas loading and achieving full pressure in the screw press required more than 30 minutes, the same job in the vacuum bag is done in less than 10 minutes. Perfectly distributed pressure ensures even contact between veneer and substratum, eliminating bubbles and veneer slippage. The clear vinyl bag lets me check registration of veneer to substratum and even make minor adjustments while the vacuum is being drawn.

And now after pressing more than 10,000 sq. ft. of veneer with this system, I am about to replace it with the VacuPress, shown in the photo at right, which Keil is now producing in quantities. This is the only small-shop commercial system I'm aware of (available from Vacuum Pressing Systems, 10A South St., Freeport, Maine 04032; 207-865-0744). While custom bags can be made, four standard-size bags are available: a 44-in. by 72-in. bag, a 4-ft. by 8-ft. bag, a 4-ft. by 10-ft. bag, and a 4-ft. by 12-ft. bag. While the three large bags open at both ends, the smallest bag has an easy-loading side opening. An optional manifold lets you operate up to three bags from a single pump. The 20-mil vinyl bags are pliable enough to follow any contour when veneering or when forming compound curves, and they stand up to a lot of use. I've been using two bags daily for more than three years.

The VacuPress pump is a compact, self-contained unit that can be set up in your shop or transported to a job site. The only thing you will need to add is a grooved platen of ¾-in.-thick plywood or medium-density fiberboard (MDF). The grooves help draw the vacuum evenly throughout the bag, eliminating pockets of air that might cause the pump to cycle erratically. The pump, rated at ¼ HP, moves 5 cubic feet per minute (CFM) and draws the bag down to its maximum vacuum in less than three minutes. With a properly sealed bag, the pump recycles about every 20 to 30 minutes to maintain a vacuum between 21 in. and 25 in. Hg. This preset range applies more than adequate pressure for all veneering, marquetry and molding processes I've tried.

Although I have a permanent location for my vacuum press, you will appreciate the ease with which the system can be dismantled and stored, especially if you have a small shop. With my setup, I made one platen the recommended maximum size for each bag so that I can press any size piece up to the capacity of the bag. But unless you are veneering a lot of tabletops, you'll probably want to make a smaller 4-ft. by 4-ft. platen. This size makes the system much easier to set up and store, requires less space and handles 90% of your veneering requirements. You could also make a 4-ft. by 8-ft. platen if needed. The same bag can be used for both platens by rolling up and sealing one end to within a few inches of the smaller platen, effectively reducing the size of the bag (see the photo at right on the next page).

Even more than the portability and convenience of this unit, the feature I like best is the bag closure system, shown in the left photo on the next page. Cumbersome battens and clamps are replaced by hook-and-loop fasteners, a clear plastic ⅝-in.-OD rod and a plastic C-channel. The bag is sealed by first folding the open end around the plastic rod and then by pressing the hook-and-loop fasteners together to temporarily hold the bag closed until the C-channel is snapped over the rod.

Working in a vacuum—Although the vacuum system is easy to operate, here are some tips that can improve your success and minimize problems. First, ease the edges and sharp corners of platens, forms or cauls so they don't puncture the bag. As suggested in the operating instructions, I made my platen from plastic-laminated particleboard, which prevents glue squeeze-out from sticking to the platen. But I ripped wider grooves (¼ in.) and spaced them closer (about every 2 in.) than recommended because I found that wider grooves are not as easily blocked by dried glue and that air evacuation is quicker and more complete. Also, a piece of cardboard placed under the bag helps cushion and protect it from any debris.

Even with care, the bag will develop small holes and leaks through normal use, and if they are not patched, they can cause the pump to overwork. Although some leaks are evident either through their hissing sound or from more frequent recycling of the vacuum pump, harder-to-find pinholes can be tracked down by

wiping the bag, under vacuum, with a water-soluble dye. The vacuum draws the dye through the bag and reveals the leak. Do this test with just the platen in the bag so you don't stain any veneering projects. Once you locate leaks, patch them with any vinyl-repair kit while the bag is in use so the vacuum holds the patch in place.

When pressing veneers, you will need a caul to protect them from the platen or from the vinyl bag. If veneering both sides of a substratum at once, you will need two cauls. The top caul must be exactly the size of the substratum to ensure proper pressure because a caul that overhangs the substratum may break off or bow up, reducing pressure around the edge of the veneer. This means you may need to cut a new caul for each glue-up. The thickness of the caul is also important and will be determined by the application. A flexible sheet of ⅛-in.-thick bending plywood works best when veneering a curved surface. (Contact Atlantic Plywood Corp., 8 Roessler Road, Woburn, Mass. 01801; 617-933-3830 for your local source.) But for an extremely rippled veneer, you will need a ¾-in.-thick caul that won't conform to the shape of the veneer. The only failure I've had since I started using a vacuum bag came when I glued up badly warped mahogany crotch veneer with a ¼-in. caul on top. Because the ripples in the veneer were stronger than the caul, the caul bent around the veneer rather than pressing it flat, and I ended up with a rippled-veneer panel. Despite the admonitions of my veneer supplier, who said the vacuum bag wouldn't work, I tried again using a ¾-in.-thick caul and had perfect results.

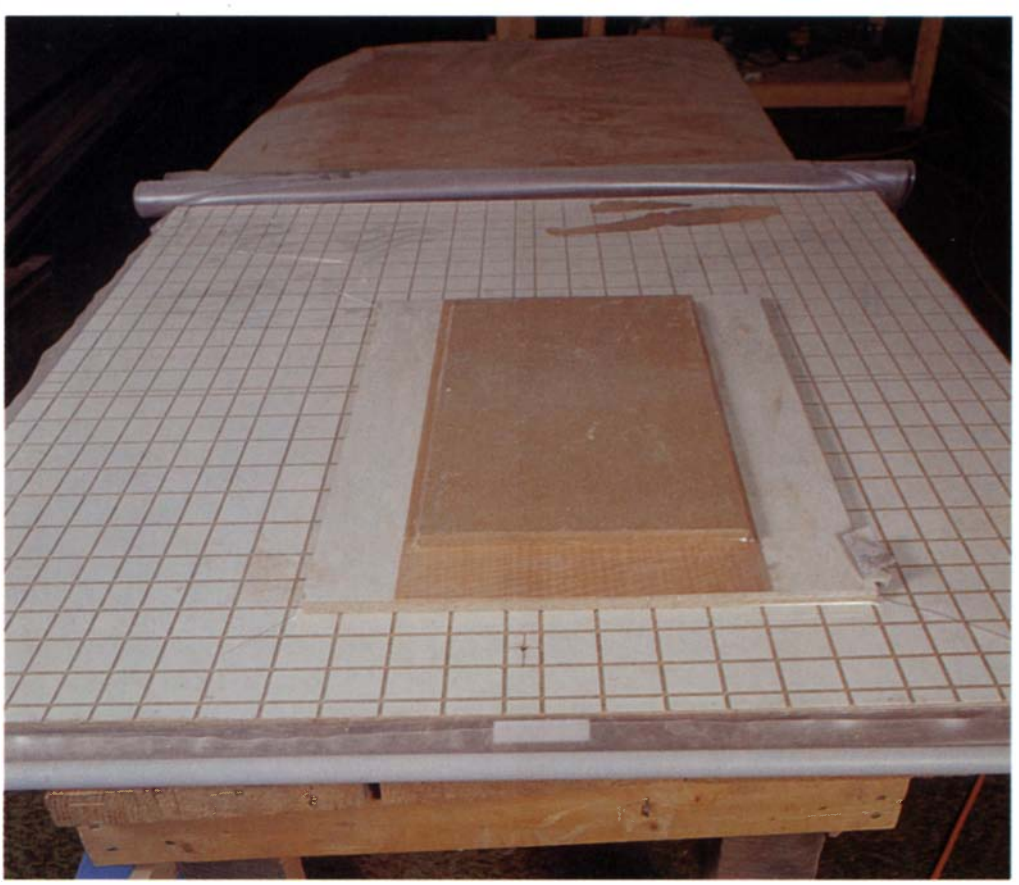
But because of these problems, I veneer one side at a time, with the caul on top of the platen, the veneer placed facedown on the caul and the substratum laid, with the glue-side down, on top of the veneer (see the photo at right). The caul does not need to be the exact size because the substratum distributes the clamping pressure evenly over its entire surface and the veneer is fully supported by the caul below it. To ensure good pressure on the veneered pieces, however, the caul should not be more than 6 in. to 10 in. larger than the substratum. With yellow glue, I leave the panel under pressure for about two hours; but if I need more time during glue-up, I use white glue and leave the panel clamped for at least three hours.

Vacuum veneering allows you to register the veneer to the substratum to within 1/32-in. tolerances. But to prevent any movement when I slide everything into the bag, I secure the veneer in place on the substratum with a small piece of masking tape. I recently veneered a large oval dining tabletop with 48 pie-shaped segments of Macassar ebony separated by a 1/16-in. band of inlaid pewter. Even with white glue, my working time was limited to gluing up four sections at a time. And after 12 separate glue-ups, the segments were all perfectly aligned for proper grain and pattern match.

Molding in a bag—Once I became familiar with the machine, I began to experiment with different possibilities, such as all the radius work for the desk in the photo on p. 68. When I was using the hand-screw press, this required constructing a male and female mold and allowing for the thickness of the material being formed between the two molds. For an oval or elliptical shape, building these molds is involved and complex. This prompted me to put just the male form into the bag and bend material over it. I was surprised to find that the uniform atmospheric pressure produced a smooth and perfect radius. In addition to saving significant time in building the molds, the single-mold process makes it easy to add exciting forms to your furniture. Be sure your molds have solid sides to avoid overstretching the bag and have internal ribs to avoid imploding the mold or sucking the platen into the bottom of the mold.

A bendable plywood product, known as wacky wood, wiggle board or bending lauan, works extremely well with the vacuum-forming process. Wacky wood is easily bent even to tight radii, and when two layers of the nominal ⅜-in.-thick material are laminated together with three alternating layers of veneer, a ¾-in.-thick structural panel can be molded into some very interesting shapes. □

Gordon Merrick builds custom furniture in Kennebunkport, Maine.



***Above:** The VacuPress closure system seals the bag securely and quickly. The bag is wrapped around a rod and hook-and-loop fasteners hold it until the C-channel is attached.* ***Right:** When laminating one side at a time, Merrick places the veneer on top of the caul, which is usually larger than the applied sheet. Reference marks on the substratum and veneer can be aligned through the bag. For smaller pieces, the bag can be rolled up to within 4 in. of the platen.*

Storage Box for 35mm Slides

Simple, stackable, finger-jointed trays

by George Levin

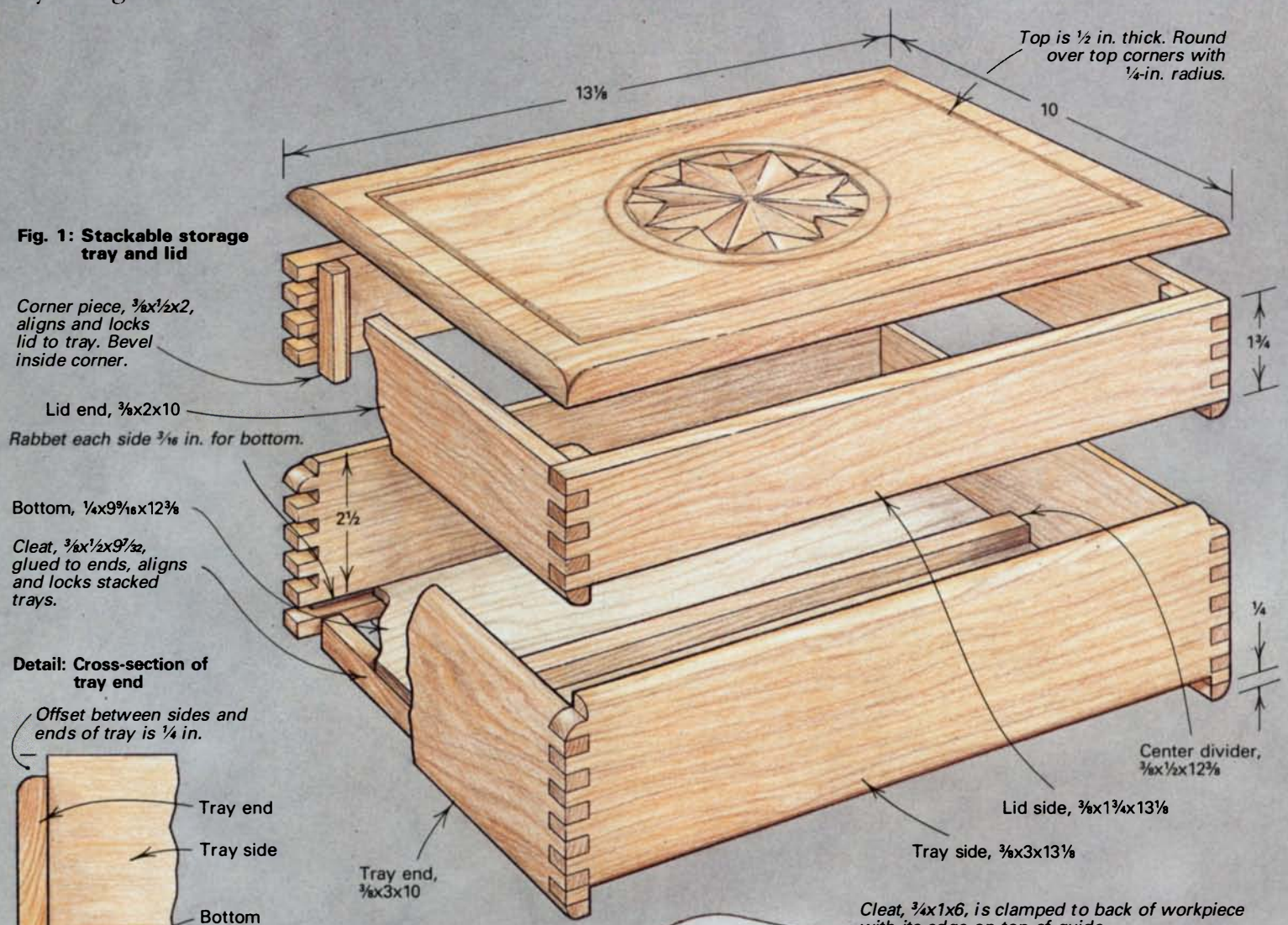


Fig. 1: Stackable storage tray and lid

Detail: Cross-section of tray end

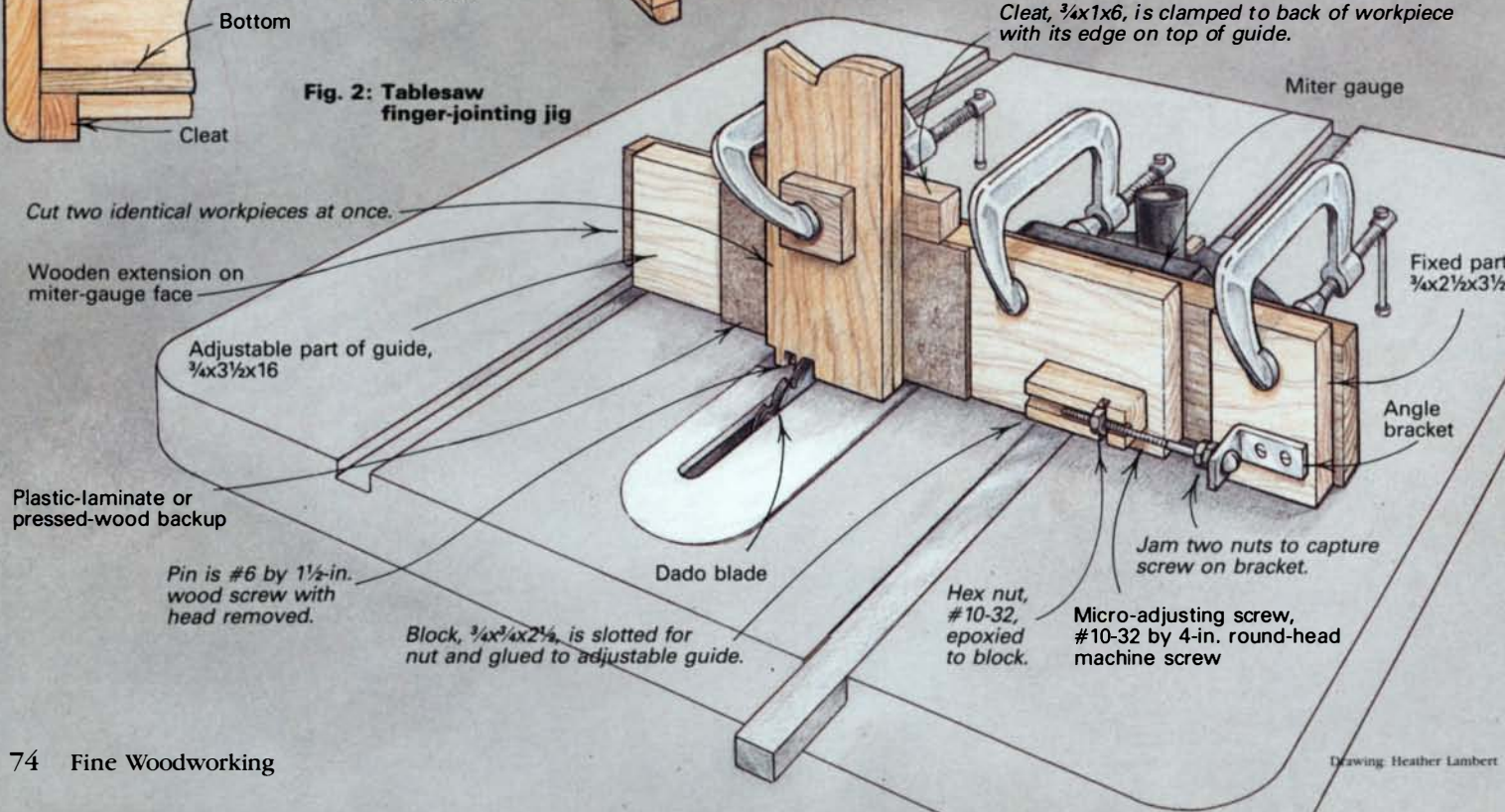


Fig. 2: Tablesaw finger-jointing jig

Drawing: Heather Lambert

After accumulating more than 100 rolls worth of color slides, I needed something better than shoe boxes to store them. So I designed and built the stacking trays shown here. Any number of trays can be stacked in any sequence underneath the decorated lid, and as I acquire more slides, I can make additional trays. Although the trays are for slides, you can increase their height to accommodate audio cassettes.

Construction is fairly simple. The sides are held together with finger joints that I cut on the tablesaw with an adjustable shop-made jig I'll tell you about. The bottoms fit in rabbets in the sides and butt against the ends, where they are supported by cleats that hang down so that the individual boxes will nest into each other. Although I've embellished the lid, it can remain plain or you can decorate it to suit your taste.

Preparing stock—I made the sides and top with quarter-sawn straight-grain white oak so that grain and color are uniform in each tray, like those in the photo at right. You can make the tray bottoms from matching or contrasting plywood or from solid stock.

I planed the wood for the sides and ends of the trays to ⅜ in. thick and for the top of the lid to ½ in. thick, and then ripped and jointed the side and end pieces to their finished widths (see figure 1). Before cutting the finger joints, I cut the sides and ends ⅛ in. longer than called for so that the fingers overhung 1/16 in. at each end. I trimmed these flush after assembly. I like the grain to wrap around the sides of the box, and so I cut the sides and ends in sequence from a single board and then marked the mating pieces to simplify assembly.

Cutting the finger joints—My tablesaw finger-jointing jig, shown in figure 2, can be adjusted to cut fingers from ⅛ in. to ¾ in. wide, which is the maximum width of my dado blade. It has two parts: one is fixed, which I clamp to the saw's miter gauge, and the other is an adjustable guide, which has a ⅛-in.-dia. pin that registers against one side of each successive finger. The pin locates the dadoed space and sets each finger's width. A micro-adjusting screw joins the two parts of the jig. By turning the screw, you can make fine adjustments to ensure that the fingers and spaces between them are equal.

To adjust the guide, I first set the dado blade width (¼ in.) and height (7/16 in.). Then before clamping the jig to the miter gauge, I adjust the distance between the pin and the dado blade until it's the same as the width of the blade. This distance determines the width of the fingers. I make a series of trial cuts on two pieces of scrap and fine-tune the screw until the fingers on the two pieces fit together snugly. Each time I make a trial cut, I clamp the adjustable guide to the miter gauge. Once I am satisfied with the adjustment, I leave the guide clamped in place and cut all the finger joints.

Cut the joints in two identical workpieces (such as opposite sides) at the same time by clamping them together. First align the workpieces, square them to the saw table, and clamp a ¾x1x6 cleat on the back with one of its edges against the top edge of the jig's adjustable guide. When cutting the fingers, the cleat rides along the top of the guide to maintain the workpiece perpendicular to the saw table. Be sure to use a clamp pad on the front of the workpieces so you don't damage the surfaces. I attached a scrap of plastic laminate or thin pressed wood to the face of the guide with double-faced tape to act as a backup and prevent tearout on the back of the workpiece. Replace the backup when it's too worn to be effective.

In this design, there is a finger on at least one edge of each piece and you should begin cutting the joints by holding that edge against the guide's pin. But if your design calls for a space on both edges of a piece, for the initial cut you must offset the workpiece from the pin by the ¼-in. thickness of the finger. You can do this by holding a ¼-in.-thick shim between the edge of the workpiece and the pin. After cutting a space, shift the workpiece so that the pin is in the new space and is registered against the next finger; then make the remainder of the cuts in the usual manner.

This nest of trays for slides is quarter-sawn oak with finger-jointed corners that were made on the tablesaw with a simple jig. By increasing the height ¼ in., the trays will accommodate audio tapes.

With the dado blade width still set at ¼ in., reset its height to 3/16 in., remove the miter gauge and jig, and cut the groove in the sides for the tray bottom. Carefully align the tablesaw fence so that the end of the groove will be hidden between the bottom two fingers when the tray is assembled. Remember, only the sides are grooved. Then finish the top and bottom edges with a ¼-in. roundover bit in your router. You must stop short of the ends on the bottom edges of the sides since the bit must not cut the bottom finger. Finish rounding over this edge flush to the inside face of the ends by hand-sanding after assembling the tray. The top fingers of each side are also finished flush by hand and bullnosed on the ends.

Assembling the box—Next, cut the tray bottoms to size—their width equals the inside width of the tray plus 5/16 in., and the length equals the inside length of the tray. Then glue up each tray, applying glue only to the finger joints. Be careful not to glue the bottom to the sides or ends because it should be free to allow wood movement. Complete the tray by cutting and gluing the ⅜x½x12⅜ center divider to the inside of the bottom and the ⅜x½x9 7/32 cleats to the ends only. I cut the cleats about 1/32 in. less than the interior width of the tray so that the trays nest easily. The ends of the fingers on the corner joints can now be trimmed flush, which I did on my stationary belt sander.

Glue up the sides and ends of the lid as you did the tray, but don't trim the fingers until you glue the top in place. I cut the top of the lid slightly larger than its exterior dimensions and trimmed it to size after assembly. Before assembly, though, I carved the decoration on the top. After gluing up the lid, trim the ends of the fingers and the top flush on the belt sander and round over all the top and bottom edges of the sides with a ¼-in.-radius roundover bit. Finally, cut and glue the ⅜x½x2 corner pieces in place. These index the lid to the tray and aren't meant to strengthen the corners.

Finishing—Before applying a finish, I sand all surfaces with 100-grit and then 150-grit paper. I coat everything with a penetrating oil, such as Watco (available at paint stores), rubbing with 0000 steel wool between applications. Three coats are more than adequate for a durable finish. Paste wax is the finishing touch and smells good too. □

George Levin is a self-taught woodworker living in Seattle, Wash. Photo by author.

Wall Sculptures

Turning big and burly

by Dennis Elliott

The author's wall pieces get much of their visual impact from the orderliness of the circular design being superimposed onto the chaos of the maple burl's natural edge. On this piece Elliott added a turned alabaster center and burned one of the rings with a propane torch.

I've been turning and selling large wooden platters for some time. I suspect that some of them end up as shallow fruit bowls, while those purchased by less-practical folks probably function only as objets d'art. Either way, a big and beautiful wooden plate looks great in the middle of the dining-room table. The only problem is what to do with it when you use the table. Seeking a solution to this problem led me into a new area of turning: wall-hung sculptures.

But wait, I'm getting ahead of my story. My most popular platters are turned from big-leaf maple burls, which I get from a supplier in Oregon. The burl comes in 3-in.-thick slabs that usually measure about 2 ft. to 3 ft. in diameter. Most of the slabs have the rough natural edge partway around the perimeter, as well as one or two straight edges from chainsaw cuts. Normally I bandsaw out a complete circle, which eliminates both the natural edge and the sawcuts, and then turn a platter from the circle. However, a few months ago, a shipment arrived that included several slabs that were cut from a very large and fairly symmetrical burl and were completely surrounded by the natural surface of the burl. Well, there was no way I was going to cut out a circle and throw away the completely intact natural edge just to make a platter. I realized that this was an opportunity for me to make something special: a nice, smoothly turned platter that would show off the spectacular figure of the burl and contrast beautifully with the prickly irregularity of the naturally sculpted edge (see the left photo on the facing page).

So I set about turning these large gems of the forest into decorative platters. They were very successful, both in the satisfaction they gave me and in the sales department. But I was getting to the bottom of the pile and even though the remaining slabs still had an intact natural edge, they had other problems. For one thing, they had bark inclusions, which would result in irregular holes in the surface of the platter; I find this condition undesirable, even on a semi-functional platter. In addition, I was left with the larger and more irregularly shaped slabs. I think that a 3-ft. platter is a bit overkill, and the remaining slabs were far from circular—more like 35 in. by 25 in.

While thinking about how to use these large, oddly shaped pieces to best advantage, I came up with the idea of making purposely nonfunctional wall pieces. I had already begun to rout a keyhole slot in the bottoms of the natural-edge platters so they could be hung on a wall when not on a tabletop; this combination of functions prompted me to name them "Vertizontals" (see the top, left photo on the facing page). So it was a short mental leap to eliminate the tabletop function entirely and use the larger-than-platter-size slabs to make wall-hung sculptures with no pretense of being functional (see the photo above and the top, right photo on the facing page). Turning these wall pieces is pretty straightforward. Of course you need a heavy-duty lathe to handle the large size and out-of-balance weight of the spinning slabs (see the sidebar). But the actual turning doesn't require any exotic techniques, and I've developed a step-by-step method that gets the job done quickly and efficiently.

Turning irregular burls—After selecting a slab, I decide whether it will be a functional platter or a wall sculpture. Since the slabs

(continued on p. 78)

Photo: Dennis and Iona Elliott

Photos left and right: Dennis and Iona Elliott

The platter above is a "Vertizontal"; a keyhole slot on its bottom allows it to be displayed (and stored) vertically on a wall when not in use horizontally on a table. The sculptures at right and on the facing page, which are both about 3 ft. at their widest points, are made from burl slabs that were too large or irregular to be used as platters.

A 3,000-lb. portable lathe

I was in the market for a bigger lathe—one that could handle the large burl slabs and whole log sections that I was struggling to turn on my 12-in. spindle lathe. When I saw fellow woodturner David Ellsworth's huge 4,000-lb. lathe, I immediately asked him where I could get one like it. He said that his lathe was custom built by Jim Thompson of Greenville, S.C., and that Thompson had a new, portable model in the works. I wasn't interested in anything portable, but on Ellsworth's insistence I called Thompson to find out more. As it turned out, he was working on a videotape to demonstrate the portable lathe's capabilities. I ordered a copy of the tape and after viewing it, I called and ordered the machine on the spot.

The lathe gets its portability from the ease with which its bed portion can be disassembled from the headstock, motor, etc. Both base sections are made from ⅜-in.-thick steel plate formed and welded into boxes that can be filled with sand. Empty, the lathe weighs 1,500 lbs.; but when filled with sand, it tips the scale at about 3,000 lbs., giving it the stability needed for turning the large-size pieces that it's capable of holding. It will swing an 18-in.-radius piece over the bed and turn 42 in. between centers.

Everything about the lathe is big and heavy, but the machine is designed to be effortless to use. The tool-rest base and tailstock move along the tubular steel bed on precision radial bearings and can be locked to a central feed screw that runs the length of the bed. When locked in position they will not slip, no matter how much pressure is applied to them. But they can be moved along the bed together or independently by turning the feed-screw handwheel. The tailstock barrel can be removed and replaced by a 3-ft.-long boring bar, which will accept different size cutters. With the boring bar in place, you can advance the tailstock with the feed screw and hollow out the center of even very tall faceplate-mounted pieces. After this initial hollowing, you can move the tailstock out of the way and straddle the bed, as shown below, to complete the hollowing.

The 5-HP, 1,725-RPM motor drives a "Dana" hydrostatic speed variator, which allows you to start the motor under no load and then go from 0 RPM to 1,800 RPM clockwise or counterclockwise with constant torque. You can bring the work to a halt without turning off the lathe by dialing the speed back to 0, or you can stop and start the lathe at whatever RPM you're using. The on-off control is mounted at eye level on a swiveling arm, allowing you to place the switch wherever you happen to be working on the lathe.

The handwheel is designed to accept any number of small magnets so that with a little trial and error, you can counterbalance an out-of-balance workpiece. However, I must confess that I've never used this feature; I figure that if I can get a 3,000-lb. lathe to vibrate, I should just slow it down a bit.

I could go on about this monster lathe that combines mammoth bulk with hummingbird precision, but I've probably made my point. Of course this dream machine doesn't come cheap; it costs about $11,000. But it delivers what it promises and does it all. For more information on Jim Thompson's lathes, write to him at 1021 Miller Road, Greenville, S.C. 29607. *—D.E.*

Elliott sits astride the custom-made lathe that makes it possible for him to turn these large irregular pieces. In spite of its size, the lathe can be made portable by unbolting the bed portion from the headstock. After the lathe is assembled, the base can be filled with sand, which increases its weight to 3,000 lbs.

With a faceplate mounted on what will be the front of the sculpture ***(above)****, Elliott cleans up the slab's back side. It takes concentration and a steady hand braced against the tool rest to keep the tool's cutting edge in the same plane while the spinning slab's jagged edge moves in and out of contact with the tool* ***(below)****.*

Below: *The author has removed the faceplate from the front of the slab and has mounted a larger faceplate on the back side after turning it true. The aluminum bar with the pointed rod is used to center the faceplate on an indentation that was made with the tailstock center just before removing the workpiece from the headstock.*

are cut from roughly spherical burls, all but the center slab have a naturally beveled edge. If the slab is to be used as a platter, I make the finished side the one away from the bevel of the natural bark edge, because this makes it easier to pick up the platter. For the sculptures that are meant only to hang on the wall, I use the other side to take advantage of the natural irregularities that lie just beneath the bark. Since I will need to mount a faceplate on the slab, I often have to smooth the chainsaw marks on the surface with a small power planer so the faceplate will sit flat. Then I pick off all the bark that will yield to a large screwdriver or a pneumatic chisel. This job can be very easy or very difficult depending on what season the burl was cut and on how long it has dried. The important thing at this point is to remove all the large pieces of loose bark so they won't fly off when turning the slab on the lathe. Later, after the initial turning process, I sandblast the natural edge to remove the small pieces of bark tightly embedded in the crevices of the burl's prickly edge.

With the burl flattened and most of the bark removed, I locate what will be the center of the turned portion. This is usually not the actual center of the slab as determined by measurements, but is rather the point of visual balance. To find this point, I just play around with the compass until I find a circle that relates well with the natural edge. I draw this circle onto the slab and mark its center with a hammer tap on the point of the compass. I center my faceplate with the aid of a short length of threaded aluminum bar—a by-product from milling out the faceplate that I salvaged from the machinist. To register the faceplate precisely at the center of my desired circle, I thread the bar into the faceplate and then insert a slender sharpened rod through a hole in the bar's center, as shown in the bottom photo.

I mount the piece on my lathe and flatten the back side, as shown in the top and center photos. I slowly increase the lathe's speed until the overhead switch vibrates slightly and then I slow it down a little. The average speed for turning these burls is about 300 RPM to 500 RPM. You can see from the photos at left that as the slab spins, the jagged edge moves into and out of contact with the cutting edge of the tool. Keeping the cutting edge in the same plane as I work toward the edge of the burl requires a steady hand registered against the tool rest and steady nerves. Make no mistake about it, this type of work can be dangerous. If I'm feeling at all anxious or nervous about anything, I will not turn these pieces.

After cleaning up and flattening the back side, I run the tailstock forward until its point marks the slab's center. This gives me a point of reference for mounting a faceplate on this side at the center of my desired circle. I then remove the faceplate from the headstock, unscrew the faceplate from the slab and mount a larger-diameter faceplate on the just-flattened back side (see the bottom photo). It's not entirely necessary that the new faceplate be larger, but it is critical that the screw holes of the two faceplates do not line up with each other. If the mounting screws in the second faceplate were in the same circle, I might hit them with the tool when making the deep cut to remove the holes left from the first faceplate (see the center photo on the facing page). The circle of mounting-screw holes in my second faceplate has a 1 in. larger radius than those on the first faceplate; this way, these screws will be safely anchored in the raised ring adjacent to the deep cut that removes the first faceplate's screw holes.

Once the work is back on the lathe, I make about a 1-in.-deep cut at the original compass circle and then taper the area outside this circle to the edge, again taking great care as I work into the jagged zone. I then use a ¼-in. (6mm) roundnose scraper (a parting tool will also do) to define and visually separate the center circle from the tapered outer area. Before turning the center section, I shut off the lathe and use the tool rest to lay out the radiating V-grooves that I usually carve in the outer tapered area (see the left photo on the facing page). There's nothing tricky about

Left: The radiating lines of the carved V-grooves are laid out by rotating the workpiece in small increments and drawing along the tool rest.

Center: Elliott uses a gouge to cut the concentric rings that form the central design. He develops the pattern as he works by alternating wide raised areas with narrow beads and V-grooves. The small ring near the slab's center was cut with a narrow gouge in order to eliminate mounting-screw holes left by the faceplate.

Top, right: When the turning is nearly complete, the author takes the piece from the lathe and carves the V-grooves with a reciprocating gouge, which runs off a flexible shaft chucked into the multipurpose tool in the background.

Bottom, right: A flap sander is ideal for breaking the burl's sharp edges and spikes without altering their basic shapes. After carving the V-grooves and just before this final sanding, the natural areas were sandblasted to remove any remaining bark.

turning the center section; I just make it up as I go along. The crispness of the small beads and grooves would be easily lost if they were sanded, and so I cut every detail with sharp gouges, aiming for clean, precise lines right off the tool (see the center photo).

When I'm sure the turning is about 90% complete, I take the piece off the lathe and carve the V-grooves with a reciprocating gouge, as shown in the top, right photo. The V-grooves draw the eye to the center of the piece and their hand-carved quality adds another texture, one that aptly fills the space between the smooth orderliness of the turned rings and the natural chaos of the outer edge. After carving the grooves, I sandblast the rough burly edges to clean off any remaining bark or paper-like remnants of the cambium layer. Then, the piece is mounted on the lathe one last time so I can redefine the ¼-in.-wide groove between the carved V-grooves and outer ring. I also take this opportunity to add more detail to the central area if the spirit moves me to do so. Now I dull the sharp edges and spikes of the natural areas with a flap sander chucked into a portable electric drill, as shown in the bottom, right photo. Finally, I smooth the raised rings of the center area with a pneumatic sander, being careful not to soften crisp edges.

I've found that I can further enhance the textural variations by oiling only the turned portions (see the finished pieces on pp. 76-77). I carefully apply about five coats of Waterlox oil (available from most building-supply stores) or Sealacell, a two-part finish available from Craft Supplies USA, 1287 E. 1120 South, Provo, Utah 84601. The only thing left is to decide which end is up. I do this by trial and error. I drive a nail in the back at various places and hang the piece off the bench until the center of gravity is just right for the visual balance of the sculpture's abstract shape. I then mortise in a large brass keyhole bracket that I order from Larry and Faye Brusso's Fine Cabinet Jewelry Co., 3812 Cass-Elizabeth, Pontiac, Mich. 48054; (313) 682-4320.

If you have a lathe that can handle a project such as this and decide to tackle it, be forewarned; turning pieces with irregular edges and voids in the surface can be very dangerous. You can't be in a hurry and you should turn at a slow speed. Keep your tools sharp and always wear face and head protection. When the piece is spinning, the outside edge will either disappear or will look like it is completely round; so a large, well-anchored tool rest is essential to support and guide the tool when you're working toward the edge. In addition, if you keep your hands behind the tool rest at all times, you won't risk getting severely mashed knuckles. Don't do this kind of work in an environment that could pose any distractions. Finally, make sure you are in the right frame of mind; whenever I'm turning large pieces, I borrow a line from the old *Honeymooners* television show and run it like a broken record through my head: "If I'm not careful, 'One of these days...pow, right in the kisser'!" □

Dennis Elliott is a woodturner in the Brookfield, Conn., area.

Making a Frame-and-Panel Bed

Subtle details enhance a basic bedstead

by John McAlevey

Recently I was asked to design a headboard that could be attached to a standard, adjustable steel bed frame. These bed frames are practical and fairly attractive when fitted with a nice headboard, but to me, they just don't compare with a wooden bedstead, complete with headboard and footboard. As the clients and I conferred on possible designs, I urged them to go with an all-wood bedstead, and they eventually agreed and decided to use solid cherry.

I began making sketches, exploring ways to take advantage of this beautifully figured wood in the large headboard and footboard, which had to be at least 60 in. wide to accommodate a queen-size mattress. I had recently designed and made a couch with frame-and-panel ends, which the clients had seen and liked when they visited my shop. As I sketched my ideas, I decided to develop a similar frame-and-panel system, as shown in the top photo on the facing page. Basically, the bed posts serve as stiles for the panels in the headboard and footboard, and the crossmembers, which set the width of the bed, complete the frames that hold the panels. The bed rails that run the length of the mattress can be joined to the posts with standard knock-down bed hardware (see the bottom, left photo on the facing page) or with T-nuts, bolts and decorative caps.

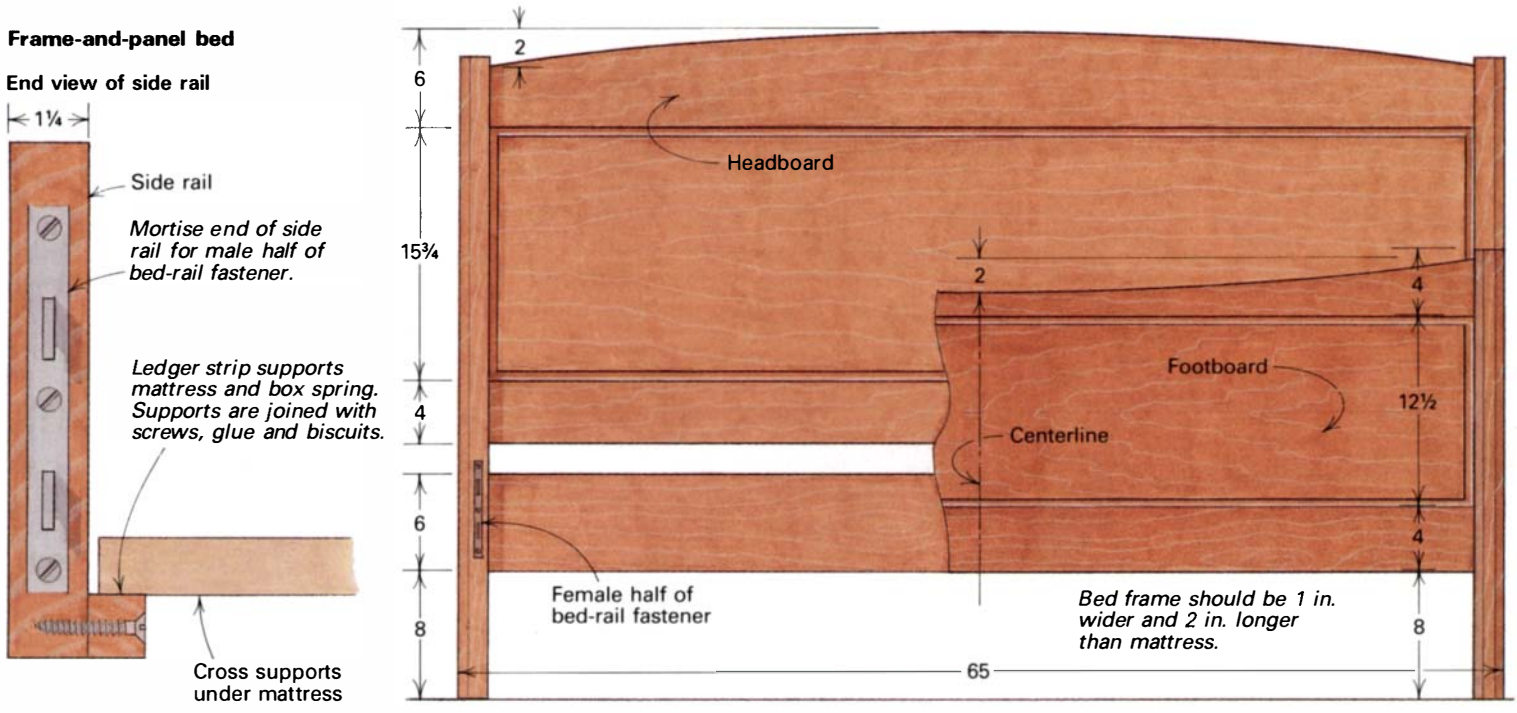
Having decided on the type of construction, I continued sketching and experimenting with the shape of the top crossmembers on the headboard and footboard. A straight horizontal line across the top of the headboard lacked interest. So I drew concave and convex lines, and eventually decided that a convex curve on the headboard and a concave curve on the footboard would provide a linear contrast that would give the piece the look I was after. I also decided to chamfer the posts heavily to make them more interesting and appealing.

As is my usual practice, I rendered a final drawing that incorporated all of the design details and submitted it to the clients for approval. At this time, if the clients have any suggestions or changes to propose, we discuss them and make adjustments accordingly. In this case, the design was approved and I gave the clients an estimated delivery date. I also usually tell my customers when I intend to begin work on their project because sometimes they like to see the work in progress. I encourage this, although not to the point of them hovering over my shoulder during the whole job.

Bed joinery and hardware—I selected ¾ stock for the bedposts and ¾ stock for the rails and crossmembers, and then milled them to the dimensions given in the drawing. A queen-size mattress generally measures 60 in. by 80 in., but bed sizes can vary from manufacturer to manufacturer. So make sure you measure the length, width and thickness of your mattress and box spring before cutting out stock; you may have to adjust the dimensions.

As an economy move, whenever I cut stock to length, I crosscut the longer pieces first, hoping to get my shorter pieces from the cutoffs. From the ¾ stock, I ripped 3-in.-wide pieces for the bedposts.

Frame-and-panel bed



Drawings: Vince Babak

Two 40-in.-long posts were needed for the headboard and two 28 in. long posts were used for the footboard. For the bed rails, I ripped two 8-in.-wide strips from my 1¼-in.-thick stock and then cut each piece to a length of 80½ in. All of the crossmembers for the headboard and footboard are 61 in. long. The headboard required two 6-in.-wide crossmembers and one 4-in.-wide crossmember, and the footboard needed two 4-in.-wide crossmembers (see the drawing). While I'm rough cutting stock, I also mill and glue up enough stock for panels. To make sure everything fits together, though, I don't cut the panels to size until after the frames are completed.

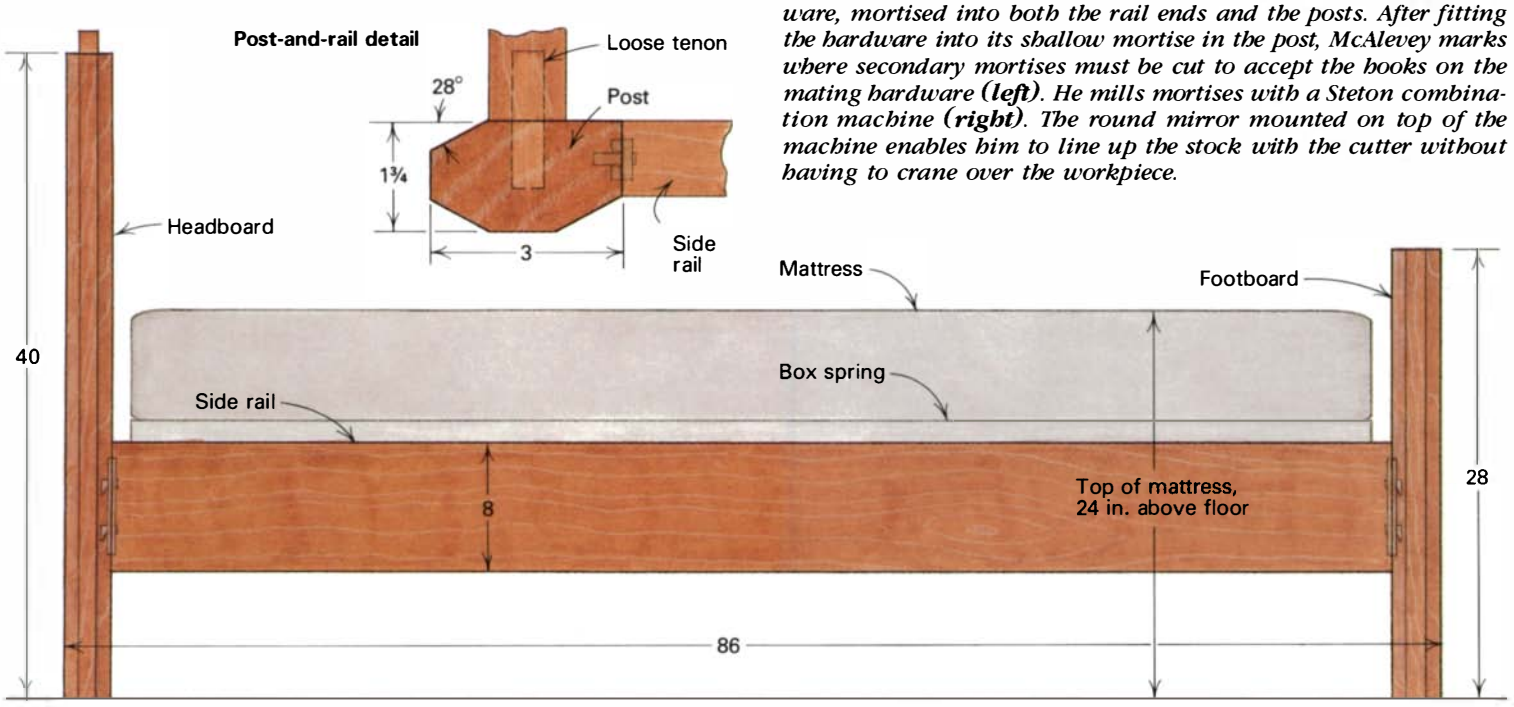
After all the pieces were cut to width and length, I laid out the joints. The headboard and footboard components are held with loose mortises and tenons. I have found that this loose-tenon system has several advantages over more conventional mortises and tenons. First, I can measure directly from my drawing and don't have to worry about forgetting to add the lengths of the tenons to pieces that need them. Second, I can plane my tenon stock to the exact thickness needed, in this case ½ in., and so my tenons are more accurately sized than those I cut with various tablesaw or shaper jigs. The bed rails are joined to the headboard and footboard with wrought-steel 6-in. bed-rail fasteners, which I ordered from The Woodworkers' Store, 21801 Industrial Blvd., Rogers, Minn. 55374-9514. These bed-rail fasteners are very strong, and they also make it easy to take the bed apart for shipping and moving.

I am fortunate to have a Steton combination machine (see the bottom, right photo), which provides me with a jointer and a thickness planer, as well as a horizontal mortising machine. This is a definite plus for making loose mortise-and-tenon joints. The stops on the mortiser can be adjusted to control the width and depth of the mortises, and so the required layout is not very extensive. Since loose tenons are fitted into mortises in the ends of the crossmembers, I don't have to worry about any tenon layout.

The joints were cut in two steps. First I cut mortises on the ends of the crossmembers and then used them to mark out the mortise locations on the four bedposts. Once the mortising machine is set up, the only reference I need is a centerline for each mortise. But in this case, I also marked the pieces to remind me which face of the wood will be up on the mortising table. By working off the same face all the time, it doesn't matter if my mortises end up being slightly off center. If you don't have a horizontal mortiser, you can, of course, cut

Convex and concave lines dress up the wide headboard and footboard of McAlevey's frame-and-panel bed.

Bed rails can be joined to posts with standard metal bed hardware, mortised into both the rail ends and the posts. After fitting the hardware into its shallow mortise in the post, McAlevey marks where secondary mortises must be cut to accept the hooks on the mating hardware ***(left)****. He mills mortises with a Steton combination machine* ***(right)****. The round mirror mounted on top of the machine enables him to line up the stock with the cutter without having to crane over the workpiece.*



the mortises with more traditional methods: on a drill press with a mortising attachment or with a plunge router and jig, like the one Tage Frid used in "Routing Mortises," *FWW* #30.

Once all the crossmember mortises were cut, I milled enough stock for the loose tenons. After crosscutting the tenons to length, I glued them into the mortises in the crossmember ends. I lightly clamped across the sides of the crossmembers when gluing the loose tenons in place, and usually got a light glue squeeze-out. I don't know if clamping is really necessary, but it is easy enough to do, ensures a good glue bond and doesn't take much time.

Next, I laid up the headboard and footboard on my benchtop and transferred the mortise (now tenons) centerline marks to the posts at the appropriate heights and locations. After mortising the posts (as shown in the bottom, right photo on the previous page), I routed the grooves for the panels. But before I cut the panels to their final dimensions, I dry-assembled the headboard and footboard and measured for the length and width of the panels. I always consider the time of year and the humidity in the shop and allow for expansion or contraction across the grain of the wood. Then I cut the panels to size and profiled the perimeter of the panels with a custom-made shaper knife that I ordered from the Freeborn Tool Co., 3355 E. Trent Ave., Spokane, Wash. 99202.

Once I was sure the panels fit properly in the headboard and footboard, I bandsawed the convex and concave curves on the two upper crossmembers. I laid out my curves by anchoring the ends of a thin strip of oak with a spline weight at each end of the rail, bending the strip until I got a pleasing curve and then tracing along the curve with a pencil, as described in *FWW* #71, pp. 42-45. After bandsawing the curves, I cleaned up the edges with a compass plane, a block plane and scrapers.

The 1¾-in.-thick by 3-in.-wide bedposts are heavily chamfered on three of the four vertical corners to add visual interest to their otherwise rectangular shape. I set the angle of my chamfers on the tablesaw using a bevel gauge. Because the angle of the chamfer is greater than 45° (it's about 62°), I had to run the posts on edge through the tablesaw with the blade tilted 28°. Always use push sticks to keep your hands out of harm's way during this operation. To remind myself that I am chamfering only three of the four corners, I determined the orientation of all four posts and marked the corners to be chamfered ahead of time.

A well-tuned Stanley #80 scraper quickly cleans up bed parts and even makes quick work of cleaning up sawmarks on the chamfers of the cherry bedposts.

After chamfering the posts, I made the mortises for the bed-rail fasteners with a ⅝-in.-dia. bit on my horizontal mortiser. The mortises on the rails and posts are shallow, about ⅛ in. deep, to match the thickness of the fasteners. The next step is to square the corners of all eight mortises with a chisel. Don't panic if you discover that the male half of the hardware doesn't sit just right in the bed-rail mortises—you haven't made a mistake. If you recheck the fasteners, you'll see that the hooks that engage the two halves of the hardware protrude through the back side of the metal plate. I chucked a ¼-in. bit in the mortiser and made a narrow vertical groove, about ⅜ in. deep, in the center of the post mortises to allow clearance for the hooks on the rails. You could also drill or gouge out the bottom of the mortises to accommodate those bumps.

With this design, the box spring and mattress are supported by ledger strips attached to the side rails with plate-joinery biscuits, screws and glue. I used all three joinery methods because I didn't want the ledger strips to tear away from the rails. Gluing and screwing alone is probably adequate, but I used biscuit splines to locate the strips and to add some extra strength.

Preparing for finishing touches—Recently I have avoided using a belt sander for finish work. I've discovered that a properly sharpened and burnished Stanley #80 cabinet scraper will do the job more accurately and without the dust and noise of a belt sander. I scraped all the parts with the Stanley #80 (see the photo below), and used a flat cabinet scraper to prepare the surfaces for final hand-sanding with 120-grit and 220-grit aluminum-oxide open-coat sandpaper. Before I glued up all the parts that make up the headboard and footboard, I gave them a light coat of Watco Danish oil (available from most hardware stores), taking care to keep it off the tenons. Doing this ensures that the panel is oiled right up to its edges and makes it much easier to clean up glue squeeze-out after assembly.

After unclamping the glued up headboard and footboard, I checked them for any dings I might have inadvertently inflicted on the wood during assembly. As usual, I found a few and so I steamed them out using a damp cloth and a household iron. I then scraped and resanded the area prior to applying a second coat of oil. Once the bed was oiled and gone over two or three more times with 0000 steel wool, it was ready for delivery.

With the bed assembled, I laid 1-in.-thick poplar boards across the frame and on top of the ledger strips to support the box spring. The poplar boards are usually random widths—four or five boards, 4 in. or 5 in. wide by the required length—and evenly spaced along the bed's length. Many customers find a mattress or a Japanese-style futon to be quite comfortable and adequate without the bulky box spring. In such a case, you will want to adjust the mattress and rail height accordingly. When a box spring is not used, I lay more of the random-width poplar boards across the width, leaving a space of an inch or so between the boards. Then, if you turn your mattress over every so often, you can also flip the boards at the same time, to compensate for any bow they might develop.

And, by the way, if you don't think it's worth the trouble to make an all-wood bed frame, you can build the headboard alone and attach it to the various types of steel frames sold by department stores. You may, however, have to adjust the height of the bottom crossmember in the headboard to fit a particular frame. As with the mattress, check the sizes of the frame before beginning construction. □

John McAlevey builds furniture in Warner, N.H.

Carving a Ball-and-Claw Foot

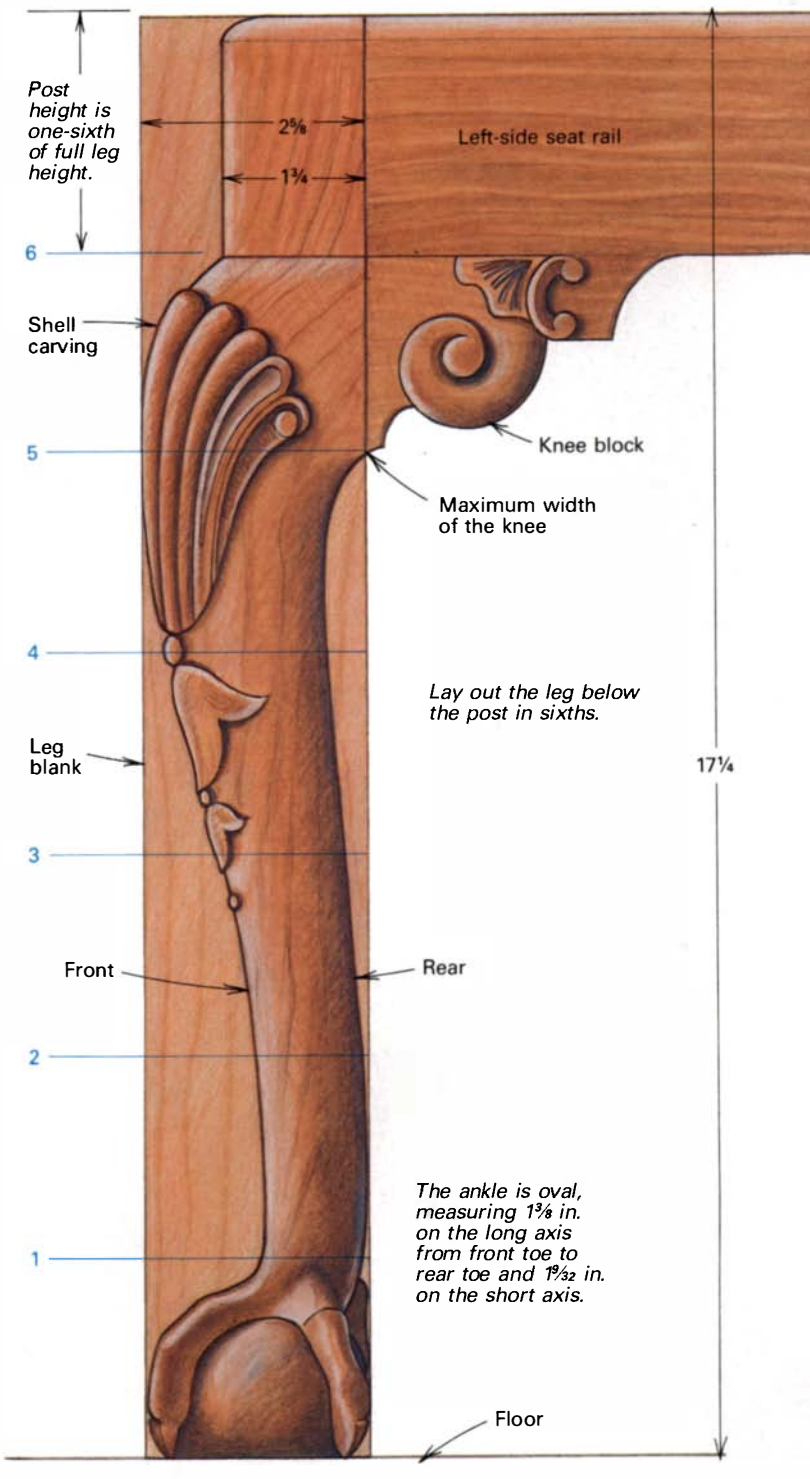
Tracing the techniques of a Williamsburg cabinetmaker

by Mack Headley, Jr.

Recently I "studied under" Peter Scott, a cabinetmaker who worked in Williamsburg, Va., from the early 1720s to the mid-1770s. Although he's been gone for more than two centuries, he left a legacy of furniture that provides a fairly comprehensive training program for contemporary woodworkers. Scott himself was probably educated in Scotland before arriving in Virginia, where he built furniture for the state's most demanding customers. During his time, furniture design emphasized strength and bold sculpture with broad reflective surfaces, which created a sense of weight. As part of my study of regional styles of cabriole legs, I carved a reproduction of one of his chair's legs, using the simple tools and methods common during that time.

I'll tell you how I made a pattern and sawed the leg from a blank and how I carved Scott's version of a ball-and-claw foot. I'll demonstrate the gouges I used to duplicate the sculpture below the shell carving at the knee. For more on this, see "Cabriole Knees" (*FWW* #72). Although this foot is a reproduction of a Williamsburg design of the 1740s, you'll find that my tool techniques and procedures for executing this foot will be helpful when carving other feet.

Fig. 1: Proportions of a Peter Scott cabriole leg



I couldn't rip one of Scott's chair legs in half to trace the sawn section and make a pattern. Instead, I projected imaginary lines past the leg onto a blank in much the same way you would shine a beam of light past the leg and trace its shadow. I held a straightedge parallel to the floor and across both front chair legs so that it met my carving blank at a right angle. I aligned the front of the 2⅝x2⅝x17¼ Honduras mahogany blank parallel with the right front leg of the chair. Then I held the straightedge against the widest points on the front of the two legs (at the knees and feet) and I marked those points on the blank. Next, I marked the blank for the widest points on the back of the legs (at the ankles and where the curves at the back of the knees intersect the edge). Holding the straightedge across the inside curves (the front of the ankle, top of the foot and back of the knee), I marked the blank where the end of the straightedge touched each of these places. I also marked the blank at a number of places along the curves, and carefully outlined the foot in the same manner. Finally, I drew a fair line connecting the marks on the blank, and then I traced this profile and cut out a paper pattern. Since the lines of the original leg and foot are the same when viewed from the front and outside, one pattern can be used for both sides.

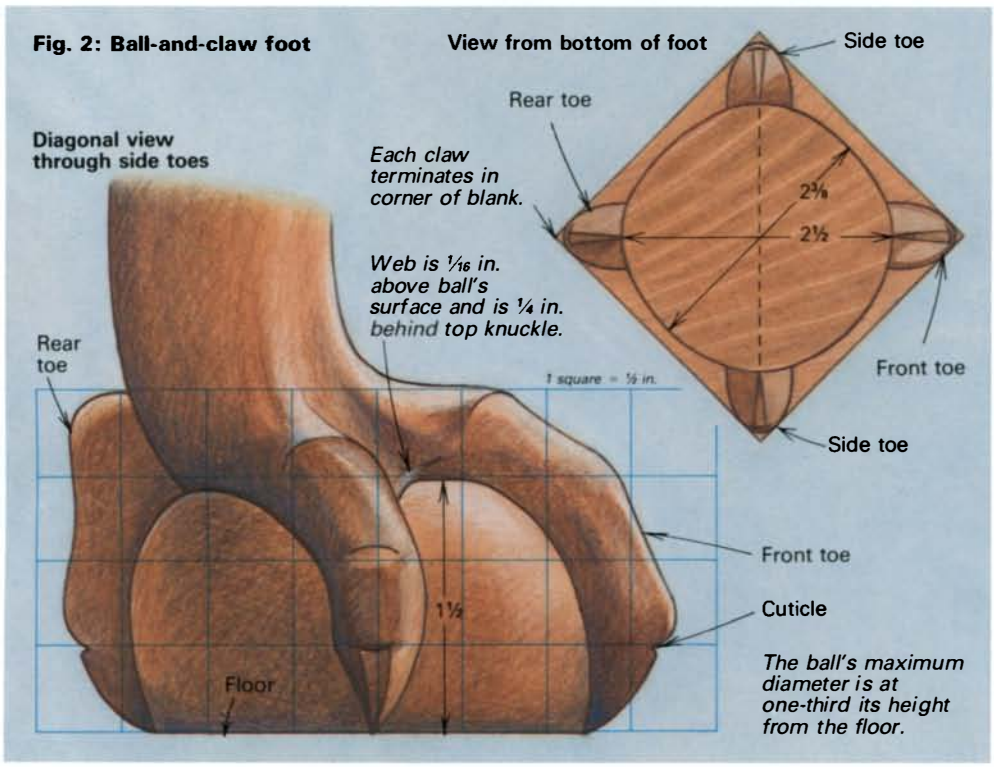
I found that Scott probably based the leg's proportions on classical rules of Greek architecture, which cabinetmakers in the 1740s found particularly appealing. He apparently laid out the leg according to this "rule of sixths" by first making the post one-sixth of

the leg's full length and then dividing the leg below the post by six and proportioning its shape on this scale, as shown in figure 1 on the previous page.

The claws on well-carved feet should reach over and grasp the ball in an animated fashion, as shown in figure 2 below. On the Scott feet, the tips of each claw terminate in the corners of the blank. The side toes on some feet follow the corners of the blank and point straight down, which creates an awkward, boxy appearance. However, this doesn't happen on the Scott feet because the upper knuckles angle forward, giving the side toes' claws the appearance of raking backward. Although the foot and ball are shaped from the same blank, you should try to think of them as two separate elements of this sculpture.

Consistently, the balls on the Scott feet aren't round; they're larger in diameter under the toes than between them, and therefore they give the foot a broader stance. Draw the bottom of the ball with two compass arcs so there is 2⅜ in. in diameter between the claws and 2½ in. in diameter under the claws. Then fair the two diameters together halfway between the claws.

Transfer points from the original leg to the blank following a straightedge held parallel to the floor and against the leg. Mark the blank where the end of the straightedge touches.



***Above:** Following an original discarded example, the author ripped from the knee to the ankle with a handsaw, and then he finished by cutting across the ankle with a bowsaw.* ***Below:** Headley uses a gouge to cut the shape inside the knee.*

2 To understand how Scott roughed out his legs, I referred to an unfinished table leg excavated from the stream silt at Anthony Hay's cabinet shop in Williamsburg. This example, discarded in the early stages of production, had apparently been roughed out with a handsaw. Following this, I made two straight cuts along the length of the leg with a handsaw and then cut across the adjacent tops of the foot and intersected the handsaw cuts at the ankle with a bowsaw. I roughed out the rest of the leg with a drawknife, paring chisels and gouges, and finished it with a spokeshave. You can bandsaw the entire shape to the pattern line quickly and accurately. But by working with hand tools, I became accustomed to the blank's grain, and so I was able to correct my cuts before I reached the pattern line.

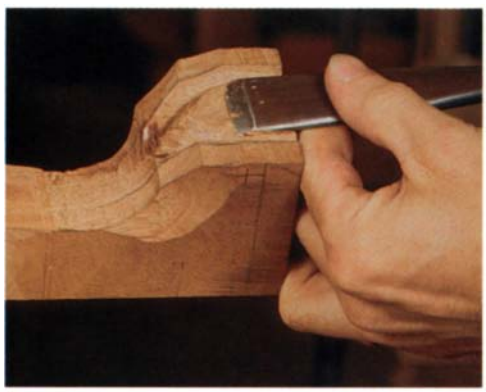
3 To duplicate the shapes of the original, I matched the width and sweep of gouges to the original sculpted ankle, toes and ball, and then I used those tools to carve the reproduction. For instance, I carved the inside curve where the front toe sweeps up to the ankle with a ½-in.-wide #5 gouge. After establishing the front-toe height, I lowered the tops of the side toes ⅛ in. below it and began carving the top of the knuckles. A 1¼-in.-wide #3 gouge matches the arc from knuckle to knuckle. Unless I specify which toe, use the same tools and techniques to carve all of them, but carve the back toe last.

Since the surface of the ball at its greatest diameter projects beyond the toes (as shown in figure 2), I only removed wood next to the toes and left the full width of the blank in between. So if you bandsaw the leg from the blank, don't saw directly on the line across the lower joint of the toes and risk removing wood that's needed for the fullness of the ball.

Next I defined the forward rake of the side toes' upper knuckles by scalloping wood from behind the upper knuckles with a ½-in.-wide #3 gouge. Then I delineated the side toes' 9/16-in. width with a pencil as I guided it against their freshly carved outside shape. Following in this manner, I then delineated the 9/16-in. width of the front toe, which descends straight down the ball to the blank's corner. Before shaping the ball, I cut just shy of these lines with a straight parting tool, defining the toes' width and their height above the ball. But cutting this way also left wood to carve later when I made the final cut down along the side of the toes with a 1¼-in.-wide #3 gouge.

Matching the sweep and width of a ½-in.-wide #5 gouge to the original leg ***(above)****, Headley cuts the transition from the toe to the ankle accurately* ***(below, left)****. The outside of the side toe has been scalloped to angle it toward the center toe, forcing the claw to rake back. After marking their width, the toes are roughed out with a parting tool* ***(below, right)****.*

4 On Scott's original, the ball's maximum diameter is at one-third its height from the floor. I carved its surface below that point taking downward strokes with a 1¼-in.-wide #5 gouge, and carved its narrower surface near the web taking upward strokes with a ½-in.-wide #3 gouge. And I pared across the transitional grain at the ball's greatest diameter with the 1¼-in.-wide #5 gouge. Working along both sides of the front toe first, I faired the ball's surface where it passes under the toe, but carved its final diameter after roughing out the surfaces on both sides. Then I cut down along the sides of the toe with the 1¼-in.-wide #3 gouge, leaving a distinct transition between the toe and the ball. Carve the ball's final surface in front of the side toes after you've roughed out its back surfaces.



Above: *Headley shapes the lower surface of the ball with a 1¼-in.-wide #5 gouge, powering the cut with his right hand and guiding it with his left.* ***Right:*** *The author carves across transitional grain at the ball's greatest diameter. The leg is held at a comfortable height and angle in an auxiliary clamp secured in the bench vise.*

***Above:** The edge of the web is cut with a ½-in.-wide #5 gouge. **Below:** The concave web is cut with a ½-in.-wide #5 gouge.*

5 You are now ready to carve the webs connecting the toes. The height of the ball at the edge of the webs between the front and side toes is 1½ in. And the webs' edges are ¼ in. behind the top knuckles when viewed from above, or are ¾ in. from the outside of the ball. Holding a try-square handle against the bottom of the leg with the blade against the ball, measure from the blade to the web.

Working one web at a time, I cut the edge of the first one with a ½-in.-wide #5 gouge, holding the tool parallel to the leg's long axis and cutting toward its bottom. Then I carved the concavity of the web with the same tool, using its full arc to take a deep cut beginning where the web meets the top of the ball. This gouge cut should begin parallel with the floor and sweep up quickly, terminating where the top knuckle of each side toe meets the ankle. The height of the web above the ball on this outstretched foot is 1/16 in. (as shown in figure 2 on p. 84). When looking down at the foot, the web should be distinct and there should be a broad reflective surface on the top of the ball.

***Below:** The edge of the web is ¾ in. from the outside of the ball, measured with the blade of a small try square. Headley works on one web at a time, cutting the edge of the first web with a ½-in.-wide #5 gouge. He then carves the concavity of the web with the same gouge.*

The top of the toe is triangular and is rounded over with a ½-in.-wide #6 gouge. A slight concave arc joins each knuckle.

6 Beginning with the front toe (and then following with the side toes), I shaped its claw first by roughing it out with the parting tool. Each claw is the full width of its toe at the cuticle (below the lowest knuckle) and each tapers to a 1/16-in.-wide point. The claw is rounded so that the profile of its top is a convex arc from the knuckle to the floor. The top of the claw is then finished so that a flat facet diminishes from ⅛ in. wide at the knuckle to 1/32 in. wide at the floor.

I first sculpted the sides of the toes with a ½-in.-wide #3 gouge, giving them a somewhat triangular cross section. Initially I cut their tops almost flat, using a ¼-in.-wide #6 gouge, but I left a slight concave arc between knuckles. The junction of the toes' flesh, below the lowest knuckle, and the claw is a 1/16-in.-wide V-shaped cuticle, which I cut with a ½-in.-wide #3 gouge.

There should be a quick transition from the top of the front and side toes to the vertical ankle. This makes the leg appear to sit back on the ball and it gives the leg a sense of weight. I began carving the top of the toe with a ½-in.-wide #5 gouge, and I finished the sweep up to the ankle with a knife because the gouge alone couldn't negotiate the sharp angle.

The back toe of Scott's foot is a unique design element and it should be carved last. It's vertical at the point where it suddenly emerges from the ankle and descends to the ball. And it appears to be a separate component. On most feet from other regions, the web between the back and side toes is a flowing arc, as it is here between the front and side toes. On the Scott foot, however, the junction of the ball, rear toe and ankle forms an obtuse angle. When looking at this profile, the rear toe is a convex-concave-convex curve, carved with a ½-in.-wide #5 gouge.

***Above:** Headley uses a knife to finish-carve the quick sweep of the top of the toe to the ankle. The ankle's curve gives the leg a sense of weight.* ***Below:** The shape of the rear toe and claw lends a distinctive character to the Scott ball-and-claw foot. The original leg is on the left.*

Drawing its teeth perpendicular to the stroke, a mill file leaves the leg ready to be scraped and polished.

The ankle is oval, and its longest axis runs on the diagonal between the front and rear toes. When rounding the leg, you should initially retain the full dimension of the leg blank from below the shell carving on the knee to the foot. I prefer shaping the leg with a spokeshave and chisel. This way, I can learn about the wood's grain and apply the information when cutting the background in the shell carving. Although you could use a rasp if the grain is difficult, it tears up the surface. With practice, the cuts of sharp-edge tools should merge cleanly at grain transitions on curves, but some clean up will still be necessary.

To follow 18th-century methods, I use abrasives sparingly. Instead, I smooth surfaces with mill files and cabinet scrapers, the marks of which I've seen in unobtrusive places on old pieces. A half-round mill file does a good job and leaves few marks if you draw its teeth perpendicular to your stroke. A light pass with a very sharp cabinet scraper removes the file marks. Since the scraper follows the hard and soft variations in the grain, I alternated the cutting direction with each pass to avoid amplifying irregularities. Finally, I polished the leg with a fine abrasive for an even, reflective surface. At home I'd use worn 240-grit sandpaper; at Colonial Williamsburg it's more appropriate to use shark skin or shave grass (Dutch reeds). □

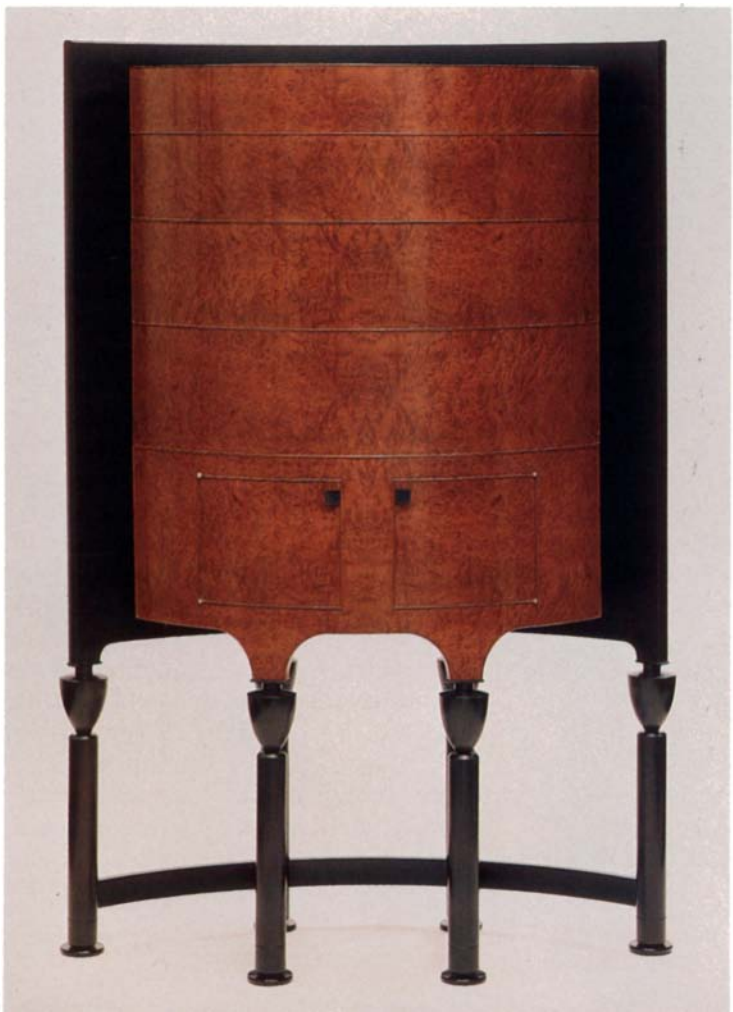
Mack Headley, Jr. is a master cabinetmaker studying the regional differences of cabriole legs at Colonial Williamsburg, Va.

New American Furniture

Boston museum show offers an historical perspective

by Jim Boesel

"The High Chest by Thomas Hucker *(below and above, right)* exemplifies the MFA show's theme," according to Curator Edward Cooke. "He successfully blends his Eastern-influenced aesthetics with the overall form of the high chest built about 1700 *(left)* that he chose as an inspiration piece. Both chests have burl-veneered drawer fronts trimmed with cock beading, a shaped skirt and six turned legs. But the facade of Hucker's chest bows out to present an uninterrupted surface cupped by a curved, painted-plywood back panel."



Contemporary furnituremakers may have taken a giant step forward by taking a brief look back. For the past 10 years, design-oriented craftspeople have been questioning traditional furniture forms and challenging the limitations they impose; at the same time, the more traditionally minded have been challenging the value of this quest for originality. "New American Furniture: The Second Generation of Studio Furnituremakers," which is currently touring the country, attempts to put both viewpoints in perspective by relating the current work of designer-craftsmen to furniture built in the 18th and 19th centuries. The resulting exhibition offers some insights into how contemporary furniture fits within the continuum of furnituremaking in America.

"New American Furniture..." which opened last winter at the Museum of Fine Arts (MFA) in Boston, Mass., was the brainstorm of Edward S. Cooke, Jr., associate curator of the MFA department of American decorative arts and sculpture. He first conceived the idea in 1982 when he was teaching a Boston University (BU) class called "The American Craftsman in Historical Perspective" and also taking a woodworking course in BU's Program in Artisanry. Finding that the furnituremakers he met were interested in historical furniture sparked the idea for an exhibition in which leading studio furnituremakers would each build a piece of furniture inspired by a specific historical piece. When Cooke began working at the MFA in 1985, he immediately began planning the exhibition; a risky proposition considering that he was trying to sell a show that as of that time had no objects and was only a concept.

The name of the show and the selection of participants were based on Cooke's view (put forth in his essay in the show's catalog) that during the 1970s a new generation of craftspeople were developing within the school and university programs that had been stimulated and established by an earlier generation of furnituremakers. This first generation, which emerged after World War II, includes George Nakashima, Wharton Esherick, Sam Maloof, Tage Frid, James Krenov, Wendell Castle and Art Carpenter. These craftsmen, either by their example, as in the case of Nakashima and Esherick, or through their personal contact with countless students in furniture design and construction programs, paved the way for a rebirth of craftsmanship and design in American furniture.

Photos except where noted: Courtesy of Museum of Fine Arts, Boston

Cooke feels that Rosanne Somerson's Black Lace Table, *below and at left,* "May be one of the best responses to the assignment, but it's also one of the hardest for the average person to connect with the historical piece" (the 1760 Philadelphia side table, *above*)."All the decorative elements of the original are present: A piece of slate replaces the marble top; the swell in the scalloped skirt echos the gadrooned serpentine front; and the copper leaf on the skirt's domes provides the metallic glint of the original's brass hardware. Somerson has also done a nice job of integrating the mixed materials. The copper leaf and painted-and-carved skirt details repeat the color and texture of the slate."

According to Cooke, by the 1980s the second-generation furnituremakers had begun to establish their dominance in the field. Thanks to the training and guidance of the first generation, they had acquired a solid foundation in traditional techniques and high-quality workmanship. In addition, throughout the '70s these college-trained craftspeople had developed an open-minded emphasis on concept and design (this emphasis on design is one of the rationales for calling them "studio" furnituremakers). By the mid-'80s, the work emerging from the second generation was reaching a new level, a point of balance between the "wood for wood's sake" attitude of the '60s and '70s and the "see how wild you can get" attitude of the early '80s.

It was from this pool of second-generation studio furnituremakers that Cooke chose the 26 participants in the exhibition. And then to get the project off the ground, he invited them all to the museum for a two-day symposium to discuss such historical elements of furnituremaking as design, modes of production, and the social and economic aspects of the trade. The group toured the museum's permanent furniture collection and each participant selected an historical piece as a point of departure for designing a new piece for the show. The makers could use the historical piece as a conceptual or design starting point; pattern their piece after its overall form; reinterpret some of the decorative elements; or incorporate all of these approaches.

The purpose of the exhibit, in Cooke's words is, "To show work of the highest quality in terms of conception, execution and design, and to educate a broader public to think in a more sophisticated fashion about both new *and* old furniture. We want people to go beyond issues of functionality, or comfort or stylistic categorizations—like whether it's Chippendale or Arts and Crafts. They should be able to look at the older furniture and see that it might have been symbolic, or it may have indicated something about social status, or that it came from a certain kind of shop with a certain sort of production behind it. Hopefully, if people start looking at the old furniture in different ways, they can also look at the new work in different ways."

And Cooke goes on: "I'm intrigued with the social context of production and the dialog between maker and user. In my previous work I tried to relate 18th-century furnituremakers with the communities in which they grew up or worked in order to define the real social context of furniture production. When viewed in this light, furniture becomes part of the evidence for understanding societal relationships or economic history broadly considered."

Evaluating the show—Perhaps the most obvious criticism of the exhibition is its overemphasis on New England furnituremakers; Gary Knox Bennett and John Cederquist, both from California, and Paul Sasso, from Kentucky, are the only participants without close ties to New England. While this criticism is valid, I think there are logical and practical reasons for the show's New England bias.

This show was proposed in the first place because Boston in particular, and New England in general, have surfaced as the center of the studio-furniture movement. This is partly due to Boston's close proximity to some of the most influential furniture-design programs, such as those at BU, Rhode Island School of Design (RISD) and Rochester Institute of Technology (RIT). Woodworkers were initially attracted to these schools by the reputations of the first-generation instructors. After graduation, many of them set up shop in the New England region because it was one of the best markets in the country for high-end custom furniture due to its large affluent population and long history of furnituremaking.

The truth is, Boston wanted to blow its own horn a bit. And while there are woodworkers in other parts of the country who do excel-

(continued on p. 92)

Michael Pierschalla's table, ***below,*** based on an 18th-century cabriole-leg table, is the latest in his series of tables that combine dissimilar parts and elements. One leg appears to be the pattern for the other two roughed out, but unshaped legs. The only concession to function is the small copper shelf. Pierschalla explains, "I am not especially interested in function anymore...I like furniture that works, but I just think there are other things to do."

Wendy Stayman was attracted to the oak two-drawer chest, ***shown at right,*** by its proportions and texture. The entire front surface of this 1710 chest is covered with relief carving in swirling, abstract floral patterns. To achieve the feel and look of the original, Stayman veneered her MDF upper doors with Swiss pearwood first and then overlaid this with maple veneer. She routed through the maple to reveal the pearwood and then inlaid maple floral patterns, and the date, into the corrugated surface. Stayman also left space to inlay the eventual owner's initials.

Curator Edward Cooke on Michael Hurwitz's rocking chaise: "Michael admired the continuous liquid curves and strong use of negative and positive space of an 1810, Samuel Gragg patented fancy chair. Rather than recasting these elements within the same format, however, he stretched out the line and placed it upon a rocking substructure...To achieve the desired lightness, he laminated mahogany, delicately tapering the ends. To ensure strength, he laminated a ¾-in.-sq. steel pipe within the two long, straight horizontal pieces of the base."

In the show's catalog, Curator Edward Cooke credits Tom Loeser as "...One of the leaders in the use of paint as a compositional and decorative element." He goes on: "Inspired by a chest-on-chest with rich surface decoration ***(photo at left)***, Loeser isolated individual drawers into boxes...staggered them into various planes...and bolted the units together ***(below)***. Each of the units has gouge carving to provide rough surface decoration...From afar, the gouges appear uniform, but on closer inspection, there is considerable variety in line and depth. Loeser uses this free carving in conjunction with the subtle tones of milk paint. Each box features its own pairing of colors, but the gouges endow the piece with an overall unity."

Above, right: Hank Gilpin knew that most of the furniture in the exhibit would rely on veneer, exotic woods and color. But in keeping with his philosophy of making practical everyday furniture, he chose an oak-paneled door as his inspiration piece and built this white-oak wardrobe to which he applied no finish. He simply planed, scraped and wire-brushed the surface. The wenge handles even serve a practical purpose: dirty hands won't darken the oak.

Center, right: Traditionalist Rick Wrigley reinterpreted a sideboard built by William Hook in 1808. Although Wrigley reproduced every major element of the original, he added his own personal touch with the patinated copper rivets and backing plates and the inlaid banner holders. Wrigley emphasized the shimmering figure of the curly sycamore veneer on the drawer fronts by cutting wavy edges on the strips that make up the herringbone pattern.

Bottom, right: Kristina Madsen borrowed the overall form of her Pau ferro and silk upholstered side chair from her inspiration piece: a circa 1795 chair. But in place of the original's square legs, she turned delicate legs to emphasize the elegance of the oval back. The routed grooves on the rails and the shape of the upholstered portion of the back are derived from South Pacific carvings: a recent influence.

lent work and qualify as second-generation studio furnituremakers, you would be hard-pressed to quibble with the qualifications of the MFA-show participants. They all rose to the occasion, confronted the theme in thoughtful and personal ways and produced outstanding work. In addition, Cooke was careful to select people with a variety of approaches to design so that the show would be more representative of the wide range of furniture work being done elsewhere in the country. From the unadorned country style of Hank Gilpin's oak wardrobe (see the top, right photo on the previous page) to the carved and painted stack of drawers by Thomas Loeser (see the bottom, left photo on the previous page), there is something for everybody in this show. And the craftsmanship is excellent in every case.

There are also those who will find fault with the historical theme of the show as being counterproductive to the advancement of furniture design. But those who do, have most likely missed the point. Using an historical piece was not meant to encourage reproductions or to limit the scope of the designers. Quite to the contrary, it was an exercise in design intended to illuminate the connection between furnituremakers of the past and those of the present. Cooke feels strongly that we are in a period when many artists are actually turning to furniture as their method of expression and are embracing the functional aspects instead of fighting them. By choosing furniture as a medium of expression, an artist necessarily accepts a set of rules: a chair must allow you to sit, a table must have a flat surface and a chest of drawers must provide storage. If an object does not meet these criteria it may *represent* a chair or a table or a chest of drawers but it is not that piece of furniture. As Peter Dean, one of the craftsmen with work in the show, puts it, "You can't play tennis without a net and boundaries." Even the more avant-garde designers in the show took obvious pleasure working within the boundaries inherent in the furniture game. Some of the participants chose to poke fun at the historical piece, while others built near reproductions, even surpassing the originals in traditional techniques in a few cases; or as novelist John Updike said in his review of the show in *Art and Antiques*, "Two approaches to the assignment might be distinguished: the path of parody, and that of homage." It's also interesting to note that despite the historical starting point, each of the builders was true to his or her own personal style, developed through years of exploration and experimentation.

Whatever your opinion about tying the new work to historical roots, the theme was effective on several levels. It made the show much more fun for the general public by giving them insight into how the designs evolved. This was evidenced by the pleasant conversational murmur and the air of excitement that filled the room both times I visited the show; not the atmosphere that one usually associates with a museum. In addition, the historical theme may make it easier for traditional-furniture lovers to understand that today's furniture is part of a continuum, and that it may indeed be the traditional furniture of the future. Finally, for aspiring furnituremakers, the show provided a glimpse into the process of design by showing how new ideas can evolve from existing influences, whether inspired by an existing piece, a cultural tradition or a combination of old elements.

While it's fun and instructive to judge the pieces according to their relative merit regarding the assignment, I think each piece must be evaluated on its own merits too. When viewed in this way, one might wonder what it is about the new work that places it in its own time, the same way Arts and Crafts furniture fits into the early 20th century.

One of the elements that makes this furniture "new" is the use of texture, pattern and color that seems to reflect the influence of graphic-arts techniques. This is no accident. The schools with the most influential furniture-design programs, RIT and RISD for example, are even more famous for their graphic-arts departments, and in the past 20 years, most of the excitement in art has been in the graphic arts. So what else does this exhibition teach us about furniture in the 1990s? One, that the level of craftsmanship is as high as ever; two, that at this point in time, individual style is more important than anything else; three, that custom furniture is expensive; and four, that today's furniture designers have a sense of humor.

What does it all mean?—For the furnituremakers that were included in the MFA show, it meant instant recognition. The show received unprecedented media attention; besides the Updike review in *Art and Antiques,* it garnered a two-page spread in *Newsweek's* arts section and a feature article in *American Craft,* as well as numerous articles in the arts sections of East Coast newspapers. The exhibition even caught the eye, and lens, of a German television crew that was at the museum to cover a Monet exhibit, and they made time to do a short piece on the furniture show. I spoke with a few of the participants after the show had closed at the MFA and had moved on to its second stop, the Smithsonian Institution's Renwick Gallery in Washington, D.C., and they had all received several inquiries about future work. Not that there wasn't some hardship for the makers; they had to build a major piece that they couldn't sell for at least two years. But they were all fully aware at the outset that the potential long-term gains would more than make up for the short-term investment in time and materials.

Although Cooke was surprised by the amount of media attention, he knew that this show had the potential for, as he puts it, "museum cannonization" of the 26 participants. To combat the possibility of this show actually narrowing the field to the chosen few, Cooke arranged a luncheon with several gallery owners in the Boston area a good two years before the show was scheduled to open. He suggested to them that by putting on concurrent shows highlighting furniture, but including craftsmen other than those in the show, Boston had an opportunity not only to celebrate its leadership in the field, but also to create an event of national importance. This appeal for a joint effort resulted in six separate shows in Boston galleries and one in New London, Conn., all of which afforded exposure to a much broader group of furnituremakers and gave the public a chance to touch the work, interact with it and buy it. (See the sidebar for some work from the satellite shows.)

I think it's significant that a major art museum was willing to take a chance on a group of contemporary furnituremakers. It signals a recognition on the part of the art and design establishment that studio furnituremaking has reached a point of maturity, a new plateau where designer-craftsmen are now combining outstanding craftsmanship with a highly developed sense of design and an historical perspective. And the MFA show reminds us that, just like furniture of past generations, furniture from the second generation is not being built in a vacuum; it is part of the social fabric and it will be around to provide pleasure, comfort and inspiration for future generations. □

Jim Boesel is Managing Editor of FWW. *"New American Furniture" is on display at the Renwick Gallery of the National Museum of American Art, Smithsonian Institution, Washington, D.C., until Sept. 3. From there it travels to the Contemporary Art Center, Cincinnati, Ohio (Nov. 9, 1990 to Jan. 8, 1991) and then to the Oakland Museum, Oakland, Cal. (Feb. 9 to April 21, 1991). The catalog,* New American Furniture: The Second Generation of Studio Furnituremakers, *contains an essay by Edward S. Cooke, Jr. describing his view of the evolution of studio furnituremaking since World War II, biographies of each of the show's participants, color photos of each of the pieces in the exhibition, black-and-white photos of the historical "inspiration" pieces and a few examples of the participants' past work. The 131-pp. paperback catalog is available for $18.95 from the Museum Shop, MFA, 465 Huntington Ave., Boston, Mass. 02115.*

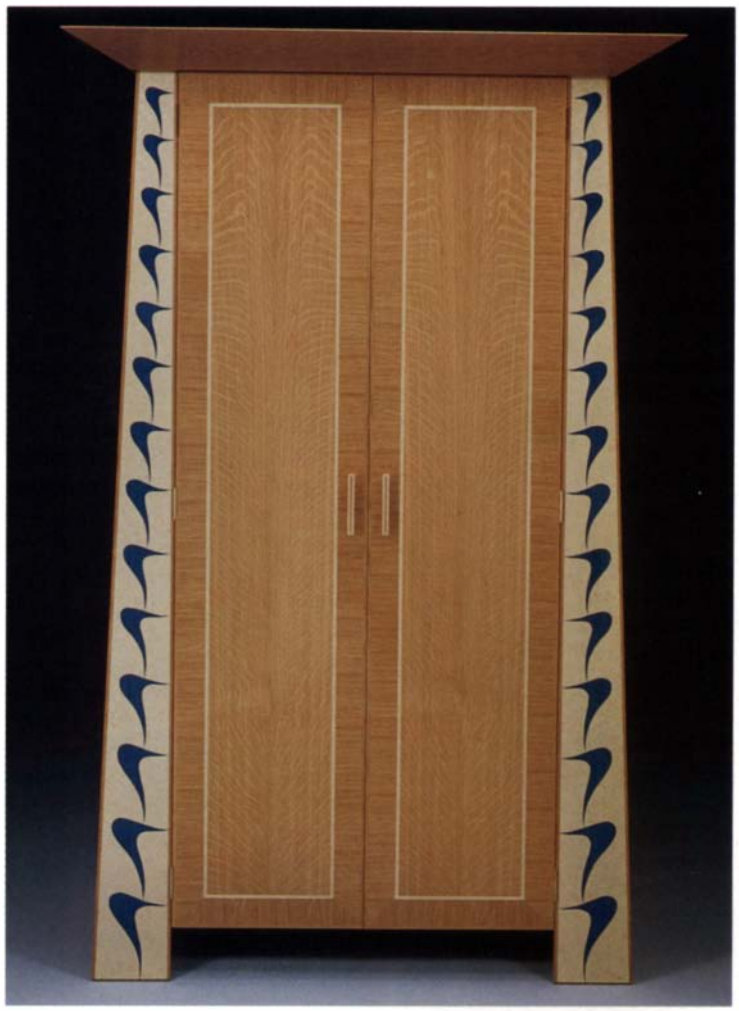
Other Boston area shows

Like a stone tossed into a pond, Boston's MFA show made a big splash and then sent ripples across the water in the form of several local satellite shows. The Boston Society of Arts and Crafts (SAC) assembled the work of nearly 50 regional craftspeople in its Newberry Street gallery. One of the most impressive pieces at the SAC show was Easthampton, Mass., furnituremaker Silas Kopf's large elliptical desk with inlaid trout swimming en masse around the curved side panels (see the photo below, left).

An exhibit at the Lyman Allyn Art Museum in New London, Conn., opened a month earlier than the MFA show and served as a preview by featuring several of the MFA participants, as well as others. Charlestown, Mass., furnituremaker Lee Trench had work in both the Lyman Allyn and SAC shows. Trench's mirror frames, shown in the photo below, right, are decorated with subtle and sensitive relief carving and provide a pleasant change of pace from the slickness of much of the other work.

The feeling of celebration that surrounded the Boston furniture exhibits was contagious enough to induce two gallery owners who are usually keen competitors to join forces. Arthur Dion of Gallery NAGA and Meredyth Hyatt Moses of the Clark Gallery in Lincoln, Mass., assembled the work of 13 furnituremakers who usually show at one or the other of the two galleries. The show was held at Gallery NAGA to take advantage of its central Boston location, which is only a block or so down Newberry Street from the SAC gallery. Jamie Robertson, of West Concord, Mass., was represented at Gallery NAGA, SAC and the Lyman Allyn Museum. The exquisite detailing on the facade of his 6-ft.-tall cabinet called "Ariaone's Armoire" (see the photo at right) belies its basic plywood construction.

It appears that the ripples created by the MFA show will continue to spread. Inspired by the success of Boston's cooperative effort, the organizers of the MFA exhibit's stops in Cincinnati, Ohio, and Oakland, Cal., are planning to include companion shows featuring outstanding furnituremakers in their respective regions. *–J.B.*



By framing the doors of this armoire with a solid-oak pediment and tapered, inlaid stiles, Jamie Robertson added to the visual impact of an otherwise simple rectangular cabinet.

Silas Kopf designed his elliptical desk to provide a "flowing" format for the sycamore-veneer fish that encircle it. Kopf's assistant, Tim Faner, did all the cabinet work, including solving the technical problems inherent in curved construction.

The shallow relief carving on Lee Trench's pearwood mirror frame has a fragile quality like patterns in sand.

Photos this page: Dean Powell

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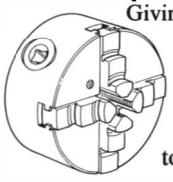

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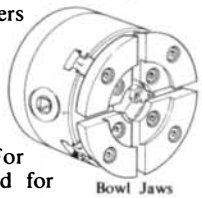
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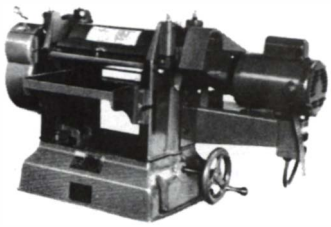

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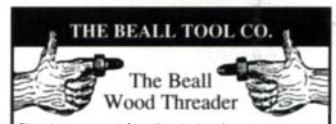

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#BKT ..... $15.00/kit (•)

Variable Speed Motor Upgrade

Convert your saw to variable speed! This quality motor will fit our Super 15" model and other saws of similar design. Also fits Sears(tm)16", and "C" arm "Superscroll" styles - 18", 22", and 26" sizes. Limited 90 day warranty on non-Penn State saws.

#SVM .....Only $99.00 (UPS $4)

Magnifier Lamp

Great for magnifying scroll work or closeup work of any kind.

#SML (reg 29.95) **On Sale ...$22.95** (UPS $3)

Scroll Saw Stand (On Sale)

34" High - the perfect height.
#STD .. (reg $39), **On Sale $26** (UPS $4

Foot Switch

For hands free operation. Installs in line w/power cord. Easy hook-up. 7 amp, 6 ft
#FSW ..... $20.00 (•)

Wood Lathe XL- 40

Reg $299.95, ***On Sale*** **$249.95**

Includes ***FREE*** 8 piece Wood Chisel Set ... **$34 Value**

Our new XL-40 Wood Lathe surpasses every lathe in its price range with quality & features you would expect from machines many times its price . FEATURES .....

Heavy Duty cast iron construction provides smooth turning action • **40" Centers** • **16" Swing** for turning larger bowls • Smooth toolrest movement on 1" solid steel rails • **"Live" center** on tailstock • **Motor mounted for easy positioning** and belt changes • **Sturdy 52" steel base** mounts on table top or optional stand.

PURCHASE INCLUDES:

- Lathe with Motor & Base • Toolrest
- 6" Faceplate • 8 pc wood turning chisel set

SPECIFICATIONS:

- MOTOR: 1720 RPM, 1/2HP, 8AMP, 110V
- 3 Speeds: 660, 1500, 2850 RPM
- Headstock thread - 3/4"x 10 tpi
- Overall length: 60" - Weight : 100lbs

Item # **L40 .....*On Sale*** **$249.95** (UPS $20)

Lathe Stand

Heavy duty. Wt. 25Lbs
Size: 28"H X 56"L X 21" W
Item **#LST .... $44/ea** (UPS $6)

Super 125 Planer

On Sale $349.95

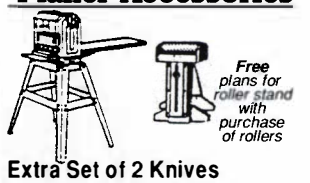
This machine will pay for itself time and again by planing your own wood. Finishes wood like machines many times its price.

• **Portable** at 65 lbs • **Power feed**
•12 1/2" wide High Speed Steel Knives
Shipped assembled and ready to run.

SPECIFICATIONS:
Motor: 16Amp, 115V, 8000RPM, 2HP• 26.2 fpm auto feed rate • 16,000 Cuts/min • Thickness of stock: 3/16" - 6" • 1/8" Max depth of cut • 2 HSS knives

Item #PLA ..... $349.95 (UPS $15)

Planer Accessories



Extra Set of 2 Knives
High Speed steel, 12-1/2" long.
Item #PKN .....$25.00/set (•)

Dust Chute
For vacuum takeoff of wood chips.
#PDS ..(reg $24), **On Sale....$15** (UPS $3)

Planer Stand (Heavy duty)
Drilled for Super 125 Planer. 27-1/4"High.
#PST ...(Reg $44), **On Sale...$39/ea** (UPS $6)

Roller Stand
HTC brand support stand w/heavy duty ball bearing roller. Height adjusts from 25" - 44".
#PRS ...(reg $40), **On Sale** ...**$35** (UPS $4)

Ball Bearing Rollers
(Minimum purchase 2 rollers). Build a roller stand, infeed/outfeed table etc. with these 13" X 2" Heavy Duty rollers. Inclues **FREE** plans for roller stand shown above.
Item **#BBR** ..... **$6.50/ea** ($3 UPS /order)

New Model with 8" disc

Two way 4"x 8" Sander

On Sale ... **$114.95** (UPS $8)
(Includes **$10 FREE** Belts & Discs)

Item #S48

Here's a machine that adds true versatility to your shop.

New design uses **universally available 8"** discs, 4" x 36" belts • Includes Assortment Of 3 Belts, 4 Discs Of Various Grits • **Built in Dust Collection** outlet • Aluminum table: tilts to allow bevel sanding to 45°, includes mitre gauge, movable for use with disc or belt • Belt tilts to any position from horizontal to vertical • **Quick release lever** for changing belts • **Single action tracking** adjustment • Motor 1/3HP, 1720RPM, 115V • Weight : 40Lbs

DC-1 Dust Collector

(Includes $15 ***FREE*** Hose & Fittings)
On Sale .. $189.95
(UPS $20)

Keep your shop clean and safe from saw dust with this large capacity, commercial style system.

SPECIFICATIONS:
1HP • 110/220V (pre-wired 110V)
• 610 CFM air flow • 2ea 20 gal bags
• 4" inlet •Castors on base • WT.: 75 lbs

***FREE* With Purchase ($15 Value)**
Dust collection hose • 4" to 3" rigid adaptor • 4" to 2" flex adaptor • Plans for 2 stage setup • Sources for accessories

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READER SERVICE NO. 96

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34-783	10" 5 HP 3 PH W/ UNIFENCE	
43-375	3 HP 1 PH HD Shaper	
37-350	8" DJ-20 Joiner W/STAND	
31-730	6" Belt 12" Disc	
33-890	12" RADIAL ARM SAW	
40-601	18" VS SCROLL SAW	
33-990	10" RADIAL ARM SAW	
22-661	DC 33 13" PLANER	
50-179	3/4 HP DUST COLLECTOR	
50-180	1 HP DUST COLLECTOR	
50-181	2 HP DUST COLLECTOR	
34-985	1 PH STOCK FEEDER 110V	
34-994	1 PH STOCK FEEDER 230V	
34-995	3 PH STOCK FEEDER 230V	
33-150	8-1/4" SAW BUCK	
34-444	10" CONTR. SAW COMPLETE	
31-380	4" X 132" EDGE SANDER	
34-670	10" MOTORIZED SAW	
40-150	15" SCROLL SAW	
31-050	1" X 30" SANDER	
23-700	WET DRY GRINDER	
31-460	4" BELT 6" DISC	
17-900	16-1/2" DRILL PRESS	
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EC-900	DOOR SYSTEM SHAPER SET	278
94-100	DOOR SYSTEM ROUTER SET	159
FB-107	7 PC. FORSTNER BIT SET	49
FB-100	16 PC. FORSTNER BIT SET	149
FT2000	ROUTER	185

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LU81M010	Gen. Purp.	10"	40	45	43
LU82M010	Cut-off	10"	50	77	45
LU84M011	Combination	10"	50	55	42
LU85M010	Super Cut-off	10"	80	95	57
LM72M010	Ripping	10"	24	57	38
LU73M010	Cut off	10"	60	70	44
LU87M010	Thin kerf	10"	24	68	39
LU88M010	Thin kerf	10"	60	74	44
LU98M010	Ultimate	10"	80	107	79
LU89M010	Non-ferrous metal	10"	72	87	59
PS203	Plywood	7-1/4"	40	36	25
PS303	Gen'l Purp.	7-1/4"	24	25	19
DS306	6" Dado - Carbide			184	105
DS308	8" Dado - Carbide			196	109
F0	1-3/4"x1/8" Biscuits 1000 Qty			32	27
710	2-1/8"x3/8" Biscuits 1000 Qty			32	27
F20	2-3/8"x1" Biscuits 1000 Qty			34	27
FA	Assorts Biscuits 1000 Qty			34	27
WC104	4 pc. chisel set w/cse. 1/4"-1"			54	39
WC106	6 pc. chisel set w/cse. 1/4"-1"			73	52
WC110	10 pc. chisel set w/cse. 1/4"-1-1/2"			119	79
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94-100	5 pc. router bit door system			230	159
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1611EVF	3HP V-SPD PLUNGE ROUTER	234
1604	1-3/4 HP ROUTER	119
1604K	1-3/4 HP ROUTER KIT	166
1606	1-3/4 HP D-HANDLE ROUTER	140
1608	5.6 AMP. LAM. TRIMMER	88
1609K	3 IN 1 TRIMMER KIT	163
3270D	3 X 21 SANDER W/BAG	126
1272	3 X 24 SANDER	163
1272D	3 X 24 SANDER W/BAG	168
1273DVS	4 X 24 VARIABLE SPEED SANDER W/BAG	188
3050VSRK	9.6V CORDLESS W/CLUTCH	133
91066	1/2" MIGHTY MIDGET VSR	108
1347	4-1/2" MINI-GRINDER	84
1654	7-1/4" SAW W/CT BLADE	98
1581VS	TOP HANDLE JIG SAW	132
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361	3 X 24 SANDER	169
362	4 X 24 SANDER W/BAG	185
363	4 X 24 SANDER	181
617	7-1/4" SAW 13 AMP	114
315	7-1/4" SAW 13 AMP	114
314	4-1/2" TRIM SAW	124
690	1-1/2 HP ROUTER	128
9118	PORTA PLANE KIT	185
555	PLATE JOINER W/CASE	159
505	1/2 SHEET PAD SANDER	109
7334	RANDOM ORBIT SANDER	118

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5201NA	10-1/4" CIRC. SAW	299
5077B	7-1/4" HYPOID CIRC. SAW	139
5007NB	7-1/4" CIRC. SAW	114
5007NBA	7-1/4" CIRC. SAW W/ELEC. BRAKE	124
1900BW	3-1/4" PLANER W/CASE	113
1100	3-1/4" PLANER HD W/CASE	210
2708W	8-1/4" TABLE SAW	257
3612BR	3 HP PLUNGE ROUTER	199
3601B	1-3/8" HP D-HANDLE ROUTER	137
9030	1-1/8" X 21" BELT SANDER	135
9900B	3" X 21" BELT SANDER W/BAG	145
9924B	3" X 24" BELT SANDER	139
9924DB	3" X 24" BELT SANDER W/BAG	148
9401	4" X 24" BELT SANDER W/BAG	167
JR3000V	RECIPRO SAW W/CASE	121
6510LVR	3/8" VSR DRILL	85
6093DW	3/8" CORDLESS KIT 2SP VSR	127
EXTRA	9.6 VOLT BATTERY W/PURCHASE	26
B04510	4-3/8" X 4" FINISH SANDER	48

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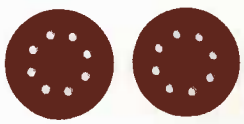
The Most Versatile Random Orbit Sander/Polisher You Can Buy.

Besides being a great sander, the 3283DVS makes an ideal polisher for your car or boat, and a variety of surfaces—painted, metal and plastic. In fact, it does so many jobs so well, it's really 2 tools in 1. Choose accessories for buffing, sanding and polishing flat or contoured surfaces. Through-the-disc dust removal eliminates dust at the source. Sanding discs last far longer and work surface scoring is virtually eliminated. Plus the dustless system gives you a cleaner workshop. The reusable hook-and-loop backed accessories go on and off quickly, easily—and never lose their gripping power from dust, heat, cold or moisture.

Bring out the best in every surface.



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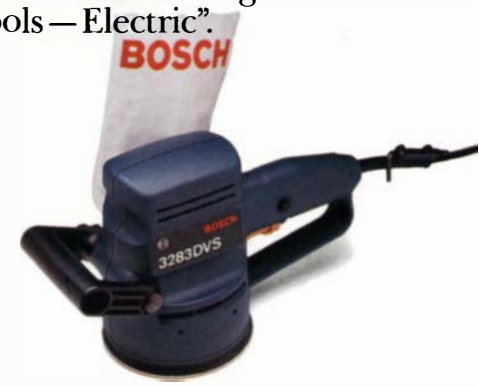

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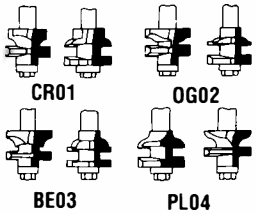

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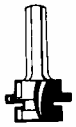

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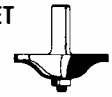

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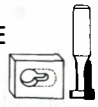

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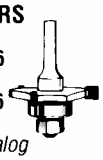
6 others in our free catalog



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	ST210	3/8	1	1/4	5.50
	ST213	1/2	1	1/4	5.50
	ST413E	1/2	2	1/2	14.00
	ST216	5/8	1	1/4	5.90
	ST219	3/4	1	1/4	8.50
Straight	ST425	1	1 3/16	1/2	8.80
	FT210	3/8	1	1/4	6.50
Flush Trim	FT213	1/2	1	1/4	6.50
	FT413	1/2	1 3/16	1/2	6.50
	DV210	3/8	3/8	1/4	4.60
	DV213	1/2	1/2	1/4	4.60
	DV413	1/2	1/2	1/2	4.60
	DV419	3/4	7/8	1/2	6.50
Dovetail	DV425	1	7/8	1/2	7.50
	CB206	1/4	1/4	1/4	8.00
	CB210	3/8	5/16	1/4	9.00
	CB213	1/2	3/8	1/4	11.00
	CB219	3/4	1/2	1/4	14.00
Core Box	CB425	1	5/8	1/2	16.00
	CH213	1 3/16	1/2	1/4	12.00
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	CH422	1 7/8	7/8	1/2	18.00
	RB232	1 1/4	1/2	1/4	12.00
Rabbet	RB432	1 1/4	1/2	1/2	12.00
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	CR205	3/16	7/16	1/4	10.00
	CR206	1/4	1/2	1/4	11.50
	CR210	3/8	5/8	1/4	14.00
	CR213	1/2	3/4	1/4	16.00
Rounding Over	CR419	3/4	1	1/2	20.00
	CR425	1	1 1/4	1/2	32.00
	RO204	5/32	15/32	1/4	15.00
Roman Ogee	RO206	1/4	3/4	1/4	16.00
	RO406	1/4	3/4	1/2	16.00
	CV203	1/8	3/8	1/4	11.00
	CV206	1/4	1/2	1/4	11.00
	CV210	3/8	9/16	1/4	12.00
	CV213	1/2	5/8	1/4	13.00
Cove	CV419	3/4	3/4	1/2	25.00
	CS206	1/4	5/8	1/4	19.00
Classical	CS406	1/4	5/8	1/2	19.00

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READER SERVICE NO. 108

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

***ARKANSAS:* Show**–Fall Festival arts & crafts show and sale, Oct. 19–21. Newton County Fairgrounds, Jasper. Sponsored by the Newton County Arts & Crafts Guild. For info, contact Betty Carpenter: (501) 294-5555.
Workshop–New Methods in the Cleaning of Paintings and Wooden Artifacts, July 11–16, 1991. Application deadline: Nov. 1. For info, contact Parker Restoration, Box 93, Gentry, 72734. (501) 736-8510.

***ARIZONA:* Exhibit**–Jacobson collection of turned bowls, thru Aug. 26. Arizona State University Art Museum, Nelson Fine Arts Center, Tempe, 85287. (602) 965-2787.

***CALIFORNIA:* Workshops**–Various workshops including Japanese woodworking, joinery and sharpening. Contact Hida Tool Co., 1333 San Pablo, Berkeley, 94702. (415) 524-3700.
Juried exhibition–Artistry in Wood '90, thru Aug. 26. The Sonoma County Museum, 425 7th St., Santa Rosa, 95401. Contact Wade Belew, Sonoma County Woodworkers Assoc., Box 4124, Santa Rosa, 95402. (707) 579-0264.
Juried shows–8th National Lathe-Turned Objects exhibition, thru Aug. 31. The Fine Art of Woodworking, Sept. 5–Oct. 28. Highlight Gallery, Box 1515, Mendocino, 95460. (707) 937-3132.
Exhibit–2nd annual exhibition of turned wood objects by members of the San Diego Woodturners, Sept. 15–16. Julian Town Hall, Julian. For info, contact Nan Bushley, 5065 Sleeping Indian Rd., Fallbrook, 92028. (619) 728-0591.
Exhibition–Wood Wise: A Knowledge of Wood, thru Sept. 16. Featuring furnishings, tables, chests, boxes and turnings. Workshops/demonstrations on the Saturdays through the show. Napa Art Center Gallery, 101 S. Coombs, Bldg. K, Napa, 94559. (707) 224-8176.
Show–Contemporary Masters, Sept. 22–Oct. 27. Current works by artists of the Jacobson collection. del Mano Gallery and Studio, 11981 San Vincente, Los Angeles, 90049. (213) 476-8508.
Show–Wood Design '90, thru Sept. 30. Humboldt Woodworking Society annual show. Ambiance, 226 F St., Eureka, 95501. (707) 445-8950.
Show–Southern California Woodworking World Show, Oct. 12–14. Los Angeles County Fairgrounds. Contact the Woodworking Association of North America, Box 706, Plymouth, NH 03264. (800) 521-7623, (603) 536-3768.
Workshop–Saw sharpening clinic and Japanese hand tools with Robert Meadow, Oct. 27–28. Contact J. vanArsdale, The Pull of the Saw, 3537 69th Ave., Oakland, 94605. (415) 635-7182.
Show–San Diego Woodworking Show, Nov. 2–4. Convention and Performing Arts Center, 202 C St., San Diego, 92101. For info, contact 1516 S. Pontius Ave., Los Angeles, 90025. (213) 477-8521, (800) 826-8257.
Show–Northern California Woodworking Show, Nov. 9–11. San Mateo County Fairgrounds, 2495 S. Delaware St., San Mateo, 94403. For info, contact 1516 S. Pontius Ave., Los Angeles, 90025. (213) 477-8521, (800) 826-8257.

***COLORADO:* Classes**–Woodworking and related classes, year-round. Red Rocks Community College, 13300 W. 6th Ave., Lakewood, 80401. (303) 988-6160.
Workshop–Wood sculpture with Ellen Driscoll, Aug. 20–24. Anderson Ranch Arts Center, Box 5598, Snowmass Village, 81615. (303) 923-3181.
Juried exhibit–6th annual exhibit sponsored by the Woodworkers Guild of Colorado Springs, Oct. 6–Nov. 11. Deadline for entries: Sept. 28–29. Colorado Springs Pioneers' Museum, Colorado Springs. Contact John Lewis, 918 N. Royer St., Colorado Springs, 80903. (719) 632-8548.

***CONNECTICUT:* Workshops**–18th-Century Carving Techniques, Sept. 15–16; evening woodworking, Sept. 27–Nov. 15; Fine Art Restoration, Sept. 29–30; Birdcarving, Sept. 27–Nov. 1; Introduction to Spindle Turning, Oct. 13–14; Boatbuilding, Oct. 19–21; Introduction to Power Tools and Equipment, Oct. 27–28; 18th-Century Woodworking Methods, Nov. 3–4. Contact Brookfield Craft Center, Box 122, Route 25, Brookfield, 06804. (203) 775-4526.
Exhibit–Wooden Fantasy, thru Aug. 25. Featuring wooden bowls, clocks, toys and folk art by local artisans. The Schoolhouse, Gales Ferry Craft Cooperative, 6 Hurlbutt Rd., Gales Ferry, 06335. (203) 437-1066.
Workshops–Various woodworking workshops, thru August. Contact Guilford Handcrafts, Box 589, Guilford, 06437. (203) 453-5947.
Juried festival–12th annual Holiday Festival, Nov. 3–Dec. 23. Application deadline: Sept. 15. Guilford Handcrafts Inc., Box 589, Guilford, 06437. (203) 453-5947.
Juried exhibition–The Celebration of American Crafts, Nov. 11–Dec. 23. Gilding the Lily, Mar. 24–Apr. 20, 1991. Deadline for slides: Sept. 15. National juried/invitational event. For info, contact Creative Arts Workshop, 80 Audubon St., New Haven, 06510.

***DELAWARE:* Conference**–The Substance of Style: New Perspectives on the American Arts & Crafts Movement, Oct. 19–20. Winterthur Museum, Winterthur, 19735. (302) 888-4600.

***DISTRICT OF COLUMBIA:* Exhibit**–Tradition and Innovation: New American Furniture, thru Sept. 3. Renwick Gallery, 17th St. & Pennsylvania Ave. N.W. For info, call (202) 357-2247.
Juried show–9th annual Washington Craft Show, Apr. 18–21, 1991. Departmental Auditorium, 1301 Constitution Ave., N.W. Application deadline: Oct. 13. For info, contact Women's Committee of the Smithsonian Associates, Arts & Industries Bldg., Room 1465, Smithsonian Institution. (202) 357-4000.

***FLORIDA:* Juried show**–5th annual Starke Festival of the Arts, Oct. 27–28. On the streets of downtown Starke. Entries deadline: Sept. 28. For info, contact Nancee Clark, Box 1530, Gainesville, 32602. (904) 372-1976.
Juried festival–28th annual Coconut Grove Arts Festival, Feb. 16–18, 1991. Application deadline: Sept. 15. For info, contact Coconut Grove Arts Festival, Box 330757, Coconut Grove, 33233-0757. (305) 447-0401.

***GEORGIA:* Juried exhibition and fair**–International Woodworking Fair Design Competition at the International Woodworking Machinery and Furniture Supply Fair, Aug. 24–27. Georgia World Congress Center, Atlanta. For info, contact Shirley Byron, International Woodworking Fair, 8931 Shady Grove Court, Gaithersburg, MD 20877.
Show–Art Buyers Caravan, Sept. 15–17. Sponsored by *Decor* magazine. Apparel Mart and Inforum, Atlanta Market Center, Atlanta. For info, call Paul Karel at (314) 421-5445.
Workshops–Japanese woodworking by Toshihiro Sahara. One Saturday each month, year-round. Contact Sahara Japanese Architectural Woodworks, 1716 Defoor Place N.W., Atlanta, 30018. (404) 355-1976.
Auction–Red Baron's fall auction, Oct. 5–7. Including Americana and fine furniture. Red Baron Antiques, 6450 Roswell Rd., Atlanta, 30328. (404) 252-3770.
Festival–20th annual fall festival, Oct. 13–14. The Prater's Mill Country Fair, 101 Timberland Dr., Dalton, 30720. (404) 259-5765.

***HAWAII:* Show**–5th annual Big Island Wood Show, thru Sept. 28. Wailoa Center, Hilo, Hawaii. Sponsored by the Big Island Woodworkers' Guild. For info, contact Bob Gleason, 45 Pohaku St., Hilo, 96720. (808) 935-7301.

***ILLINOIS:* Show**–Chicago area Woodworking World Show, Oct. 5–7. The Metro Center, Rockford. Contact the Woodworking Association of North America, Box 706, Plymouth, NH 03264. (800) 521-7623, (603) 536-3768.
Show–19th annual Midwestern Wood Carvers Show, Nov. 3–4. Belle-Claire Exposition Hall, 200 S. Belt East, Belleville. Sponsored by Belleville Wood Carvers Club. For info, contact Don Lougeay, 1830 E. D St., Belleville, 62221. (618) 233-5970.
Workshops–Windsor chairmaking and Shaker furniture, October and November. Five-day, live-in instruction. The Dovetail Joint, 1332 Harlem Blvd., Rockford, 61103. (815) 965-6677.

***INDIANA:* Juried show**–3rd annual Works in Wood, October. Chesterton Art Gallery. Featuring hand-crafted wood furniture and objects. Contact the gallery, Box 783, Chesterton, 46304. (219) 926-3041.
Festival–Chautauqua of the Arts, Sept. 22–23. Along the streets of Madison. For info, contact Dixie McDonough, 119 W. Main St., Madison, 47250. (812) 265-5080.

***IOWA:* Juried show**–World's Fair of Woodworking, Sept. 13–16. Contact World's Fair of Woodworking, Box 1422, Des Moines, 50305. (800) 441-0399.
Show–International Turned Objects Show, Oct. 27–Jan. 6. Iowa State University, Ames. For info, contact International Sculpture Center, 1050 Potomac St. N.W., Washington, DC 20007. (202) 965-6066.
Juried exhibit–Octagon Annual, Nov. 11–Dec. 30. Entry deadline: Sept. 1. Octagon Center for the Arts, 427 Douglas, Ames, 50010. (515) 232-5331.

***KENTUCKY:* Workshops**–Woodturning and joinery instruction, thru October. One day to one week. Contact Jim Hall, Adventure in Woods, 415 Center St., Berea, 40403. (606) 986-8083.
Show–Louisville Woodworking Show, Oct. 19–21. Commonwealth Convention Center, 221 4th Ave., Louisville, 40202. For info, contact 1516 S. Pontius Ave., Los Angeles, CA 90025. (213) 477-8521, (800) 826-8257.

***LOUISIANA:* Seminar**–Creating and Building a Successful Woodworking Business, Sept. 22. By furnituremaker Thomas Moser and sponsored by the Louisiana Furniture Industries Association. Contact Connie Couvillion at (504) 549-3831.
Juried show–15th annual Holiday Crafts Market, Nov. 17–18. City Park Botanical Gardens, New Orleans. Deadline: Aug. 31. Contact Louisiana Crafts Council, Box 1287, Baton Rouge, 70821. (504) 383-1782.

Juried competition–Lafayette Art Association annual national juried competition of two- and three-dimensional art, Apr. 1–30, 1991. Slides deadline: Jan. 15, 1991. For prospectus, contact Marta Fielding, Lafayette Art Gallery, 700 Lee, Lafayette, 70501.

***MAINE:* Workshops**–Various woodworking workshops, thru Aug. 31. Haystack Mountain School of Crafts, Box 87, Deer Isle, 04627. (207) 348-2306.

***MARYLAND:* Show**–Summer art show featuring works by the faculty and students from the Rhode Island School of Design and Southeastern Massachusetts University, thru Sept. 15. Meredith Gallery, 805 N. Charles St., Baltimore, 21201. (301) 837-3575.
Show–Baltimore/Washington Woodworking Show, Oct. 12–14. Festival Hall, Camden and Sharp Streets, Baltimore, 21201. For info, contact 1516 S. Pontius Ave., Los Angeles, CA 90025. (213) 477-8521, (800) 826-8257.

***MASSACHUSETTS:* Workshops**–Various workshops, thru Aug. 24. Nantucket Island School of Design & the Arts, Box 1848, Nantucket, 02554.
Juried exhibit–Handmade for the '90s, thru Sept. 9. The Berkshire Museum, 39 South St., Pittsfield, 01201. (413) 443-7171.
Workshops–House building, Aug. 27–Sept. 14; finish carpentry, Sept. 24–28; cabinetmaking, Oct. 1–5. Washington. Contact Will Beemer, Heartwood, Johnson Hill Rd., Washington, 01235. (413) 623-6677.
Workshop–Traditional timber framing with Jack Sobon and Dave Carlon, Sept. 26–30. Hancock Shaker Village, Hancock. Contact Jack Sobon, Box 201, Windsor, 01270. (413) 684-3223.
Workshop–Rustic furniture with Daniel Mack, Oct. 6. Williamsburg. Contact Horizons Craft Program, 374 Old Montague Rd., Amherst, 01002. (413) 549-4841.
Show–New England Woodworking World Show, Oct. 19–21. Eastern States Exposition Center, Springfield. Contact the Woodworking Association of North America, Box 706, Plymouth, NH 03264. (800) 521-7623, (603) 536-3768.
Classes–Woodworking classes, throughout most of the year. Boston Center for Adult Education, 5 Commonwealth Ave., Boston, 02116. (617) 267-4430.

***MINNESOTA:* Class**–Kiln Drying, Sept. 10–14. University of Minnesota, St. Paul. For info, contact Harlan Peterson, Dept. of Forest Products, Univ. of Minnesota, 2004 Folwell Ave., St. Paul, 55108. (612) 624-3407.
Show–Twin Cities Woodworking Show, Sept. 28–30. Minnesota State Fairgrounds, Snelling & Como Avenues, St. Paul, 55108. Contact 1516 S. Pontius Ave., Los Angeles, CA 90025. (213) 477-8521, (800) 826-8257.
Exhibit–8th annual Northern Woods Exhibit, Oct. 4–7. Bandana Square, Energy Park, St. Paul. Submission deadline: Sept. 1. Contact Elaine Carney, Orchard Woodworking, 948 Orchard Lane, Roseville, 55113. (612) 483-5647.

***MISSOURI:* Juried show**–Woodcarver's Showcase, Sept. 15–30. Silver Dollar City, Branson. For info, contact Silver Dollar City Chamber of Commerce, W. Highway 76, Branson, 65616. (417) 338-8210.
Fair–1st woodcraft fair, Oct. 20–21. Demonstrations, exhibits and for-sale items. Contact Paxton Beautiful Woods, 6311 St. John, Kansas City, 64123. (816) 483-7000.

***NEW HAMPSHIRE:* Classes**–Classes in fine arts and studio arts. Manchester Institute of Arts and Sciences, 114 Concord St., Manchester, 03104.
Classes–Various craft classes, including woodworking, year-round. Contact The Hand & I, Box 264, Route 25, Moultonboro, 03254. (603) 476-5121.
Juried show–National Rocking Chair Show, Sept. 15–Jan. 15. Hanover. For info, contact Lynne DiFrancesco, Rubens and Locke, 40 S. Main St., Hanover, 03755. (800) 333-3448, (603) 643-4327.
Meeting–Quarterly meeting of the Guild of New Hampshire Woodworkers, Sept. 15. 11 A.M. Business meeting with talk on woodworking with Japanese tools. At Paul Tuller's workshop. Contact Tuller, Pierce Rd., Dublin, 03444. (603) 563-8884.
Open house–Open house, Oct. 4–6. Reps and machines from 20 manufacturers. Woodshop Machines, 57 Regional Dr., Concord, 03301. (603) 228-2066.

***NEW JERSEY:* Workshop**–Making an acoustic guitar with Dick Boak, Aug. 24–31. For info, contact Peters Valley Craft Center, Layton, 07851. (201) 948-5200.
Exhibition–Regional Decoys, thru Sept. 9. Featuring 65 decoys from New England to California by 36 regional carvers. The Noyes Museum, Lily Lake Rd., Oceanville, 08231. (609) 652-8848.
Juried show–Super Crafts Star Show, Oct. 26–27. Giants Stadium Club, East Rutherford. For info, contact Creative Faires Ltd., Box 844, Tuxedo, NY 10987. (914) 351-5171.

***NEW MEXICO:* Classes**–Woodworking classes. Northern New Mexico Community College, El Rito, 87520. (505) 581-4501.

***NEW YORK:* Classes**–Various woodworking classes. Constantine, 2050 Eastchester Rd., Bronx, 10461. (212) 792-1600.
Competition–International Art Competition, thru Aug. 31. Marcuse Pfeifer Gallery, New York City. Multimedia

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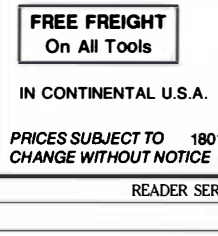

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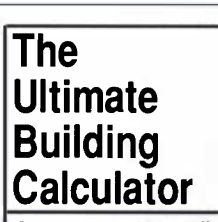

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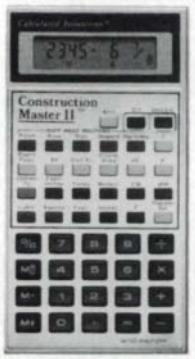

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competition, including wood and furniture. Contact I.A.C., Box 1058, Lodi, NJ 07644. (201) 646-0222.
Exhibit–Every Bird Has Its Own Story: The Carvings of Andrew Zergenyi, thru Sept. 1. DeWitt Historical Society of Tompkins County, 116 N. Cayuga St., Ithaca, 14850. (607) 273-8284.
Classes–Beginning Sept. 17: Americana whittling and carving with Jack Van Deckter, woodworking at three levels with Maurice Fraser, turning wood bowls at three levels with Bill Gundling, furniture finishing and refinishing with Susan Perry. Also, gilding with Susan Perry, Sept. 22; router techniques with Bill Gundling, Sept. 29; stenciling with bronze powder with Susan Perry, Sept. 29; router techniques with Bill Gundling, Sept. 30; tool sharpening with Bill Gundling, Oct. 6; Japanese hand tools with Robert Meadow, Oct. 20–21; tablesaw techniques with Bill Gundling, Nov. 3; restoration and reproduction turning with Bill Gundling, Nov. 17–18. The Crafts Student League, 610 Lexington Ave. at 53rd St., New York City. (212) 735-9732.
Workshops–Hand-tool workshops with Robert Meadow, Sept. 15–16, Oct. 13–14, Nov. 17–18, Dec. 8–9. The Luthierie, 2449 W. Saugerties Rd., Saugerties, 12477. (914) 246-5207.
Juried festival–16th annual Fall Festival Art and Craft Show, Oct. 6–7. Outside. Contact Fall Festival Art Committee, Box 808, Ellicottville, 14731. (716) 938-6794.
Juried show–Craft Art from Western New York 1990, Oct. 6–Nov. 25. Buffalo. Featuring artists having lived in western New York state. Contact Burchfield Art Center, Rockwell Hall, State University College at Buffalo, 1300 Elmwood Ave., Buffalo, 14222-1095.
Show–Upstate New York Woodworking Show, Oct. 5–7. Riverside Convention Center, 123 E. Main St., Rochester, 14604. For info, contact 1516 S. Pontius Ave., Los Angeles, CA 90025. (213) 477-8521, (800) 826-8257.
Exhibit–The Doghouse, thru Oct. 14. Cooper-Hewitt Museum, 2 E. 91st St., New York, 10128. (212) 860-6868.
Meetings–New York Woodturners Association, first Tuesday of each month. Woodturning techniques and exhibits also. The Crafts Student League, YWCA, 610 Lexington Ave., New York City.
Show–Central New York State Show, Nov. 3–4. New York State Fairgrounds, Center of Progress Bldg., State Fair Blvd., Syracuse, 13209. For info, contact the Woodworking Association of North America, Box 706, Plymouth, NH 03264. (800) 521-7623, (603) 536-3768.
Show–Albany Woodworking World Show, Nov. 9–11. New Scotland Ave. Armory, 130 Scotland Ave., Albany, 12208. For info, contact the Woodworking Association of North America, Box 706, Plymouth, NH 03264. (800) 521-7623, (603) 536-3768.

NORTH CAROLINA: **Show**–Carolina Woodworking World Show, Sept. 21–22. M.C. Benton Convention Center, Winston-Salem. Contact the Woodworking Association of North America, Box 706, Plymouth, NH 03264. (800) 521-7623, (603) 536-3768.
Fair–43rd annual Southern Highland Handicraft Guild Fair, Oct. 19–21. Asheville Civic Center, Asheville. Contact Alice Hardin, Box 9545, Asheville, 28815. (704) 298-7928.
Workshops–Various woodworking, woodturning and woodcarving workshops, year-round. Campbell Folk School, Brasstown, 28902. (800) 562-2440.

OHIO: **Show**–Greater Columbus Woodworking Show, Sept. 14–16. Ohio Expositions Center, 632 E. 11th Ave., Columbus, 43211. Contact 1516 S. Pontius Ave., Los Angeles, CA 90025. (213) 477-8521, (800) 826-8257.

OKLAHOMA: **Show**–6th annual Wonderful World of Wood Show, Nov. 9–11. Southroads Mall, 41st Street and S. Yale, Tulsa. Contact David Davies, 8274 E. 33rd St., Tulsa, 74145. (918) 664-8971.

OREGON: **Classes**–Various tool-making and woodworking classes, thru December. Also, Business of being an Artist, Oct. 20–21; Design, Production and Marketing of Fine Furniture, Nov. 10–11. Oregon School of Arts and Crafts, 8245 S.W. Barnes Rd., Portland, 97225. (503) 297-5544.
Juried show–14th annual Artistmarket Place, Sept. 1–3. Streets of downtown Portland. Contact Catherine Wygant, 7017 S.E. 84th Ave., Portland, 97266. (503) 774-0919.
Show–9th annual Having It Made, Oct. 12–14. Historic Erickson's Salon Bldg. Sponsored by Guild of Oregon Woodworkers. For info, contact Toni Judy, 3259 Jefferson-Scio Dr., Salem, 97352. (503) 327-2543.
Show–Oregon Woodworking Show, Oct. 26–28. Memorial Coliseum Complex, 1401 N. Wheeler St., Portland, 97227. For info, contact 1516 S. Pontius, Los Angeles, CA 90025. (213) 477-8521, (800) 826-8257.

PENNSYLVANIA: **Workshops**–Spindle turning with Palmer Sharpless, Aug. 25–26; shellac finishes with Don Williams, Sept. 15; build a sack-back Windsor with Mike Dunbar, Sept. 22–26; gold-leafing techniques with Bill Adair, Oct. 20; sharpening techniques with Prew Savoy, Oct. 27; green woodworking with Drew Langsner, Nov. 3–4; period finishes with Robert Mussey, Jr., Nov. 17; chip carving with Wayne Barton, Dec. 1–2. Olde Mill Cabinet Shoppe, 1660 Camp Betty Washington Rd., York, 17402. (717) 755-8884.
Juried exhibitions–Pull Up A Chair: A Contemporary Seating Exhibition, thru Sept. 23. National competition. Also, national juried exhibition of contemporary crafts, Oct. 6–Nov. 4. Water/Life, May 4–June 9, 1991; deadline: Jan. 15, 1991. The Dining Experience/A Craft Expression, Aug. 10–Sept. 22, 1991; deadline: Feb. 27, 1991. For info, contact Lynn Berkowitz, Luckenbach Mill Gallery, 459 Old York Rd., Bethlehem, 18018. (215) 691-0603.
Juried show–Studio Days '90, Sept. 21–30. Open to DE, DC, MD, NJ, PA, VA, WV. Contact Chester Spring Studio, Chester Springs. (215) 827-7277.
Workshops–Woodcarving workshops, thru Sept. 28. Bird carving, relief carving, sculpting with wood, woodcarving, clay sculpture. Sawmill Center for the Arts, Cooksburg, 16217. (814) 677-3707.
Show–Pittsburgh Tri-State Woodworking Show, Sept. 21–23. Pittsburgh ExpoMart, 105 Mall Blvd., Monroeville, 15146. Contact 1516 S. Pontius Ave., Los Angeles, CA 90025. (213) 477-8521, (800) 826-8257.
Festival–7th annual Penn's Colony Festival, Sept. 22–24. Route 528, Prospect. For info, contact Penn's Colony Festival, 603 E. End Ave., Pittsburgh, 15221. (412) 241-8006.
Juried fair–Lancaster Designer Craft Market, Nov. 2–4. Artworks Expo Center, Ephrata. For info, contact Jean Lehman, Box 765, Lancaster, 17603-0765. (717) 295-1500.

RHODE ISLAND: **Exhibit**–Tomorrow's Heirlooms Today, Sept. 5–9. Featuring contemporary furniture of particleboard and medium-density fiberboard. Warwick Mall, Providence. For info, contact PB/MDF Institute, 18298 Premiere Court, Gaithersburg, MD 20879. (301) 670-0604.

TENNESSEE: **Show**–Smoky Mountain Artistry in Wood, Oct. 6–7. Rodeway Inn , Knoxville. Contact Gary Falin, 693 Wright Rd., Alcoa, 37701.
Meeting–Hardwood Manufacturers Association fall production meeting, Oct. 3–5. Concourse Hotel, Madison. For info, contact HMA at (901) 346-2222.
Juried exhibition–Woodturning: Vision and Concept II, Oct. 24–Dec. 8. 4th annual American Association of Woodturners Symposium, including demonstrations and seminars by national turners, Oct. 25–27. Arrowmont School of Arts and Crafts, Box 567, Gatlinburg, 37738. (615) 436-5860.

TEXAS: **Classes**–Timber framing, Sept. 10–16; timber frame home design, Nov. 10–11. Contact Wynter Chauvin,

ORDER 1-800-328-0457 - MAIL ORDER HOURS 7:00-5:30 C.S.T. MONDAY-FRIDAY

DELTA BENCH TOP TOOLS

Model		List	Sale
23-700	Wet/dry grinder	201	159
23-680	6" bench grinder 1/4 H.P.	81	75
23-880	8" bench grinder 1/2 H.P.	136	115
11-950	8" drill press	164	139
14-040	14" drill press	313	309
40-150	15" hobby scroll saw	178	139
28-160	10" hobby band saw	189	144
31-050	1" belt sander 2.0 amp	93	78
31-460	4" belt/disc sander	178	139
31-340	NEW 1" belt/8" disc sander	226	175

NEW TOOLS BY DELTA

40-560	16" 2 spd scroll saw	266	185
23-580	5" Bench grinder 1/5HP	60	54
11-990	12" Bench Drill Press	266	185

DELTA STATIONARY

34-761	10" unisaw 1-1/2 H.P.	1715	1399
33-990	10" radial arm saw	727	569
37-280	6" motorized jointer	440	379
50-179	3/4 H.P. 2 stg. dust coll.	435	339
50-180	1 H.P. dust collector	535	449
50-181	2 H.P. dust collector	760	599
22-667	13" planer w/2 HP motor w/stand & ext. wings	1750	1099
33-050	NEW 8-1/4" Sawbuck	742	545
34-330	NEW 8-1/4" Tbl Saw 13A	321	195
34-985	1/6 H.P. stock feeder	698	599
32-100	NEW station plate joint	645	319
36-040	NEW 8-1/4" cmpd mitre	216	159
34-897	50" Delta unifence	500	338
36-755	NEW 10" Tilt Arbor Saw	1203	889

MILWAUKEE TOOLS

6527	NEW SawZall v/spd 8A w/cse & Quick Loc Cord	299	175
0399-1	NEW 12V cdless var/spd drill w/batt., charger & case	290	165
0395-1	9.6V cdless drill w/cse	270	154
0219-1	9.6V cdless drill w/cse	295	165
0224-1	3/8" drill 4.5A magnum	189	114
0234-1	1/2" drill 4.5A mag 0-850rpm	209	114
0244-1	1/2" drill 4.5A mag 0-600rpm	209	114
0222-1	3/8" drill 3.5A 0-1000 rpm	179	104
0228-1	3/8" drill 3.5A 0-1000 rpm	169	99
0375-1	3/8" close quarter drill	208	125
0379-1	1/2" close quarter drill	243	154
6539-1	Cdls. scrdrv. 190 rpm	119	69
6540-1	Cdls. scrdrv w/bits&case	159	108
6546-1	Cdls scrdrv 200&400rpm	126	79
3102-1	Plmbrs rt angle drill kit	330	189
3002-1	Electricians rt angle drill	330	185
5399	1/2" D-hdle ham drill kit	312	179
1676-1	H.D. Hole Hawg w/cs	429	235
6511	2 sp SawZall w/case	224	129
6750-1	Drywall gun 0-4000 4.5A	154	95
6507	TSC SawZall w/case	239	129
6170	14" chop saw	430	259
6014	Orb.sand 4.5" x 9.25"	209	122
8977	Var. temp heat gun	114	75
5397-1	3/8" v/sp ham. drill kit	232	137
5371-1	1/2" v/sp ham. drill kit	335	185
3107-1	1/2" v/sp rt angle drill kit	340	195
6754-1	Drywall gun 0-4000 4.5A	179	119
0230-1	3/8" drill 0-1700 rpm	189	107
3300-1	1/2" v/sp mag rt angle kit	309	179
5660	Router 1-1/2 H.P.-10A	325	195
5680	Router 2 H.P.-12A	355	225
5455	7/8" polisher 1750rpm	219	129
6215	16" chain saw	280	169
6365	7-1/4" circular saw	204	114
6366	7-1/4" circ saw w/fnc&bld	214	119
6368	7-1/4" circ saw w/fence blade & case	239	129
0216-1	2 sp cdls drill Hi-torque	245	139
0235-1	1/2" drill kyls. chuck mag	215	125
6016	1/4 sheet pad sander	84	49
6145	4.5" grinder 10,000 rpm	159	99
6142	6145 w/cse & access.	197	125
6749-1	Drywall gun 0-2500 4.5A	189	125
6377	7-1/4" worm drive saw	295	169

FREUD SAW BLADES
5/8" Bore - Industrial Grade
CARBIDE TIPPED SAW BLADES

Item No.	Description	Teeth	List	Sale
LU72M010	Gen Pur. -A.T.B.	10"40	58	38
LU82M010	Cut-off	10" 60	77	44
LU84M011	Comb.	10" 50	65	40
LU85M010	Super Cut-off	10" 80	96	55
LM72M010	Ripping	10" 24	57	37
LU73M010	Cut off	10" 60	70	44
LU87M010	Thin kerf	10" 24	60	38
LU88M010	Thin kerf	10" 60	74	44
LU98M010	Ultimate	10" 80	107	69
SD306	6" Dado - Carbide		184	105
SD308	8" Dado - Carbide		196	109
F0	1-3/4"X5/8"Bisc. 1000 Qty.		32	27
F10	2-1/8"X3/4"Bisc. 1000 Qty.		32	27
F20	2-3/8"X1"Bisc. 1000 Qty.		34	29
FA	Assor. Biscuits 1000 Qty.		34	29
WC106	6 pc. chisel set w/cs	1/4"-1"	73	52
WC110	10 pc. chisel set w/cse		119	79
FB100	16 pc. forstner bit set		284	155
FB107	7 pc. forstner bit set	1/4"-1"	82	49
94-100	5 pc router bit door system		288	155
JS100	Biscuit Jointer w/case		300	159
CE82	Planer w/case carb blds		218	135
FT2000	3-1/4 H.P. plunge router		299	185

THE NEW "TK" BLADE SERIES

Item	Description	Teeth	List	Sale
TK203	7 1/4" Framing	24	29	17.35
TK206	10" Framing	24	33	19.80
TK303	7 1/4" Finishing	40	36	21.60
TK306	10" Finishing	40	40	23.95
TK903	7 1/4" Combo	30	31	18.60
TK906	10" Combo	50	45	26.95

MAKITA CORDLESS

Model		List	Sale
6070DW	3/8 v/sp rev. drill, 7.2v	130	78
6071DWK	3/8 v/sp rev. drill w/removable batt. 7.2v	199	115
5090DW	3-3/8 saw kit. 9.6v	256	139
6010DWK	3/8 cdls drill kit. 7.2v	164	95
6010SDW	3/8 cdls drill, 7.2v	99	65
DA3000DW	3/8 angle drill. 7.2v	251	139
8400DW	Hammer drill kit. 9.6v	272	149
4390DW	9.6v cdls. recip saw kit	230	128
4300DW	Jig saw kit comp. 9.6v	232	129
6012HDW	2 spd. driver drill w/clutch & cse 9.6v	236	122
6092DW	V/sp drill, kit comp	250	127
6093DW	V/sp drill w/clutch-comp	261	129
6891DW	Drywall gun 0-1400 9.6v	237	135
632007-4	9.6 volt battery	48	30
632002-4	7.2 volt battery	40	28
5007NBA	7-1/4 saw w/elec. brake	233	129
5008NBA	8-1/4 saw w/elec. brake	284	158
8D4510	1/4 sheet pad sander	85	54
9900B	3 x21 belt sander w/bag	268	148
9924DB	3 x24 belt sander w/bag	282	149
9045N	1/2 sht fin. sand. w/bag	231	129
4200N	4-3/8 circ. saw 7.5A	225	127
4301BV	Orb. v/sp jig saw 3.5A	289	155
JR3000V	Vs. recip saw w/cse	227	129
LS1020	New 10" miter saw	463	245
9820-2	Blade sharpener	373	195
19008W	3-3/4 planer w/cse	209	115
1911B	4-3/8 planer 7.5A	240	139
1100	3-1/4 planer w/case	401	219
9207SPC	7" sander-polisher	276	155
3601B	1-3/8 H.P. router	255	139
3700B	1/2 H.P. trimmer	190	109
9501BZ	4" grinder, 3.5 amp	126	75
BD4530	6" round sander	101	59
BD4550	1/4 sht pad sand w/bag	86	55
DA3000R	3/8" angle drill	270	148
6302	3/8" v/sp 5.2 Amp drill	209	105
HP2010N	3/4" v/sp hmr. drill w/cs	300	165
2708W	8-1/4" table saw	504	259
2711	10" table saw w/brake	841	489
2030N	12" planer/jointer	3120	1699
2040	15-5/8" planer	2595	1399
1805B	6-1/8" planer kit /case	679	359
5005BA	5-1/2" circular saw	223	135
6404	3/8" drill 0-2100 rpm 2A	104	65
6510LVR	3/8" drill rev. 0-1050 rpm	145	79
6013BR	1/2" drill rev. 6 Amp	241	139
5402A	16" circular saw-12 Amp	636	349
3612BR	3 H.P. plunge router	377	189
9401	4" x 24" belt sander w/bg	318	175
3620	1-1/4 H.P. plunge router	192	109
4302C	V sped. orb. jig saw	302	159
5077B	7-1/4" Hypoid saw	252	145
LS1440	14" Miter saw	721	439
2414	14" cut-off saw AC/DC	351	199
5007NB	7-1/4" circ saw 13A	209	114
3612B	3 HP plunge rout sq/bs	377	189

SENCO AIR NAILERS

Model		List	Sale
SFN1	Finishing nailer 1"-2"	377	269
SFN2	Fin. nailer 1.5"-2.5"	571	395
SN325	Nailer 1-7/8"-3-1/4"	665	445
SN4	Gen'l purpose 2"-3-1/2"	685	469
LS2	Pinner 5/8"-1"	351	249
SKS	Stapler 5/8"-1-1/2"	351	249
LS5	Pinner 1"-1-1/2"	399	285

BOSTITCH AIR NAILERS

Model		List	Sale
N80C-1	Utility coil nailer	795	399
N80S-1	Stick nailer	795	399
T36-50	Sheath & decking stapler	595	334
N12B-1	Coil roofing nailer	795	399
N60FN-2	Finishing nailer	625	335
T31	Brad nailer	245	149
CWC100	1 HP Pancake Comp.	445	295

SKIL SIZZLERS

Model		List	Sale
6850-02	NEW 1/2" EMH hammer drill w/case 4 amp	255	129
5510	(551)5-1/2" circ saw	112	105
5625	(552)6-1/2" circ saw	175	129
5656	(553)7-1/4" circ saw	132	125
5790	(810)10-1/4" circ - dr ft	400	269
5825	(367)6-1/2" worm saw	229	155
5865	(825)8-1/4" worm saw	250	164
3810	10" Miter saw	263	225
3810S	3810 w/60 tooth carb bld.		239
77	7-1/4" worm drive saw	230	145
5350	2-1/3 HP circ. saw	82	75
5250	2-1/4 HP circ. saw	69	64
2735-04	12v v/spd cordless drill complete w/cse. & 2 batt.	210	144

LEIGH DOVETAIL JIGS
D1258R-12-List 329.00-Sale 255.00
D1258R-24-List 399.00-Sale 295.00
LEIGH INSTRUCTIONAL VIDEO-SALE 29.00!!

MMT	12" multiple mort. & tenon attachment for D1258-12	269	219
MMT	24" multiple mort. & tenon attachment for D1258-24	299	239

HITACHI TOOLS

Model		List	Sale
TR8	Plunge router, 1-1/2 H.P.	219	119
M12V	NEW 3H.P. v/sp router	437	249
TR12	Plunge router, 3 H.P.	354	178
C10FA	10" dlxe. mitre saw	490	275
C12FA	NEW 12" mitre saw	586	339
C8FB	8-1/2" slide cmpd saw	859	469
FREUD LU91M008	8.5"c/bld 48 tooth	58	49
C15FB	15" miter saw	745	385
FREUD LU85M015	15"c/bld 108 tooth	181	115

PIRANHA By Black & Decker CARBIDE TOOTH SAW BLADE

Model #	Dia.	#Teeth	List	Sale
73-716	6-1/2	18	13.70	7.35
73-717	7-1/4	18	13.90	7.99
73-737	7-1/4	24	17.20	9.29
73-757	7-1/4	40	31.30	16.79
73-759	8-1/4	40	44.65	24.99
73-719	8-1/4	22	19.65	11.95
73-715	5-1/2	16	13.70	7.99
73-740	10	32	33.20	15.95
73-770	10	60	61.46	29.95
73-711	10	50	65.08	29.95

PANASONIC CORDLESS

Model		List	Sale
EY6205B	NEW v/spd. 12 volt drill w/15 minute charger	390	219
EY6200B	NEW 2 spd. 12 volt drill d-hdle w/15 minute charger	350	195
EY6281B	NEW v/spd. 9.6 volt drill w/15 minute charger	350	189
EY571B	V/spd. 9.6 volt drill	239	135

JORGENSEN STEEL I-BAR CLAMPS

Model	Size	List	Sale
7224	24	27.11	17.55
7236	36	29.10	18.65
7248	48	31.96	19.75
7260	60	35.60	23.55
7272	72	37.30	25.29

ADJUSTABLE HANDSCREWS BY JORGENSEN

Item#	Jaw Length	Open Cap	List	Sale	Box of 6
#3/0	6"	3	15.57	8.89	49.98
#2/0	7	3-1/2	16.74	9.95	53.55
#0	8	4-1/2	18.63	11.95	62.95
#1	10	6	21.30	12.99	71.49
#2	12	8-1/2	24.45	15.95	81.89
#3	14	10	31.01	18.95	104.95
#4	16	12	40.30	24.89	146.85

STYLE "J" ADJUSTABLE HANDSCREW KITS

Model	Jaw Length	List	Sale	Lots of 6
J06	6	8.50	5.49	31.29
J08	8	9.50	6.09	34.69
J10	10	11.10	8.89	50.55
J12	12	13.79	9.99	54.95

STYLE 37 2-1/2" Throat 1/4"x3/4" JORGENSEN

Item#	Jaw Length	List	Sale	Box of 6
3706	6	9.30	6.29	35.65
3712	12	10.30	6.79	38.59
3718	18	11.37	7.35	41.69
3724	24	12.42	7.99	45.25
3730	30	13.85	9.05	51.19
3736	36	15.15	9.95	56.65

PONY SPRING CLAMPS

Model	Size	List	Sale	Lots of 25
3201HT	1	2.25	1.35	31.99
3202HT	2	3.39	1.85	43.95
3203HT	3	6.45	4.04	89.00
3204HT	4	10.75	6.99	159.00

PONY CLAMP FIXTURES

Model		List	Sale	Lots of 12
50	3/4" black pipe clamps	13.10	7.89	83.99
52	1/2" black pipe clamps	10.93	6.30	68.25

BOSCH

Model		List	Sale
1581VS	Top hdle. jig saw	239	133
1582VSC	NEW CLIC Barrell jig saw	245	133
1582VS	Barrell grip jig saw	225	124
	Bosch metal case for above jig saws	34	30
	Bosch blade assortment for jig saws 30 of Bosch's best selling blades		25.99
1942	Heat gun 650°-900°	99	75
1272D	3"x24" belt sander w/bag	299	175
1273D	4"x24" belt sander w/bag	315	182
1290D	1/2 sheet sander w/bag	209	129
11-212VSR	Bulldog 3/4"SDS rtry. drill	339	195
1198VSR	1/2" v/sp hammer drill	229	135
1608	5.6A lam trimmer	140	89
1608L	Same/above w/trim gd	145	92
1609	5.6A offset base trimmer	205	122
1609K	Lam installers kit w/1609	295	169
1601	1 HP Router	165	105
1602	1-1/2 HP Router	199	125
1603	1/2 HP D hndl router	223	139
1604	1-3/4 HP 2 hdle router	219	122
1604K	Same/above w/cs&acc.	269	166
1606	1-3/4 HP D hdle Router	243	149
3258	3-1/4" planer w/blde grd	210	129
3270D	3"x21"belt sand w/bag	225	135
1273DVS	V/sp 4x24 belt sander	339	189
1611	3 H.P. plunge router	349	205
1611EVS	3 H.P. V/sp router	410	234
1651	7-1/4"circ.saw drop ft	179	109
1654	7-1/4"circ. saw pvt base	179	109
1632VSRK	Recip saw 8.4A orb-v/sp.	225	135
3050 VSRK	NEW 9.6V v/sp cdls.drill w/case & 2 batteries	235	135
3283DVS	NEW 5" Random orbit disc sander 2.3 Amp	159	119

HEGNER SCROLL SAWS

Model		List	Sale
Multi Max 14	var./spd. w/stand	799	735
Multi Max 18	var./spd. w/stand	999	819

ELU BY BLACK & DECKER

Model		List	Sale
3338	2.25 HP v/sp plunge rout	387	255
3304	1 HP v/sp plunge router	261	178
3375	3-1/8 univ. planer 7.2A	280	188
3380	Biscuit jointer w/case	485	265
4024	3x21 v/sp belt sander	289	195
3303	1 H.P. plunge router	210	159
4023	3x21 belt sander 5.2A	261	185
4029	4x24 belt sander 9.2A	469	319

BLACK & DECKER

Model		List	Sale
1166	3/8 drill 0-2500rpm 4A	96	59
2600	3/8 drill 0-1200rpm 4.5A	125	85
1707	8.5 crosscut miter saw	813	449
1703	10 miter saw w/73-770 bld	313	179
3047-09	7-1/4 super saw cat w/br	282	169
3048-09	8-1/4 super saw cat w/br.	297	185

BIESEMEYER FENCES

	50 commer. saw fence	329	285
	52 homeshop saw fence	249	229

JET TOOLS

Model		List	Sale
JBS-14MW	14" band saw 1 HP	482	385
JTS-10	10" tbl saw w/std 1.5 HP	554	459
JTS-12	12" tbl saw w/std 1.5 HP	630	509
JWS-18	1/2" shaper w/std 1 HP	479	375
JJ-4	4" jointer, 1/2 H.P.	310	285
JJ-6	6" jointer, 3/4 H.P.	465	385
JWP12	12.5" bench plnr 2 H.P.	569	379
JWP12D	Dust chute for JWP12	45	22
JSG-6	6" x 48" belt & disc sander, 1-1/2 H.P.	634	465
OR1758	17" bnch drill prs. 5 HP	319	289
OR1458F	14" flr drill press 3/4 HP	369	325
OR1758F	17" flr drill press 3/4 HP	395	349

RYOBI SPECIALS

Model		List	Sale
R500	2-1/4 HP plunge router	326	155
TS25IU	10" miter saw	392	177
TS25IUS	10" miter w/acc. kit & B&D 73-770 carb bld	435	219
AP10	10" surface planer 13A.	820	358
RA200	8-1/4" radial arm saw	515	245
RE600	3 H.P. plunge router	398	215
R150K	1 HP plunge router w/cs	206	105
BE321	3x21 v/sp belt sander	259	129
JP-155	6-1/8" jointer-planer	602	309

PORTER CABLE

690	1.5 HP router 8A	225	128
691	1.5 HP router D hdle	245	137
536	1.5 HP speedmatic router	310	198
518	3 HP 5 speed router	560	338
520	3 HP 15A router	510	315
695	1.5 HP router/shaper	310	198
696	H.D. shaper table	170	119
351	3 x21 belt sand w/o bag	225	128
352	3 x21 belt sand w/bag	235	133
360	3 x24 belt sand w/bag	310	175
361	3 x24 belt sand w/o bag	290	169
362	4 x24 belt sand w/bag	325	185
363	4 x24 belt sand w/o bag	310	179
315-1	7-1/4 top hdle circ saw	195	115
9315-1	315-1 comp w/cs&carb bld.	225	129
617	7-1/4 pushhandle saw	195	115
9617	617 comp. w/cs & carb bld	225	129
314	4-1/2 trim saw 4.5A	215	128
9548	X HD bayonet saw w/cs	290	192
9629	Recip saw v/sp 8A	235	137
9627	Recip saw 2 spd 8A	225	128
666	3/8 HD vsp drill 0-1200rpm	185	122
621	3/8 HD vsp 0-1000rpm	155	95
320	Abrasive plane 3 Amp	160	109
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7511	3/8 v/sp drill 5.2 Amp	185	115
7514	1/2 v/sp drill 0-750rpm	195	119
537	1.5 HP D hdle router	325	203
7548	Top hdl jig saw 4.8A	230	129
7648	Barrel grip jig saw 4.8A	225	139
330	Speed block sand 1/4 sht	97	55
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Show–7th annual charity show and sale, Oct. 26–27. Greenspoint Mall. Sponsored by the Woodworkers' Club of Houston. Contact Bill Sallans, 1131 Glourie Dr., Houston, 77055. (713) 465-0291.
Juried competition–American Society of Furniture Artists and Council for the Visual and Performing Arts art-furniture competition and exhibition, Apr. 8–May 3, 1991. University of Texas Medical School Gallery, Houston. Entry deadline: Dec. 1990. For prospectus, contact ASOFA, Competition, Box 270188, Houston, 77277-0188.

UTAH: **Juried exhibit**–The New Utah Furniture: Contemporary Concepts, Sept. 22–December. Nora Eccles Harrison Museum of Art, Utah State University, Logan, 84322. (801) 750-1412.

VERMONT: **Workshop**–Shaker oval boxes with John Wilson, Sept. 5–6. Vermont State Craft Center at Frog Hollow, Middlebury, 05353. (802) 388-3177.

VIRGINIA: **Competition**–7th annual International Creative Marquetry Show (ICMS), Oct. 30–Nov. 21. The Hofheimer Library, Virginia Wesleyan College, Norfolk. Contact Suzanne Cartwright, 63 Church Lane, Sproughton, Ipswitch, Suffolk, IP8 3AY, England, or Joyce Howell, Virginia Wesleyan College, 1584 Wesleyan Dr., Norfolk, 23502.

WASHINGTON: **Exhibitions**–Country show featuring furniture accessories, thru Sept. 2; curly colorations by Michael Neiman, thru Sept. 30; musical instruments featuring work of luthiers, drum makers and flute makers, Sept. 6–Oct. 28; 10th anniversary members-only show, Oct. 3–Nov. 10. Northwest Gallery, 202 First Ave. S., Seattle, 98104. (206) 625-0542.
Workshops–Wooden boat repair, Sept. 24–28; caulking and canvas decks, Oct. 6; tools workshop, Oct. 13; block making, Oct. 20; ship nameboard carving, Oct. 27; open house, Sept. 8–9. Northwest School of Wooden Boatbuilding, 251 Otto St., Port Townsend, 98368. (206) 385-4948.
Classes–Woodworking classes, year-round. Also, beginning three-dimensional carving, Sept. 22–Oct. 27. Contact Port Gamble Klallan Tribe, Box 280, Kingston, 98346. (206) 638-2794.

Juried show–Clock show, Oct. 25. Slide deadline: Sept. 1. Also, woodworking and furniture by area artists on display, year-round. Artwood, 1000 Harris Ave., Bellingham, 98225. (206) 647-1628.
Show–Annual woodworking show/arts alive festival, Oct. 27–28, Nov. 3–4. LaConner Civic Garden Club, 622 2nd St., LaConner. Sponsored by Northwest Corner Woodworker's Association and The Wood Merchant. Contact Dianne Lindsay, 474 Lois Lane, Sedro Woolley, 98284. (206) 856-4947.
Juried show–10th annual Woodcarving Show, Nov. 10–11. Western Washington Fairgrounds Expo Hall, Puyallup. Sponsored by Northwest Carvers Association. Contact NCA, Box 6092, Federal Way, 98063-6092. (206) 564-3278.
Show–Western Washington Woodworking Show, Nov. 16–18. Seattle Center, 305 Harrison St., Seattle, 98109. For info, contact 1516 S. Pontius Ave., Los Angeles, CA 90025. (213) 477-8521, (800) 826-8257.
Meetings–Northwest Woodworkers Guild, last Wednesday of each month. Contact Kirk Kelsey, 744 N. 78th, Seattle, 98103. (206) 789-2142.

WEST VIRGINIA: **Workshop**–Shaker oval boxes with John Wilson, Oct. 5–6. Crafts Center, Cedar Lakes, Ripley, 25271. (304) 372-7005.

WISCONSIN: **Show**–Milwaukee Woodworking World Show, Oct. 26–28. MECCA, Milwaukee. For info, contact Woodworking Association of North America, Box 706, Plymouth, NH 03264. (800) 521-7623, (603) 536-3768.

CANADA: **Classes**–Various woodworking classes including bird carving, wood sculpture, willow chairmaking and more. Contact the Haliburton School of Fine Arts, Box 339, Haliburton, Ont., K0M 1S0. (705) 457-1680.
Workshops–Intermediate woodturning with Jason Marlow, Aug. 20–22; Tage Frid teaches woodworking, Oct. 12–14. Tools 'n Space Woodworking, 338 Catherine St., Victoria, B.C., V9A 3S8. (604) 383-9600.
Exhibit–Turned vessels by Ted Hodgetts, Sept. 1–Oct. 31; Fieldcote Memorial Park and Museum, Box 7099, Ancaster, Ont., L9G 3L3. (416) 648-8140.
Juried exhibit–Dimensions, last three weeks in September. 10th Street Gallery, 328 10th St. N.W., Calgary. Open to residents of Alta., B.C., Sask., Man. Contact Southern Alberta Woodworkers Society, Box 6753, Station D, Calgary, Alta., T2P 2E6. (403) 230-7991.
Juried exhibition–Explorations in Wood, Dec. 2, 1990–Jan. 13, 1991. Maltwood Gallery, Victoria, B.C. Entries deadline: Oct. 31. For info, contact Glenn Gerein at (604) 382-1939 or (604) 592-8264.
Meetings–Canadian Woodturners Assoc. meetings, throughout the year. Second Tuesday of each month. Contact Bob Stone, Box 8812, Ottawa, Ont., K1G 3J1. (613) 824-2378.
Meetings–Blue Mountain Woodworking Club meetings, throughout the year. Third Wednesday of each month. Contact Glenn Carruthers, Box 795, Stayner, Ont., L0M 1S0. (705) 444-1752.

ENGLAND: **Classes**–Woodworking classes. Smith's Gallery, 56 Earlham St., WC2. Contact Laetitia Powell, Parnham, Beaminster, Dorset, DT8 3NA. (0308) 862204.
Exhibit–Waywood's annual exhibition, Sept. 8–9, Oxford. For information, contact Waywood, Eynsham Park Sawmill, Cuckoo Lane, N. Leigh, Witney, Oxford, OX8 6PS. (0993) 882748.
Exhibit–Wood for the Trees, Sept. 10–27. Work by selected members of Green Turners. Oxford Gallery, 23 High St., Oxford, OX1 4AH. (0865) 242731.
Exhibit–Diverse Cultures, thru Oct. 14. Celebrating British craft culture. Crafts Council Gallery, 12 Waterloo Place, London, SW1Y 4AU. 071-930-4811.

FRANCE: **Démonstrations**–Démonstrations par les artisans–professeurs de "La Main et l'Esprit," sculpture sur bois, tournage. Ebénisterie. Dorure. Vernissage au tampon. Finitions. Patines. Cannage et rempaillage. Peinture marbre et bois. Reliure. Sept. 22 et 23. Bruxelles, rue de Fierlant, 123 1060 Belgique. 02/538.09.70.

NORWAY: **Class**–Basic log building, Oct. 6–19. Norsk Folkemuseum, Oslo. For info, contact Great Lakes School of Log Building, 3544 Grand Ave., Minneapolis, MN 55408. (612) 822-5955.

PHILIPPINES: **Exhibition**–Phil Build '90, International Construction Equipment and Building Materials exhibition, Oct. 15–19. Philippine International Convention Centre, Manila. Contact SHK International Services Ltd., National Mutual Centre, 151 Gloucester Rd., Hong Kong.

SWITZERLAND: **Tour**–Woodworkers' tour, Sept. 7–16. For info, contact Drew Langsner, Country Workshops, 90 Mill Creek Rd., Marshall, NC 28753. (704) 656-2280.
Tour–Woodworking/woodcarving tour, Sept. 25–Oct. 8. Contact Wayne Barton, Alpine School of Woodcarving, 225 Vine Ave., Park Ridge, IL 60068. (708) 692-2822.

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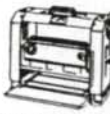

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Classic Chinese Furniture by Wang Shixiang. *Han-Shan Tang Ltd., 717 Fulham Road, London SW6 5UL, England; 1986. $95; 328 pp.*

Chinese woodworkers of the classic period (the Ming and early Ching dynasties) built furniture that has an unmistakable "signature." It is distinctive in its forms, materials, construction and style of decoration. This great furniture tradition has been known in the West for centuries, but only in recent decades has it received scholarly attention. Gustav Ecke's book was the first to include photographs of a representative collection of Chinese pieces. Since then George Kates, R.H. Ellsworth and Michel Beurdeley have produced large, well-illustrated volumes on Chinese furniture. Now at last we have a major treatise on the subject by a Chinese scholar, collector, and connoisseur of furniture, Wang Shixiang.

Classic Chinese Furniture combines the best features of the coffee-table book and the scholarly treatise. The photographs are breathtaking, and the text, although brief, is full of technical information. The book is beautifully bound and a feast for the eyes.

Wang Shixiang speaks with authority on his subject. He has written on a wide range of Chinese arts and crafts, and has been studying and collecting Chinese furniture for more than 40 years. In the process of restoring worn and damaged pieces, he has watched and learned from contemporary Beijing cabinetmakers, the inheritors of the classic tradition. He has taken a particular interest in the terms they use to describe and classify furniture types, joints and details. His text covers the history of Chinese furniture, the woods used, the principle furniture forms, joinery, decoration, and the appreciation and use of furniture in China.

Classic Chinese Furniture differs from other works on the subject chiefly in its thoroughness and attention to detail. The book is systematic in its classification of furniture types and use of furniture terminology. Each photograph is labeled with a complete description including the vintage of the piece shown, the type(s) of wood used, the basic form of the piece, significant structural features, dimensions and location (museum or private collection). The author's notes following the plates include many interesting observations and critical remarks about design and decoration. The following, from p. 287, is typical: "Since the table is less than one meter long, its strength is not seriously affected by the fact that neither the elongated bridle joint nor the inserted shoulder joint is used. A small defect in the design is that the four legs are a little too narrow. If they were just one centimeter wider, the proportions of the table would be more satisfactory."

The translators have taken great pains to provide literal English equivalents for Chinese terminology. The two basic forms of Chinese furniture that Gustav Ecke identifies as "box form" and "post and rail form" are rendered as "waisted" (i.e. having a waist) and "waistless" forms. Structural and decorative details are given technical names, such as "apron head spandrel," "humpbacked stretcher," "everted flange," and the like. While such terminology may seem to be of interest only to specialists, it draws our attention to characteristic features of this furniture and helps us to see into the minds of Chinese designers.

In one section of the book, Wang Shixiang recapitulates his 1980 article on the aesthetics of Chinese furniture design, "The Merits and Defects of Ming and Early Qing Furniture." The "merits" include simplicity, purity, awkwardness, sharpness, fluidity, emptiness, and other qualities. For each quality the author refers to a specific piece of furniture that embodies it. I found this discussion fascinating and all too brief. The "defects" listed in the article are not discussed in this book, and that is unfortunate, because a discussion of artistic failures could have been very instructive for readers interested in problems of design.

At $95, this is not a book most of us will purchase casually. It is more like a fine tool which can be used and enjoyed for a lifetime.

—Allan Smith

Build Your Own Wood Toys by R.J. DeCristoforo. *Sterling Publishing Co., 387 Park Ave. S., New York, N.Y. 10016-8810; 1989. $12.95, paperback; 273 pp.*

R.J. DeCristoforo offers a thorough introduction to the basic woodworking skills of toy making. He has excellent charts for the beginning woodworker, pays careful attention to the construction details, and gives the best coverage of pull-toy construction (including basic design options) that I've ever seen.

However, DeCristoforo has a definite design style, and it carries over from his furniture to his toys. His toys are functional, but so far from attractive as to be almost ugly. Some actually are ugly.

If you're looking for aid with the construction and mechanical design for both simple and moving toys, the book will be helpful. If you are already fairly competent in furniture design, and are looking to add toy-making skills to your repertoire, this book might be worth adding to your shelves. But if you are looking for a book with good technical help *and* aesthetically pleasing toys, DeCristoforo will be a disappointment.

—Richard Griffin

Marquetry by Pierre Ramond. *The Taunton Press, 63 S. Main St., Box 5506, Newtown, Conn. 06470-5506; 1989. $59.95, hardback; 240 pp.*

Marquetry has been used to decorate French furniture in most of the important styles from Louis XIV to the Art Deco period. This tradition has produced generations of talented craftsmen; and in France today marquetry remains a serious endeavor. Many individual practitioners of the craft were taught by Pierre Ramond, who is a professor at the Ecole Boulle and the Sorbonne University.

Those who have an interest in marquetry can be grateful that Ramond's book has now been translated and published in English. It offers a very complete study of the subject with an emphasis on traditional techniques and furniture decoration.

The book begins with a history of furniture with marquetry decoration. While the emphasis is on French furniture, other countries are included. The heart of the writing is technical: Ramond discusses the main methods of cutting marquetry, but his passion is what he calls the "piece-by-piece" technique, which was very popular in the late 18th century and demands great skill.

Marquetry gives detailed treatment of different materials used in furniture decoration, such as metals, mother of pearl, etc. The section of the book dealing with geometric parquetry cutting is very thorough. For the truly ambitious, Ramond has included a set of scale drawings on the construction of the traditional marquetry tools. Although the text is filled with technical terms, the translators have done an admirable job in making the book quite readable.

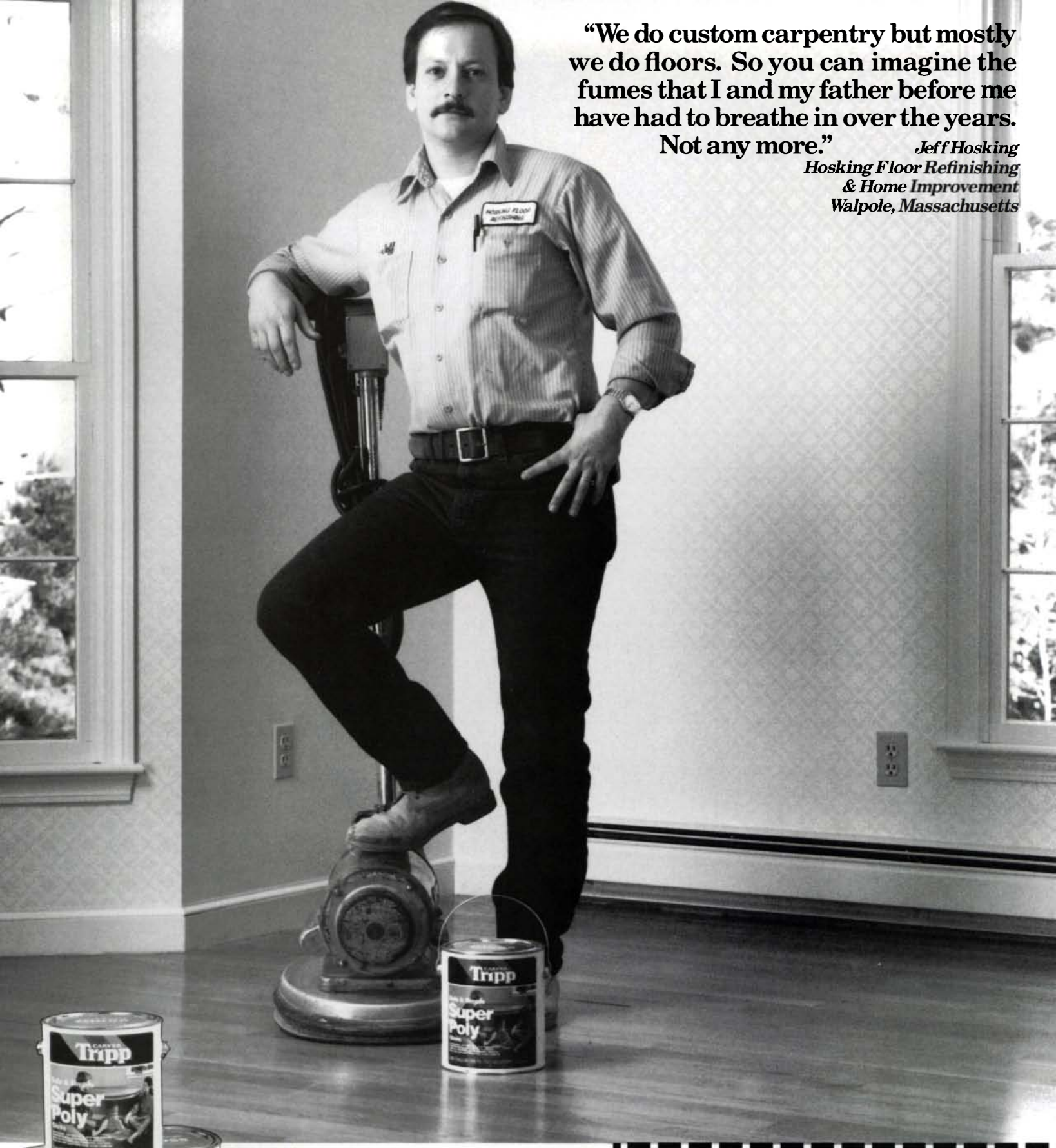
I do have two criticisms of the book. First, although it is profusely illustrated with color and black-and-white photographs, there is a small percentage of pictures that are not of the highest quality. A subject like marquetry demands good pictographic presentation. Second, I am disappointed that any book published in the United States in 1989 would include a discussion of embargoed products (ivory, tortoiseshell, etc.), implicitly approving of their use.

This book should be of interest to anyone seriously interested in marquetry and the reproduction of antique furniture. If one presumes that good furniture design flows from an intimate knowledge of the craft, then *Marquetry's* greatest contribution may be that we can look at classic pieces of furniture with new understanding.

—Silas Kopf

Modern Cabinetmaking by William D. Umstattd. *Goodheart-Willcox Co., 123 W. Taft Drive, South Holland, Ill. 60473; 1990. $32, hardback; 796 pp.*

This textbook will surprise you. Despite its 796 pages, there is very little in here that a moderately accomplished woodworker



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does not already know. In fact, if you've been working wood for more than a couple of years, you'll quickly find that the topics are covered in a rudimentary manner.

I can't pretend I read every page carefully, but I spent a couple of days with the book, and here are some observations. Among other things, the author leaves out information on vacuum presses for veneering, featherboards, Japanese waterstones and, in the list of suitable cabinetmaking woods, white pine. "Specie," used throughout the book, is not the singular of species, but a word meaning coin money. The concepts regarding equilibrium moisture content are wrongly defined and incorrectly interpreted. A "dog hole" is not planer tearout, but a scar left by the metal hook—the dog—that grips the log during sawmilling. While "spice knot" and "trip scale" are somewhat poetic, they should read spike and rip. There is also some confusion about right and left in figure 40-34. Labels are misplaced in figure 20-48. Tempered glass *does* break up into tiny pieces. A couple of "cabinet scrapers" shown are actually spokeshaves. And there's a lot more of this.

I'm particularly irritated by captions that say "The guard was removed to show the operation," because many of the operations could not have been performed with the guard in place. I'm mildly annoyed by the author changing the name yellow poplar to American tulipwood; he spells the Latin name wrong, too. I'm delighted, however, when an author reminds us to feed a router in the direction of the bit's rotation; but in this book, there are photos showing this going the other way!

Additionally, the author recommends some practices that I wouldn't; for example, I wouldn't tear sandpaper, but cut it; a regular office paper cutter works great, and a small, used model is fairly cheap. At the lathe, I wouldn't cut a V-notch using the short point of a skew. I wouldn't attempt a shearing cut using a single-bevel scraping tool with the bevel up. I wouldn't melt a shellac stick using an open, yellow flame—the carbon in it will pollute the stick's color. I also wouldn't try the process shown in figure 40-43 because it won't work. Figure 21-16A reminds us to use a spacer block against the rip fence when cutting repeat sizes with the miter gauge, so that the work can't be trapped between the fence and the blade. But the spacer block shown is too narrow, and the piece *can* be trapped diagonally, and you are likely to eat it. I could go on, but by now you've gotten the point.

On the positive side, the chapter on spraying is probably the best I've ever read. The method for drawing an ellipse is terrific. And the author does "cover" just about everything: machines, finishing techniques, woods, glues, jigs, design considerations, and how to get, hold, and even advance in a woodworking job. In the hands of a good teacher—to steer a student past the trouble spots and expand on the ultra-basic information given—this could be an acceptable industrial-arts text. *—Jim Cummins*

The First American Furniture Finisher's Manual: a reprint of 'The Cabinet-Maker's Guide of 1827' edited by Robert D. Mussey Jr. *Dover Publications Inc., 31 E. 2nd St., Mineola, N.Y. 11501; 1987. $4.95, paperback; 120 pp.*

This book presents a fascinating look into how early woodworkers applied their primitive finishes to the furniture that we prize so highly today as antiques. If you restore or reproduce period furniture, you will find a wealth of interesting formulas for early finishes, as well as information on how to apply them. Until this book was reprinted, much of this information was, to my knowledge, unavailable to the general public. Since the original volume was first published in 1827, many of the ingredients are completely un-

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known to us, such as the stain on p. 24. We are instructed that, "To stain beech a mahogany color, take 2 oz. of dragon's blood, break it in pieces and put it into a quart of rectified spirits of wine." These instructions would leave even the most knowledgeable modern finisher in a quandary if it were not for the excellent glossary that Mussey has included in the front of the book. We find that dragon's blood is a dark red resin from a tree grown in East Africa and that spirits of wine is nothing more than ethyl alcohol.

The last part of the book has a collection of information on gilding, bronzing, japanning and mirror silvering, and listed under miscellaneous are such obscure procedures as how to bleach ivory and how to resilver brass clock faces. The appendix contains some interesting tables on the computation of the board feet in a plank or log. It is interesting to note that Table 3, board feet in a log, goes up to the circumference of 96 in. or a diameter of 30.5 in. Oh, to have lived in the days when trees like that were common.

This is an informative and interesting book at a modest price and one that you should own if you are a serious finisher or are interested in the primitive methods used by our early American predecessors. *–James Lea*

Parsons' Mill by Timothy Lewontin. *University Press of New England, 17½ Lebanon St., Hanover, N.H. 03755; 1989. $12.95 clothbound; 192 pp.*

Parsons' Mill is a sharply focused, thoroughly enjoyable non-fiction account of the author's short career as an apprentice sawyer in a Vermont sawmill. Lewontin's crisp images pop like flashbulbs to capture the sawmill's cranky machinery, its blue-collar workers and especially its darkly eccentric owner, Henry Parsons.

In the first few pages, Lewontin gives us a glimpse of the mill. With its gray clapboard siding, its six-over-six sash windows, and its lean brick smokestack, the mill had an order and simplicity, a self-containedness, that gave it the imaginative promise of a toy model. Later we discover that the mill's main products are ash dowels for ladder rungs and wooden-tennis-racquet lamination strips.

Lewontin's first job in the mill is trimming dowels to length. Later he progresses through several other jobs including operating the doweler, assisting at the headsaw, rolling logs around the yard with a peavey—even dusting the mill while all the other hands are on vacation. But the high point of Lewontin's sawmill career is the time he spends operating the ripsaw, a job second in responsibility only to the head sawyer.

The author breathes personality into the mill's touchy machinery through extraordinary observation and descriptive skills. But this is not a book just about machines. It is also about working men, their eccentricities, pecking orders, one-up games and vulnerabilities. And the truths touched here don't just apply to mill hands. Lewontin's description of the workers' maneuverings at break time to use a prized cushioned seat could easily be transposed into a polished corporate boardroom setting.

So if you're curious about the workings of a sawmill and like a well-written story, I recommend *Parsons' Mill*. Unfortunately, the odds of your picking up a copy in you local bookstore are slim; so order directly from the publisher. *–Jim Richey*

Allan Smith is a cabinetmaker in Pennington, N.J. Richard Griffin is an amateur woodworker in Oak Park, Ill. Silas Kopf has a woodworking shop in Northampton, Mass. Jim Cummins is an amateur woodworker in Woodstock, N.Y. James Lea is a professional cabinetmaker and coatings chemist in Rockport, Maine. Jim Richey is a woodworker in Katy, Tex.

The Second International Contemporary Furniture Fair

Although not as large or as well established as the furniture exhibitions of Cologne or Milan, New York's International Contemporary Furniture Fair (ICFF) is quickly becoming one of America's premier showcases for high-quality furniture. In just its second year, the ICFF has doubled in size and this year featured the work of more than 230 designers, manufacturers and distributors from 11 countries.

I had a chance to attend the ICFF during its four-day run at the Javits Convention Center in New York City last May. At the show, co-sponsored by *Metropolis* magazine and George Little Management Inc., I joined the crowds of architects, interior designers, retail-shop owners and general public (admitted on the last day) who came to see the latest in all forms of furnishings. More than 150 American exhibitors, as well as 75 companies from around the world displayed a melange of furnishings: chairs, desks, couches, tables, beds, cabinets, armoires, sculptural decorations, lamps and interior accessories. British furnituremakers made a particularly good showing at the ICFF, with a contingent of 25 exhibitors. The British Overseas Board of Trade sponsored the trip to the ICFF for these participants, who were selected on the basis of their work.

The exhibitors ranged from one-man shops making custom furniture to huge international manufacturers producing multiple lines of furnishings. A majority of the booths at the ICFF, however, were occupied by small businesses that design and/or produce furniture on a limited-production basis. Designforms of Grass Lake, Mich., is one such business, run by Carter Blocksma and his wife Gail McCulloch. The mahogany, wenge and sapele armoire (shown in the photo below, right) is one of more than half a dozen furniture pieces they produce in small-quantity runs, in addition to custom furniture and cabinets. The couple came to ICFF this year both because they found it affordable and a good vehicle to meet prospective clients; when we met at the show, one client had already expressed interest in their rocking chairs, for possible export to Germany and Japan.

While some of the larger, international

Photo: Po Ku

Photo: Hampton Bridwell

Photo: Carter Blocksma

Above, right: "Deco Drama" is a limited production piece made by Carter Blocksma. It has an aromatic cedar lining and two doors when configured as an armoire as shown. But it is a versatile piece: it can also be made into an entertainment center to house a television and stereo equipment.

Above, left: Although reminiscent of the Art Deco era, Po Ku used computer-assisted design (CAD) to create this desk of American cherry, Australian lacewood, steel, plated brass and cast aluminum. He cut some of the decorative metal pieces with computer-assisted lasers.

Bottom, left: It took Mark Nathenson more than 300 hours to complete this "Southwest Chest." The 26Hx52Wx28D blanket chest has a purpleheart frame, panels of painted poplar, and an inside lining of Indian blanket material.

furniture companies that showed at ICFF, like Palazzetti, displayed lines of classic furniture pieces originally designed by famous architects, such as Charles Rennie Mackintosh and Gerrit Reitveld, there were also dozens of young designers showing their recent work. Po Ku, founder of and designer for Quess Furniture, based in Toronto, Ont., Canada, showed his "Hawksmoor" executive furniture line, including the desk, shown in the top, left photo on p. 122. The desk is representative of the clean-lined, superbly crafted high-end furniture that abounded at ICFF. On a smaller scale, many designer/craftsmen displayed only a few one-of-a-kind pieces or prototypes, with the hopes of attracting commercial interest in their work. Michael Reilly, who runs an architectural millwork and cabinet shop in Bridgehampton, N.Y., had just one piece in the booth he shared with colleagues to defray show costs: a large cherry poster bed with built-in drawers and curtains hung from a tester frame that was topped at the corners by cut out and painted clouds and papier-maché angels.

The composition of the furnishings displayed at the ICFF were as divergent as the exhibitors who created them. While wood, metal, glass, leather and fabrics were the most common materials in view, the show abounded with examples of furniture that employed high-tech synthetic materials, automotive-paint technology and modern plastic laminates. The contrast of traditional, earthy materials with modern, man-made materials certainly kept visitors entertained: One booth displayed a pair of 10-ft.-high electric-blue Greek columns that were part of a line of single-piece molded foam furnishings by Kong of Munich, Germany. Just down the isle was a collection of the latest rustic chairs by Daniel Mack of New York City. He made them from twigs and tree branches, whittled and fitted together and several pieces had old hand tools incorporated directly into the finished products.

Another satisfying aspect of the show was the plethora of different styles encompassed by the work; more than enough to fulfill even the most eclectic tastes. Furniture that fit into readily identifiable categories, such as art nouveau, Art Deco and post modern was plentiful, but synthetic styles that combined varied influences were also prevalent. Consider, for example, the purpleheart-and-poplar blanket chest, shown in the bottom, left photo on p. 122, designed and built by Mark Nathenson of Rochester, N.Y. It combines a traditional Southwestern motif with playful, colorful graphics and sculpture in a style that might be described as "Santa Fe post modern."

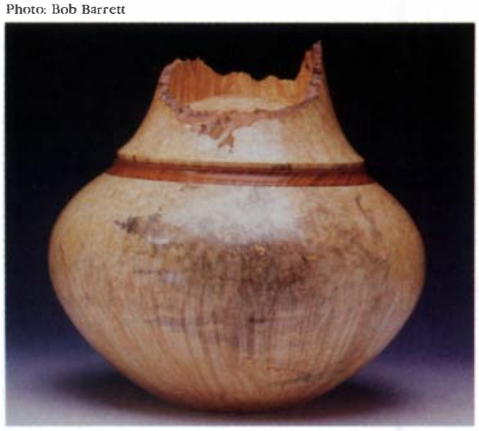
A stroll around the ICFF revealed not only a diversity of styles and materials, but also a wide range of craftsmanship; the fit and finish of the work ran the gamut from pedantic and precious to positively funky and far-out. The silky elegance and flawless joinery of the laminated holly "Millennium 3" chair by English designer/craftsman and educator John Makepeace was only a few booths down from a collection of gigantic, rough-hewn yew wood and fiber chairs by another English woodworker, Julienne Dolphin-Wilding. These giant, more-visual-than-functional chairs looked as if they were designed as seating for Amazon warriors.

So was the ICFF a success for the designers and craftsmen who paid to attend? According to most of the exhibitors I spoke with, there were very few actual sales made at the show; so this question remains to be answered. What is clear, however, is that the ICFF is a substantial and growing forum for both young and established furniture designers and craftsmen to display their work in an international arena. And that's not an opportunity that American craftsmen have everyday.

Details on the third annual International Contemporary Furniture Fair, scheduled for May 19-22, 1991, is available from George Little Management Inc., 2 Park Ave., Suite 1110, New York, N.Y. 10016; 212-686-6070.

–Sandor Nagyszalanczy

Photo: Bob Barrett



Mode's lidded vessel, 11 in. dia. by 10 in. high and with a natural-edge top, is turned from box elder burl. A mulberry band is inlaid beneath the lid.

Turn, Turn, Turn

For every season there is a turning exhibition. The world of the woodturner is spinning with activity, and there is no shortage of outlets for displaying the artists' creative talents. The photos here, from three exhibitions that have or will be taking place in Rochester, N.Y., Philadelphia, Pa., and Los Angeles, Cal., show the range and diversity of the art of woodturning that has evolved over the last few decades. Each also offers a peek at the historical roots of this movement. Steve Loar, guest curator of the "Contemporary Wood Turners" exhibition at the Dawson Gallery in Rochester, N.Y., divides modern turners into one of three generations, each with a tendency to emphasize one of the three aspects of form: media, process or concept. Loar says that the first-generation artists, or pioneers, seem to be most drawn to the media. The second-generation turners of the 1960s and 1970s tend to emphasize technique. And the current generation's "emerging artists" utilize these developments, but feel the viewer needs to be pushed beyond thinking "Oh, it's a wood bowl." In these shows, the viewer can see the work of all three generations and develop a better feel for the evolution of the turner's art.

"Contemporary Wood Turners," an invitational exhibit held Jan. 12 through Feb. 13, 1990, at the Dawson Gallery in Rochester, N.Y., featured 22 of today's foremost turners from the United States and Canada. Richard Tannen, an assistant professor of woodworking at Rochester Institute of Technology and a custom-furniture maker in Rochester, N.Y., had the following comments on this exhibition:

"Although each entry was made of wood and turned on the lathe, the styles ranged from traditional, functional vessels to non-functional, sculptural forms." This is evident in the works by Michael Mode (see the left photo) and Steve Loar (see the photo at right). Tannen went on to say, "Mode's pieces demonstrated high-quality craftsmanship, common to all the work in the show, in elegant utilitarian form. While some of the artists abandoned any pretense of function in their pursuit of form, Loar's pieces used conventional bowl forms in a very sculptural presentation." Loar says that the show's preponderance of sculptural turnings is not an indication of prejudice on his part, but more an indication of the "...explosion of interest and activity (in this area) in the last 10 years."

"Pennsylvania Lathe-Turned Objects: Trends, Transitions, Traditions 1700-1990," the joint effort of the Woodmere Art Museum and The Wood Turning Center, both of

Photo: Tony Gerardi

Steve Loar's "Memories of East Texas," a 9Hx17Wx8D sculpture in maple, dogwood, oak and birch, is typical of work from "emerging artists."

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Philadelphia, Pa., ran April 20 through July 15, 1990. The following review was written by Steve Loar, an associate professor in the School of Art and Design of the Rochester Institute of Technology (N.Y.) where he teaches three-dimensional design.

"Pennsylvania is one of a very few regions in the United States that could be the source for such an impressive grouping of objects within the narrow confines of a specific media and process," said Loar. "The innovation, questioning and rate of exchange which so characterizes this country is encapsulated in the work of this exhibition, as reflected in Mark Sfirri's and Robert Dodges's wall mirror (see the top, left photo), and Jack Hanson's sculpture (see the bottom, left photo)."

Photo: Mark Sfirri

***Above:** The joint efforts of Mark Sfirri, turner, and Robert Dodge, painter, produced this wall mirror, "Edfu Young." Although there is historical precedence for the split and painted turnings, this piece reflects the new tradition, where a concept skillfully executed creates a harmonious form that reveals a diversity of elements.* ***Below:** Jack Hanson's "Balloon," a 10Hx8Wx4½D sculpture of madrone burl and manzanita burl, re-examines the concept of using burls and thin-walled vessels.*

Photo: Ed Bosley

Loar said that "Curator Albert LeCoff's choices for the show make it clear that the earlier periods made use of a wide variety of detailed decorative spindle turnings that, generally, came together in utilitarian pieces. One sees this breadth diminished to singular individuals and businesses that survive in a world overcome by large-volume mechanized turnings. Since the late 1940s, contemporary turners have radically interpreted hand-turning. They produce work that is boldly innovative and individualistic; They are concerned more with form than with function and show a definite infatuation with the vessel. There is an obvious concern with establishing and maintaining high levels of design and craftsmanship. The pieces that are somewhat thick, rounded or not totally refined tend to be from the late 1970s or early 1980s, and are generally the early pieces from individuals who have since gone on to fully develop a style or technique. It is apparent that public critique of one's work helps these qualities. Given woodturning's utilitarian background and the very real temptation for artists to produce slick and superfluous statements or to channel energy into building bigger and better equipment, the contemporary woodturning movement will need to continue to labor as it focuses increasingly on 'what' to make instead of 'how' to make it."

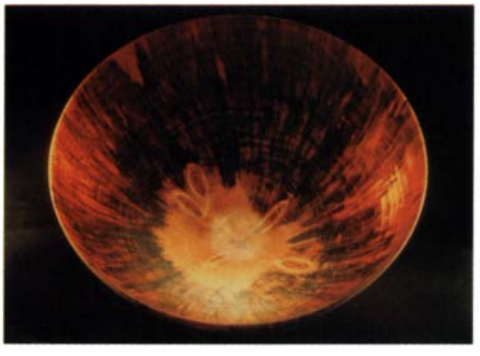
"Contemporary Masters," an exhibition of current work by the artists of the Edward Jacobson collection of turned wood bowls, will be at the del Mano Gallery and Studio, Los Angeles, Cal., Sept. 22 through Oct. 27, 1990. Edward Jacobson, a Phoenix, Ariz., attorney and one of the first and most prominent collectors, began buying turnings about eight years ago after a group of museum art directors visited his apartment. Although Jacobson thought the art directors would be interested in his collection of surrealist paintings or other sculpture, they were most excited about some turned bowls he had recently acquired. Because of this reaction, Jacobson, with the advice of some of the top turners, art directors and gallery owners in the country, began collecting bowls in earnest.

The more than 22 artists in the collection include many of today's better-known turners, such as David Ellsworth, Mark and Melvin Lindquist, William Hunter (see his piece in the top, right photo), Rude Osolnik, Bob Stocksdale and Ron Kent (see his work in the bottom, right photo), with some of the pieces having been turned more than 50 years ago. The collection, selected by the Smithsonian Institution for a three-year national tour, visited 12 major exhibition sites throughout the United States from 1986

Photo: George Post

***Above:** William Hunter's recent work includes this superbly crafted piece with flutes carved in ebony entitled "Squash Blossom."* ***Below:** The walls of Ron Kent's 7-in.-high by 19-in.-dia. bowl of Norfolk Island pine are turned thin enough to have become translucent.*

Photo: William Waterfall



through 1989 and has been a major factor in the greater exposure that turners are now enjoying. Last winter, Jacobson presented the collection to the Nelson Fine Arts Center of Arizona State University.

The del Mano exhibition will showcase current pieces by these artists, as well as display photos of their previous turnings. For some of the artists, development has been gradual, while others' new work is of a radically different style, and still others are no longer turning. A lecture on Friday, Sept. 21, 1990, will include presentations by James Prestini, professor emeritus of design at the University of California, Berkeley, Cal.; Rudy Turk, Arizona State University art director; and members of the American Association of Woodturners (AAW). For more information, contact the del Mano Gallery and Studio, 11981 San Vincente, Los Angeles, Cal. 90049; 213-476-8508.

—Charley Robinson

Notes and Comment

Do you know something we don't about the woodworking scene in your area? Please take a moment to fill us in. Notes and Comment pays for stories, tidbits, commentary and reports on exhibits and events. Send manuscripts and color slides (or, black-and-white photos—preferably with negatives) to Notes and Comment, Fine Woodworking, *Box 5506, Newtown, Conn. 06470-5506.*

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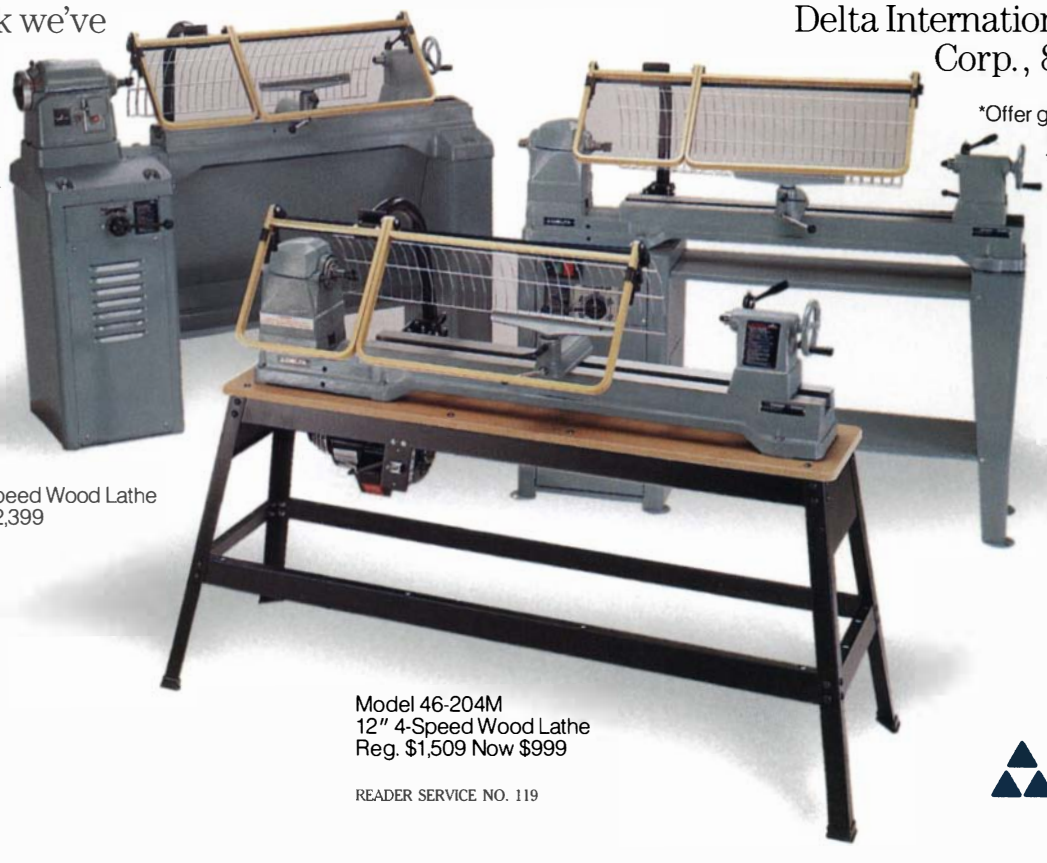

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PATCHWORK PYRAMIDS

Photos: Morse Peterson Photography

Alison A. Sahlman, Tampa, Fla., often combined her paintings with wooden constructions. One project involved about 100, 2¼-in.-dia. paintings: some were studies for larger works; some were cut from unfinished canvases; some were mini compositions. Unfortunately, she died before using the discs in one of her mosaic-like constructions. Her son, William Sahlman, of Weston, Mass., commissioned Peter Dean, of Charlestown, Mass., to build a piece of furniture to display the mini paintings. Reacting to Mrs. Sahlman's interest in geometric patterns, Dean mounted 83 of the discs, and a photo of the artist, on the sides of bleached-maple pyramids built into this glass-top, pearwood table that measures 17Hx52½Wx26½D.