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April 1993, No. 99
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Fine WoodWorking®

March/April 1993 No. 99

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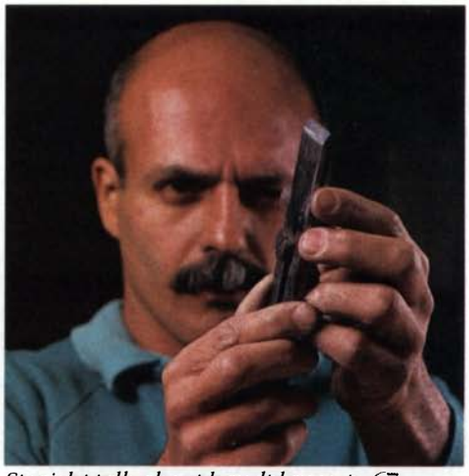

Straight talk about handplanes, p. 67

Rejuvenating with wax, p. 81

Angled tenons on tablesaw, p. 44

On the Cover: *Norm Abram applies Watco oil to an oak sideboard, one of* The New Yankee Workshop's *pieces for 1993. More on the show and Abram's work on p. 46. Photo: Alec Waters.*

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Get real—The plethora of articles, letters and advertisements promoting accuracy in tens of thousandths of an inch is ridiculous. Our raw material (wood) is notoriously unstable, and, if the truth were known, wood probably resents anything beyond 1/64 in. To maintain measurements in increments that require many zeros and decimal points suggests, too, that the door to the shop never be opened, breeze stirred, fan turned on, deep breath taken or expelled. We're not going to the moon from here. *—Robert Behm, New Wilmington, Pa.*

Antifreeze alert—I read with alarm David Carnell's letter (*Fine Woodworking* #97) about treating wood with ethylene glycol antifreeze because he makes no mention of its double-deadly properties. Ethylene glycol is toxic if ingested in any significant amount. Its sweet taste and bright color make it attractive to many animals and perhaps young children. Lethal poisonings of pets, particularly dogs, certain farm animals and many types of wild animals are common. Less common, but very significant, are cases of accidental ingestion by humans.

Amounts of less than a teaspoon of undilute ethylene glycol are enough to kill a child. A tablespoon of ethylene glycol can kill an adult. It can be readily absorbed through the skin as well. Ethylene glycol is a slow-acting poison, affecting the kidneys and the central nervous system. Symptoms include depression, dizziness and lack of coordination, excessive urination, possibly vomiting and foaming at the mouth, and eventual death. Treatment is difficult, expensive and not always successful. Kidney damage can be irreversible.

Anyone using antifreeze, dilute or undilute, for any purpose including wood treatment, please take precautions in handling and storage. Don't keep it in uncovered or unmarked containers, and don't let it escape onto the ground, driveway or shop floor. In the case of suspected ingestion, contact the appropriate medical help—doctor, veterinarian or poison control center—without delay. *—Jackie Strouble, Pittsboro, N.C.*

Locknut logic—Joe Moore, in "Last words on locknuts" (*FWW* #97) restates the classic fallacy about locknuts. John Douglas is right in *FWW* #96. The threads of a tightened nut press on the threads of the bolt away from the clamped object. If a second nut is brought up behind it, the second nut lifts the first off the threads of the bolt, and takes all the load, including that required to hold the two nuts together. *—David E. Truax, Bethel Park, Pa.*

Rosewood ban—I read with interest Jeff Greef's comments about the Convention on International Trade in Endangered Species (CITES) and rosewood (*FWW* #98). There are several areas that should be clarified. The CITES ban on trade of rose-

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wood applies only to Brazilian rosewood or *Dalbergia nigra*. Other species of rosewoods are not affected by CITES. The treaty does affect several other species of woods.

Also, the treaty rules apply to any article of any age, including antique musical instruments. The treaty extends far beyond rough lumber and veneer.

Speaking realistically, none of the 115 CITES signatories has any remote possibility of enforcing the regulations of CITES. The problems of discerning various forms of legal *Dalbergia* from the banned *D. nigra*, the unreasonable delay in issuing government permits, and the general lack of manpower at customs inspections facilities will encourage widespread disregard for the spirit of the CITES treaty. The fact that Brazil subsidizes its citizens to clear and burn an acre of rain forest but will not permit them to export any of the *D. nigra* harvested from that acre does not help matters. *—R.E. Bruné, Evanston, Ill.*

Drill presses are all wrong—All manufacturers are making essentially the same drill press. It is a 19th-century design for small machine shops, and the only thing that has changed for this century is that the line shaft pulley has been replaced with an electric motor. It is totally unsuited for the woodworker.

In all existing drill presses, the base is too small. The table is too small for woodworking, and it is the wrong height and the wrong material. The power head is too heavy and is not provided with a convenient method to raise and lower it. Stepped pulley speed change is almost as archaic as the line shaft.

In a woodworker's drill press, the base should have a wide stance using conventional pressed steel legs to hold the table at workbench height. Table mounting clips should be provided for ease of fastening and leveling the table. The table should be plywood or particleboard so that threaded inserts can be installed to hold fixtures, so that woodcutting tools are not damaged by contact, so that holes can be bored through it for sanding drums, and so that it can be easily replaced when damaged or when a different size or shape is desired.

The column should be fastened to the base at the level of the table in the manner of the column for a radial-arm saw. The power head should easily move up and down the column by rack and pinion. A variable-speed motor should be mounted at the front end of the arm to directly drive the chuck. And, of course, the machine should be as rigid and accurate as a good drill press. For tall work, the arm can be rotated to the edge of the table and the work clamped to the table. The arm can be rotated over a bored hole for drum sanding.

This tool would not only be a great improvement over the conventional drill press, but also would save space in the home shop by replacing the drill press, the support stands, the oscillating drum sander, the router table and the overhead pin router. I would be happy to correspond with an interested manufacturer to critique a prototype and to buy the production model.
—Eugene C. Hise, Oak Ridge, Tenn.

Varnish better than oil—The article on boiled linseed oil finish (*FWW* #97) requires comment. Boiled linseed applied thirty years ago turns black, as I expected. The system used by Tom Wisshack may not blacken, but I would be skeptical. The necessity to reapply every few years is not satisfactory either.

We have varnish-finished chairs 150 to 200 years old that are still good. What more could one want of a finish? Surface finishes such as varnish take more time and trouble. However, such finishes enhance the light reflective quality of fine wood—if built up to fill the pores—and offer good resistance to normal wear. The beauty of black walnut, maple or wild cherry is in its reflection of light. Oil under varnish enhances light reflection. Other than that, you couldn't give me oil finishes. They are never removable for refinishing, don't resist abrasion, let stains such as ink or orange pop soak in and don't maximize the beauty of the wood over the years. *—George C. Williston, Wooster, Ohio*

Utility woodworking—I am delighted with your new series regarding utility woodworking. I think there are a lot of us out here that enjoy *Fine Woodworking* immensely but feel klutzy after reading many of the articles each month. I have to draw my plans and engineer the projects I make to fit my skills and the tools I have.

Your bookcase in the recent issue (*Fine Woodworking* #98) is a wonderful example. Your basic plan and concept is great (particularly the square peg for the round hole to accommodate warping). I can add a back. I can simply screw it on. I may add some trim on the front and at the top. I like your concept because it is not bowed, curved, inlaid or hand-carved. The bookcase that I build for my wife's office will use your concept but will use my limited tools (no biscuit joiner) and might look quite different from yours.

I liked your information on "Selecting #2 pine." While information on finishing some exotic wood is interesting, I am not in the market for a helluva lot of exotic wood. I buy my pine and fir, occasionally oak, and plywood from the local lumberyard and from The Home Depot. *—Fred R. Penick, Conyers, Ga.*

Save the sole—This is in response to all of the people who still advocate laying a plane on its side. We all had this beat into our brains back in junior high shop class. I also remember my grandmother telling me something about a stork....

The most important part of a plane is the sole. It needs to be flat and have no scratches or burrs on it, which will cause a mark in the wood. These burrs are hard to remove without altering the accuracy of the sole. To protect the sole from accidental damage from all of our other metal tools, it should be laid flat on the bench. Now the sole of the plane is safe.

As far as the blade goes, think about it, it's a tempered piece of steel designed to cut wood, not get cut by wood. Laying it on a piece of wood cannot possibly damage the cutting edge. I've used handplanes with scratches in the sole. It seemed like a waste of time since I then had to attack the wood with 100-grit sandpaper to remove the scratches left by the plane. By the way, these planes did not belong to me. My planes are always laid on the bench, and stored in the toolbox flat, not on their side.
—Ed Speas, Ballground, Ga.

Keeping goggles fog free—I read with interest the question in *FWW* #97 about keeping safety goggles from fogging up. Mr. Nagyszalanczy responded with several elegant and expensive solutions. Surgeons encounter this problem when they wear a surgical mask and glasses. They apply a drop or two of liquid detergent to the lens, smear it with their finger and wipe it dry with tissue or cloth. Because the fog is due to myriads of tiny droplets condensing on the lens, this breaks the surface tension of all the droplets and eliminates fogging.
—Steven A. Frank, M.D., Spotswood, N.J.

Trial by fire—After failing to consider the hard wood, the dull router bit and worn brushes, and being too eager to get the job done, I slipped on my denim jacket and cranked my router up. Everything seemed to be purring like a kitten when I detected smoke in the air. I immediately cut off the router, pulled the plug and checked the bit. No excessive amount of heat, and the lumber didn't seem burned or discolored. So I cranked it up again, taking it a little slower to avoid putting too much pressure on the machine.

Well, I smelled more smoke, so I shut her down, pulled the plug and checked thoroughly. Nothing seemed unusual except the increased amount of smoke. I raised my arm to cut on the

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overhead fan and realized that my sleeve was literally on fire. Not an open flame, but the sawdust up my sleeve was glowing like mad, and the smoke was billowing out. So I did a quick striptease right then and there.

No harm was done except one sleeve ended up being a little shorter than the other. And now when I look back on it, I do recall that I did see a spark when the router bit hit the knot. So that's what happened. The spark was enough to set the sawdust on fire. And that's another good reason for not having loose sleeves around machines. It also prompts me to take notice of these things when I hang my jacket up for the day. I have now been awarded the merit badge for building a fire without matches for the second time. *–Henry B. Micks, Orange, Va.*

Sale of WoodCarver suspended—I would like to correct an error about the supplier of the WoodCarver (carving wheel attachment for angle grinders) mentioned in the article by Alec Waters, which appeared in the November/December issue of *Fine Woodworking*, p. 69.

The WoodCarver is *no longer* available from Ryobi America Corp. Several reported incidents of personal injury have occurred with the WoodCarver used on an angle grinder. Angle grinders are typically provided with semicircular guards. When the machines are fitted with carving wheels, about half the cutters are exposed during normal power-carving. Problems have also arisen when these tools have been used with their switches locked in the "on" position.

Ryobi has suspended the sale of WoodCarvers pending investigation by the Consumer Product Safety Commission. Although distributors may have the product in stock, WoodCarvers should not be offered for sale. Those who already have a WoodCarver should not use the accessory, but should contact Ryobi America Corp., customer service department at (800) 525-2579 for information about return and credit.
–Wayne Hill, Product Safety Manager, Ryobi America Corp., Anderson, S.C.

Defending the sine-bar—This is to rebut the letter in *FWW* #97, p. 6, "Sine-bar not so precise," by Charles Kennedy.

If Mr. Kennedy will reread the article in *FWW* #95, pp. 60-63, he will find that there was no mention of "centering the drill exactly on the mark." Instead, the blank is positioned against a fence with the left end butting an adjustable stop. Up to this point, exact measurement is not critical. After drilling the first anvil hole, the blank is slid to the right along the fence so that a carefully made, 10.000-in.-long spacer can be placed between the stop and the end of the blank. Then the second anvil hole is bored. The spacing of the holes should then be as accurate as the spacer length.

Sine-bars continue to be used by machinists and tool-, die-, and gauge-makers the world over. The woodworker's version of this instrument, as described in the article, was carefully designed to be made with common home-shop equipment that, assuming adherence to the instructions, will guarantee angles to within one-tenth of a degree. *–Tom Rose, Los Angeles, Calif.*

Routers for mounting in tables—The excellent article by Robert Vaughan on plunge routers in the December issue (*FWW* #97) was very helpful to me because I am currently shopping for one. However, I wish he had discussed the relative merits of the various machines for mounting in a router table because many of us have that in mind. It would seem that some designs might

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be better than others in how they deal with chips falling into the motor, access for changing bits and to the switch, and perhaps even the loads on the upper bearing when the router is inverted.

–John Black, Camarillo, Calif.

Big plunge routers—I read your recent article, "Big Plunge Routers" (FWW #97), with interest. However, I would like to bring up several points.

The text of the article uses bearing size as the hallmark of durability. This, unfortunately, reinforces the notion that bigger is better. (As a matter of fact, larger bearings generally have lower speed ratings than smaller ones.) Router bearing selection is a delicate balance of size, precision, seal type, cage type, lubricant and many other factors that determine how long a bearing will last in a particular application. At Bosch, final bearing selection is made only after extensive testing on fixtures that evaluate cutting life, in dust chambers, and in field applications with users. The article mentions that the bearings were not stamped with "standard grading specifications," and, indeed, they will not be: This is one of the reasons that cheap off-the-shelf bearings should not be expected to perform well when used as replacements.

The article also cites that a metal insert in the top motor housing and "punch crimp" (staked-and-welded) commutator connection indicate more durable construction. The article goes on to say that the Bosch 1613 series routers do not have the metal top bearing insert and that they use a tang-type commutator. However, all 1613 and 1615 series Bosch routers have both the metal bearing insert as well as a staked-and-welded commutator wire connection.

I appreciate the effort that an exhaustive article like this one involves, and I am aware that there are limitations to what can be realistically covered in just a few pages. But because many readers make buying decisions based on the articles in your magazine, I felt it was necessary to clarify these facts.

–Chris Carlson, product manager (woodworking), Robert Bosch Power Tool Corporation, New Bern, N.C.

ROBERT VAUGHAN REPLIES: I stand by my observations on bearing size. All routers tested are intended for similar speeds and duty. No printed information was found giving exact technical specifics on anyone's bearings. There is no other conclusion left other than that all bearings were pretty much the same grade. I can look at any manufacturer's router lineup and see that the routers with larger bearings are both more expensive and intended for heavier duty. As a repairman, the routers I see that have lasted are the ones with the larger bearings.

I don't have the routers we tested, but my notes on the 1615 clearly state "punch crimp armature." We've got egg on our face with that one. No excuses for it.

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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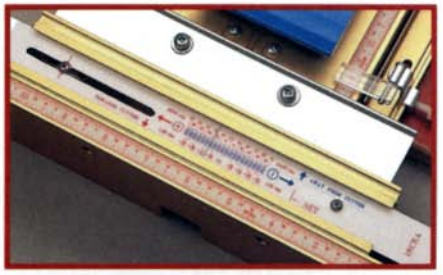

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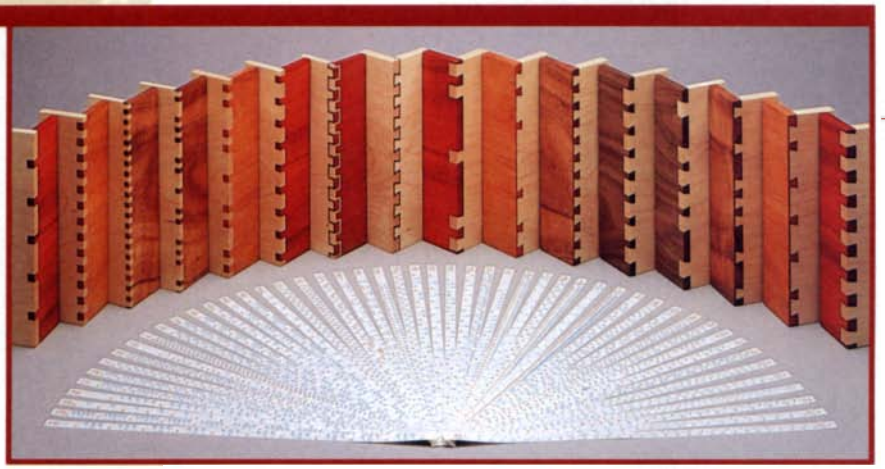
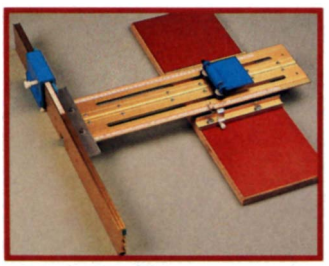


Best of all, it's surprisingly affordable. Our top of the line 16 3/8" INCRA JIG PRO sells for **$60.00 LESS** than our nearest competitor's bottom of the line 10 1/2" machine. Why? Because our superior, state of the art rack positioning technology simply works better and costs less to produce.



▲ INCRA JIG PRO

The INCRA JIG PRO, shown here with the 28" INCRA PRO Fence System , makes a truly superb fence for the table saw or router table. (INCRA JIG PRO and INCRA PRO Fence System sold separately.)

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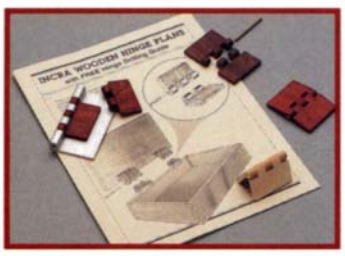

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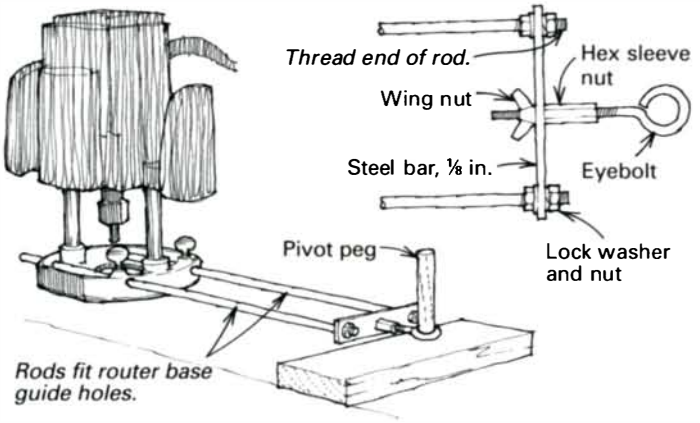
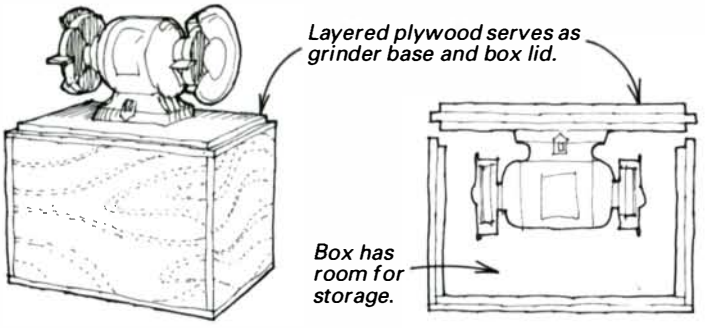
Router circle-cutting jig



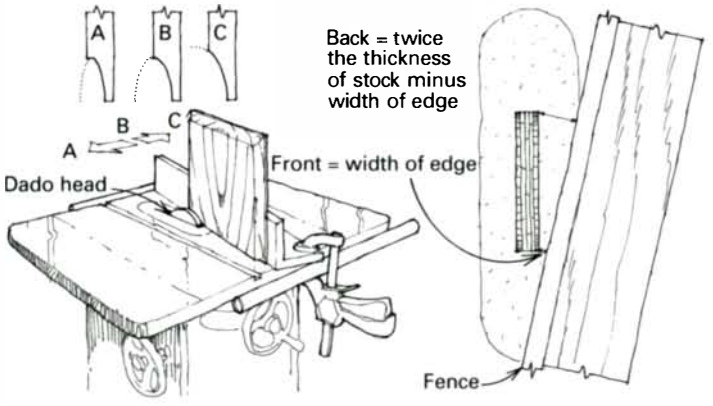
This inexpensive but accurate circle-cutting jig is made with two 18-in.-long rods that fit the guide holes in your router. Cut threads on one end of each rod and, using nuts, attach the rods to a length of ⅛-in.-thick steel bar, as shown above. Take care to ensure that the rods are parallel and spaced the right distance apart. For the pivot, attach an eyebolt to the center of the steel bar with a hex sleeve nut and a wing nut. For the center (pivot) peg, I use a ¾-in. dowel, shaved down slightly to fit the center of the eyebolt. *—James Guerami, Lake Forest, Calif.*

Grinder-in-a-box



I designed this box to protect my grinder when I have to take it to the job site. There's room in the box to place grinding wheels, wrenches and other accessories, too. By flipping the grinder over and fitting the base into a ledge in the box, the box becomes a no-compromise stand, which I can also use in my shop. *—Mike McCallum, Gresham, Ore.*

Cutting concave bevels on the tablesaw

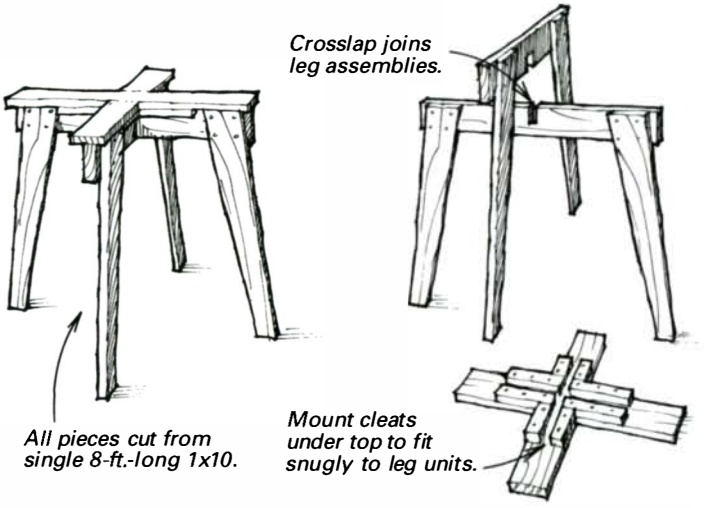


In "Machining Raised Panels" (*FWW* #94), Joe Beals says concave bevels fit better into the frame than straight bevels. I also have had good results making concave bevels using a modified cove cut on the tablesaw. I run the panel on edge past a dado head using a fence clamped at a slight angle to the blades.

There are several profiles possible using this approach. I prefer the look of profile B in the drawing, which is produced by setting the blade height to the desired field width and angling the fence according to the instructions shown in the drawing. Moving the fence closer to the rear of the blades will produce profile A, and moving the fence farther from the rear while raising the blades will produce profile C. This cut doesn't usually require a zero-clearance insert. However, a tall fence and a couple of featherboards can greatly enhance the operation.

I usually use a scraper ground to the appropriate curve to clean up the bevel. *—David A. Hood, Corvallis, Ore.*

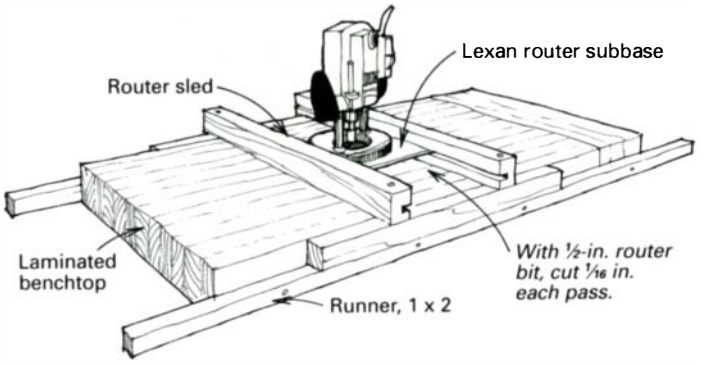
Knockdown saw stand



Because I don't have enough space in my tiny shop for a tablesaw, I designed this lightweight, knockdown tablesaw stand that stores away in three flat pieces. When I need my tablesaw, I simply set up the stand outside the door of my shop and mount the saw. There are no screws, pins or pegs, so the stand can be put together in seconds.

To make the stand in about an hour, all you'll need is an 8-ft.-long 1x10 and a handful of 1¼-in. plaster wallboard screws. Then follow the construction details shown in the sketch. The stand requires a snug fit of the leg assemblies into the cleats, so pay special attention when you attach the cleats to the underside of the top. *—Ray Mayotte, Worcester, Mass.*

Flattening a workbench top

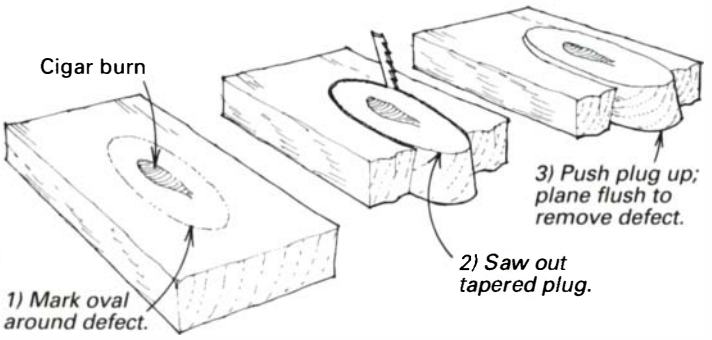


I recently completed my first workbench, a large traditional design with a heavy laminated maple top. After assembly, I flattened the top of the bench by adapting Tage Frid's method from Scott Landis' *The Workbench Book*. First, I installed a ¼-in.-thick Lexan plastic subbase on my router. Then I screwed 1x2 fir strips down each side of the bench, extending the strips far enough past the ends so I could rout the entire length. To make sure these two runners were parallel, I used two winding boards. Then, using scrap maple, I made a sled that bridged the tabletop and incorporated grooves for the Lexan router base. To sur-

face the table, I simply started at one end and, with a ½-in. bit in the router, cut 1/16 in. in a pass. It is a little slow, but it works.

—Herb Hunter, Denver, N.C.

Repairing large defects in tabletops

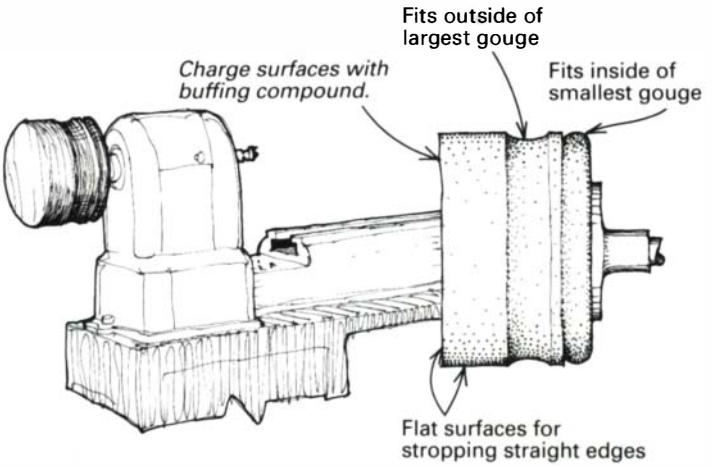


Recently, one of my restoration-shop customers brought in an antique table that had a deep cigar burn in its top. The owner wanted the burn removed but did not want the top patched with what she called "foreign wood." Sanding or scraping the flaw would leave a deep dish, so those options were out of the question. Instead, I came up with a way of repairing the defect using the existing wood.

First I penciled an ellipse around the burn. On one side of the ellipse, I drilled a series of angled 1/16-in. holes next to each other and connected them with a small chisel to allow entry of a narrow jigsaw blade with its rear corners rounded. With the jigsaw set to the same angle as the starter slot, I sawed around the ellipse, which created an oval plug. This plug could then be pushed up from the bottom about 1/8-in. because of the space created by the sawkerf. (By varying the saw's angle, you could vary how much the plug will come up to suit the depth of a defect.) After I leveled the top of the plug, some minor dry-assembling and filing yielded a nearly invisible joint with a perfect grain match. The nice thing was that the underside of the patch was hidden by one of the table's structural members.

—Charlie Giustiniani, Cold Spring Harbor, N.Y.

Stropping block for sharpening lathe tools



You can take some of the drudgery out of the grinding-honing-stropping cycle of sharpening all your tool edges by making this gadget for your lathe or drill press. It is simply a turned cylinder with cove and bead sections for stropping gouges and two straight sections for stropping chisels, skews and knives. Turn

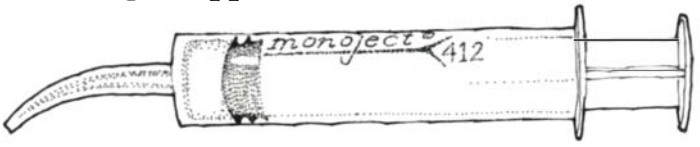
the stropping block from a softer, even grained wood like poplar with a radius of 7 in. and a length of 4 in. The radius of the cove should be slightly larger than your largest gouge, and the radius of the bead should be slightly less than your smallest gouge. Periodically, charge the surface of the cylinder with a stick of white buffing compound. This is a fine abrasive that will leave all your tool edges sharp enough to shave with.

Strop a gouge by laying its outside bevel in the cove of the rotating stropping block. Roll it side to side to get the entire cutting edge. Turn the gouge over and strop the inside edge on the beaded section of the block. Straight edges can be stropped on the face of the block or on the flat end section. If you mount the stropping block to the outboard end of your lathe, you can touch up turning tool edges without interruption while turning.

—Anthony P. Matlosz, Howell, N.J.

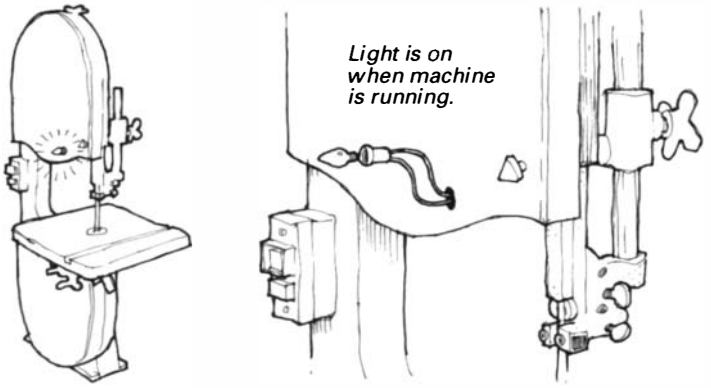
Quick tip: Glue magnetic tape, like that used on magnetic car signs, to the bottom of your oil-stone box. Then, when sharpening, just place the box on top of your tablesaw (or other steel surface) and it will stay put. *—Lewis A. Larsen, Eagle Grove, Ia.*

Ultimate glue applicator



Applying glue to joints has always been a messy chore, especially when it involves tricky corners or overhead surfaces. This curved-tip plastic syringe (Monoject #412, available for about 40 cents from any hospital supply company) solves the problem perfectly. The tapered, curved tip may be trimmed to handle the viscosity of any adhesive and allows easy access to all joints. Simply push a pin or nail into the tip to preserve the adhesive for later use. *—Gary Ouwerkerk, Los Osos, Calif.*

Tool-running light for deaf woodworkers



As a deaf woodworker, I became concerned about safety after returning to my bandsaw several times and finding it running. This is scary because, as you know, a bandsaw is also a meat-saw. So I decided to place a colored tool-running light on each of my tools. After experimenting with several types of lights, I finally settled on old-fashioned screw-in Christmas lights. I pick a highly visible spot on the machine, mount the plastic lamp socket in a snug hole and splice the wires right into the motor side of the on/off switch. The bright, colored bulbs hold up well, and I already have a box full of replacements.

You might think that a person could become accustomed to

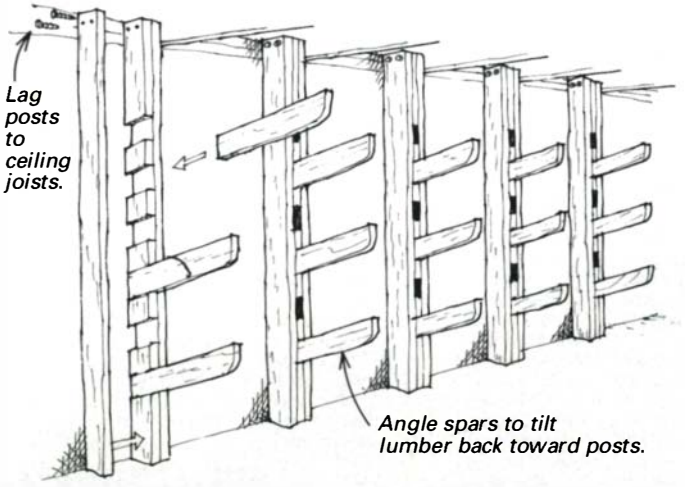
the lamp and ignore the warning. To the contrary. I find that I look for it specifically when approaching the machine.

—H. E. McLaughlin, Sacramento, Calif.

Quick tip: After I realized how much time I was wasting winding and unwinding cords, I cut each power tool's cord to an 8-in. length. I was using them with an extension cord anyway. Now when I'm through, I just lay the tools on the open shelf.

—Michael McCloskey, Tehachapi, Calif.

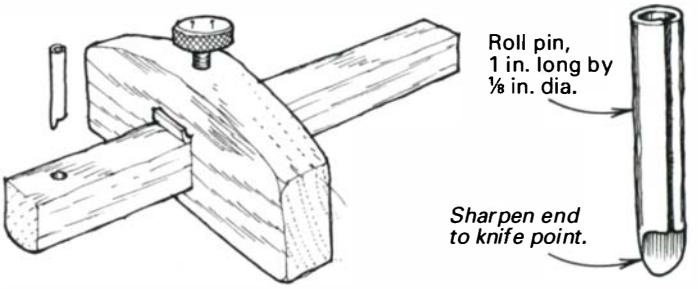
Lumber storage system



My boss, Jim Gibson, was once a shipwright in his native Scotland. So when I asked him to help me design a lumber storage system for my basement shop, he had more than a few good ideas. This design for an adjustable storage rack, for example, has proved to be quite effective and inexpensive.

—Duane F. Holmes, Ont., Canada

Improved marking gauge point



Here's a marking gauge point that has several advantages: It leaves a knife-clean line, and its depth and angle to the marking gauge fence are easily adjusted.

Start with a 1-in.-long, ⅛-in.-dia. roll pin, available at your local hardware or auto-parts store. The spring-steel pins, made to fit tightly in a hole, will really hold an edge. Grind or file away one end of the pin, leaving a knife-like nib as shown. Orient the nib opposite the slot in the roll pin. If grinding, dip the pin in water frequently to keep it from losing its temper, before you hone the nib on a whetstone. Install the pin in a properly sized hole through the marking gauge arm. Using a wooden block, press the pin in a short amount. Then, with pliers, angle the nib slightly so that it will pull the work into the fence when used. Press the pin in until only ⅛ in. of the blade is exposed.

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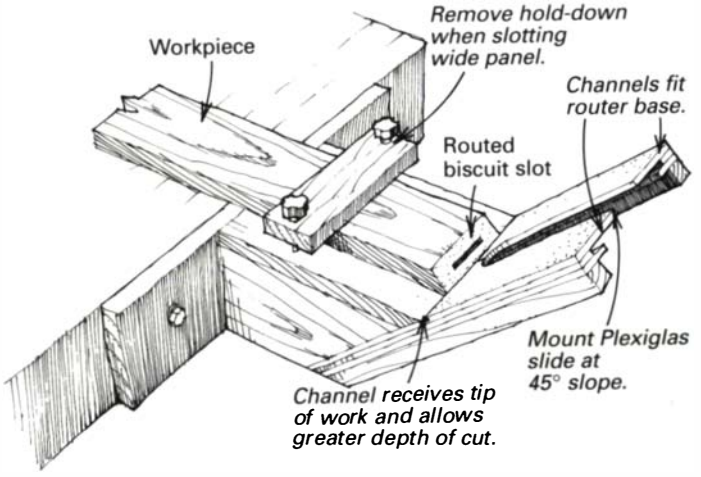
gauge will mark a clean line across the grain of even open-pored wood, like red oak, without splintering or tearing.

–Rich Haendel, Iowa City, Ia.

Miter-joint biscuit jig



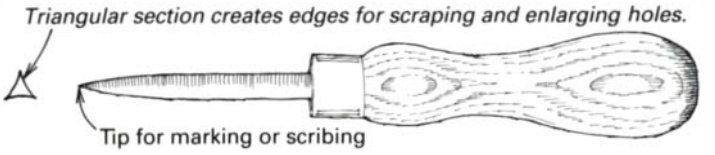
This jig, which I designed to cut mitered biscuit slots with a router, has eliminated my struggles with miter joints. It consists of a hardwood base, which bolts to my workbench, and an angled Plexiglas slide, sized to fit my router base.

To cut the slot, I use an Eagle-American biscuit cutter that has a ball-bearing limiter. The short shank on these bits limits the distance the cutter can be safely extended from the chuck. You can center the biscuit slot in ¾-in. stock; in thicker stock, you'll have to accept a biscuit slot nearer to the outside of the joint.

Mounting the 45° Plexiglas slide is critical because the recess in the Plexiglas must fit the mitered corner of the workpiece perfectly. To aid in this assembly, place a mitered workpiece in the jig to register the Plexiglas in the right position as you mark the mounting holes. Make the mounting holes slightly oversized, so you can adjust the slide if necessary.

–Francis Chan, Nassau Bay, Texas

Multipurpose marking and scraping tool



I find many uses for a bench tool made from the broken end of a small triangular file fitted with a handle. Grind the teeth off and point the end. File steel is tempered very hard, so other materials are unlikely to blunt it.

Use the tool as a marking awl. When twisted, it will enlarge a hole or mark the center of a drilled hole. When drawn along a straight edge, it will scribe a line. Used sideways, it will scrape solder off metal or glue off wood. As a lathe tool, it will true the end of a metal tube being made into a ferrule when turning a handle. *–Percy W. Blandford, Stratford-upon-Avon, England*

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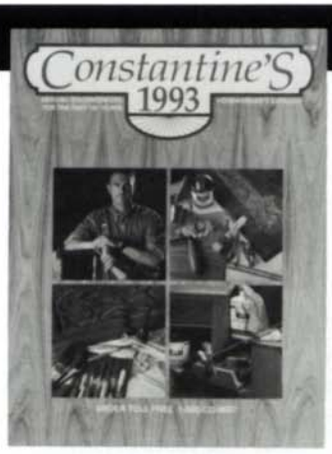

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READER SERVICE NO. 52

Cutting thin slices from a dowel

For the tenth year, I have completed making 200 wooden Christmas ornaments for my friends. But this year, I had some difficulty making halos for Mary and Joseph figures. I tried to make these from 1/16-in.-thick slices of 1/2-in.-dia. dowel. Unfortunately, the sliced dowels frayed or broke apart even though I used a brand new 10-in. sawblade. How can I make thin dowel slices cleanly and safely?

—Arthur H. Gerhardt, Albany, N.Y.

Roger Heitzman replies: I suspect that the problems you are encountering stem from trying the cuts with a circular sawblade. The tooth spacing on most blades, especially ones with carbide teeth, produce too violent a cutting action for a fine cut on a thin dowel. Probably the best—and safest—way to approach dowel slicing would be with the bandsaw. Use a blade with eight to ten teeth-per-inch (t.p.i.); the teeth should have a narrow set, if possible. Using a miter gauge in the bandsaw's table slot, slice about one-fourth of the way into the end of a dowel. Then, holding onto the dowel end that's hanging off the saw's table, rotate the dowel into the blade until the thin slice comes off. Finishing the cut this way minimizes fraying of the wood fibers due to the down pressure of the blade. Just make sure not to reach in and grab the slice with your hand while the saw is still running; use a stick or shut the saw off first.

If you're losing too many slices down into the saw, you might need to make a tighter-fitting throat plate. Also, you can clamp a block to the saw table to one side of and just ahead of the blade to act as a stock stop, so all the slices will be the same thickness. I'm sure you'll find this technique more successful and safer than using a tablesaw or radial-arm saw.

[Roger Heitzman is a furniture designer and craftsman in Scotts Valley, Calif.]

The tenons on Shaker pegs

I bought some Shaker pegs from a mail-order woodworking supplier to build a coat rack. I drilled holes in a birch plank and glued the pegs in using yellow carpenter's glue. After about a year, the pegs came loose. Then I noticed that the tenon on the end of each peg is tapered. When these tapered tenons are inserted into a regular straight-sided hole, they contact the wood only at the rim of the hole. Shouldn't the tenons be straight? ***—Malcolm Saunders, Mercerville, N.J.***

Chris Becksvoort replies: You've hit on one of my pet peeves: Why tapered tenons? Either the manufacturer's tolerances are so sloppy they can't turn an accurate ½-in. tenon, or they think the average woodworker is too uncoordinated to get a ½-in. tenon into a ½-in. hole. Wrong on both counts. If you take a caliper and measure the tenons, the exact ½ in. dia. is about 3/16 in. to ¼ in. from the shoulder. The rest of the tenon does not make contact with the hole. Would you hang a 12-lb. wool coat on a peg with a ¼-in.-long tenon? No wonder they break out. If I were you, I would return all your pegs to the supplier and complain.

I've talked to Shaker Workshops (P.O. Box 1028, Concord, Mass. 01742), and their maple pegs now have straight tenons. The other business end of their pegs are swell tapered so that heavy objects, like coats or chairs, stay flush against the peg board and don't slide forward, creating leverage that might loosen the peg.

One of the most attractive pegs I've seen is made by Smith Woodworkers & Designs (P.O. Box 42, Route 5, Califon, N.J. 07830). It has a full 1 1/32-in. head and only a .025-in. taper. Straight tenons are possible in the future.

If you must use pegs with tapered tenons, make a bandsaw cut in the end of the tenon, and insert a small wedge. The wedge will expand the narrow end to make better contact with the hole. Common sense dictates the wedge be placed vertically, cross-grain to the peg board so as not to split it. But physics dictates that the wedge be horizontal to counteract the leverage of heavy coats. A wedge inserted at a 45° angle is a good compromise.

[Christian Becksvoort, a professional furnituremaker in New Gloucester, Maine, is a contributing editor to *Fine Woodworking*.]

Calculating guitar fret spacing

I am building a guitar and am having great difficulty in locating the proper fret spacing. I'd like to build the guitar using the Gibson standard fret scale, but I'm not sure if the scale is 24¾ in. or 24 27/32 in. long. ***—Robert Pionzio, Bronx, N.Y.***

Dick Boak replies: The distance between frets can be calculated for any guitar's scale length by multiplying the ratio factors below by the length (in inches) of the desired scale. The results equal the distance from the guitar's nut to each particular fret.

Fret #	Ratio	Harmonic	Fret #	Ratio	Harmonic
1.	.0561		13.	.5281	
2.	.1091		14.	.5546	
3.	.1591		15.	.5796	
4.	.2063	⅕ harmonic	16.	.6031	⅗ harmonic
5.	.2508	¼ harmonic	17.	.6254	
6.	.2929		18.	.6464	
7.	.3326	⅓ harmonic	19.	.6663	⅔ harmonic
8.	.3700		20.	.6850	
9.	.4054	⅖ harmonic	21.	.7027	
10.	.4388		22.	.7194	
11.	.4703		23.	.7346	
12.	.5000	½ harmonic	24.	.7500	¾ harmonic

The standard Gibson guitar scale length is 24.75 in., which is equal to twice the distance from the nut to the twelfth fret. This distance is *uncompensated*, which means that a small amount of added compensation (usually between 1/32 in. and ⅛ in.) is required because when you depress the string, you are stretching it, further elevating its pitch. Electric guitar bridges have individually adjustable saddle pieces because the amount of compensation varies with the gauge (hence the thickness) of each string.

[Dick Boak is director of advertising at The Martin Guitar Company and editor of *Guitarmaker Magazine* in Nazareth, Penn.]

Beeswax as a countertop finish

In* Fine Woodworking *#84, Chris Minick said that beeswax is totally insoluble in water and alcohol. Therefore, I don't understand what is happening to my gorgeous maple countertop finished with beeswax. Where water splashes, a light spot appears. Then, when I wipe the counter with a damp rag, a large swathe of water stain remains. It can be erased with a plastic sponge and considerable elbow grease, but that's more work than anticipated. Does the finish "settle down" after a period of use? When will another coat of beeswax be needed? Would an application of vegetable oil be more effective?

—E. G. Steidemann, Madison, Wis.

Chris Minick replies: There seems to be some confusion between the terms *insoluble* and *impermeable*. Most common finishes and waxes (including beeswax) are insoluble in water, but few are totally impermeable. And being insoluble does not necessarily imply impermeability.

Beeswax alone will not provide sufficient protection to unfinished wood. The beeswax film allows moisture to penetrate and swell the wood fibers, creating the appearance of light-colored spots or streaks. The beeswax formulation published in *FWW* #84 is a polish formulation intended to be used on pre-finished wood pieces. The function of a polish is quite different from that of a finish. A polish is used to enhance the beauty of the finish, to serve as a renewable sacrificial coating and to provide a slick surface to deflect blows and prevent them from scratching the finish.

Fortunately, an easy, non-toxic solution to the problem exists. First, sand the countertop with 180-grit sandpaper to remove the

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existing beeswax. Wet the surface with water to raise the grain and sand flat after it has dried. Once the grain has been raised and sanded smooth, future grain-raising problems are minimized. Now apply two sealer coats of shellac diluted to about a two-pound cut. It is better to prepare your own shellac sealer from dry shellac flakes, but a fresh commercially prepared shellac, such as Bullseye, is acceptable. (Generally, it is a good idea to first test new finishes or techniques on scrapwood.) Lightly sand the sealer coats with 220-grit sandpaper to ensure a smooth finish. Finally, apply two or three coats of beeswax polish, and buff to the desired gloss level. If you prefer, a carnauba wax-based furniture polish will also produce acceptable results. This finishing combination, sealer plus wax, should provide the needed water resistance for your countertop. And periodic reapplication of the wax will keep it looking good.

[Chris Minick is a product development chemist and amateur woodworker in Stillwater, Minn.]

Protection from fine dust

Because I have difficulty getting a face mask to seal tightly against my nose without pushing my glasses out of position, I use a two-bag dust-collection system in my shop. How effective are these dust collectors at retaining very fine dust? What type of bag material is most effective and what ratio of bag-surface area to air-flow rate should be maintained? Also, is there an easy way for amateur woodworkers to tell how much ultra-fine dust is floating around their shops?

—Richard A. Quance, Quebec, Canada

Theodore J. Fink, M.D. replies: A dust-collection system shouldn't be a substitute for wearing a dust respirator. Though it's designed for paint vapors and mists, the 3M #8540 spray-paint respirator works well for dust protection. Designed with a low-profile nosepiece, it won't interfere with glasses or goggles.

How well a dust collector works depends on several factors. Commonly, bags in these systems are made from cotton sateen, which is inexpensive but has its drawbacks when compared with more expensive and durable knit polyester materials. Cotton sateen captures wood particles down to a size of 10 microns and allows an air-flow to bag-surface area ratio of only about 20 cubic feet per minute (CFM)/sq. ft.

Knit polyester captures particles down to 5 microns and allows a much greater air flow: approximately 50 CFM/sq. ft. If your shop has many large woodworking machines connected to a dust-collection system, you might gain additional CFM capacity by fitting knit polyester bags that allow the use of two or more pieces of equipment simultaneously (to determine the CFM requirements of individual machines, see "Figuring dust-collection needs," *Fine Woodworking* #67, p. 72). Manufacturers often do not specify bag fabric, so you may need to make some inquiries if you wish to employ knit polyester bags.

Unfortunately, there is simply no way to accurately quantify the amount of wood dust in your shop air without doing a direct sampling measurement, which is done by pumping a predetermined volume of air through a filtration cartridge that's held in the breathing zone. The level considered safe should not exceed about two milligrams per cubic meter for an eight-hour exposure. You can, however, get a very crude idea of how effective your dust-collection system is by shining a bright beam of light through your darkened shop before and after working in it. If the flashlight beam shows much turbidity in the after-work air, it may mean that your dust-collection system probably needs modification. Remember though, the absence of turbidity does not neces-

sarily mean there are not very fine dust particles (less than 20 microns) in the air (you can only see nonrespirable dust). Therefore, the safest course is to wear a dust respirator in addition to using a dust-collection system.

A final caveat about dust collection systems: It makes little sense to invest in an efficient and costly system and defeat its purpose by emptying filled dust bags *inside* the shop, creating a choking cloud of fine wood dust. Empty the system out of doors if at all possible, and keep your respirator on during the procedure.

[Dr. Theodore Fink is an internist in private practice in Shelburne, Vt., and an amateur woodworker.]

Are high-speed-steel router bits better?

I've read that router bits made of high speed steel cut more smoothly, sharpen with conventional techniques and are cheaper than carbide-tipped bits. Do you agree?

—Harry Rudin, Oberrieden, Switzerland

Jerry Glaser replies: Other than being cheaper, I see no real advantage to using high-speed-steel (HSS) bits instead of carbide-tipped bits. While it is true that HSS router bits may be ground a little sharper than carbide-tipped bits, this edge advantage lasts for only a short time. Studies by router-bit manufacturing companies, such as Onsrud, have revealed that the initial sharpness of a HSS edge deteriorated quickly during cutting; the bit maintains a lower level of sharpness for the remaining 95% of its life.

As for resharpening router bits by hand, this can be done with both high-speed steel and carbide-tipped bits by using a diamond honing stone, such as the Eze-Lap (available from Woodcraft, P.O. Box 1686, Parkersburg, W.V. 26102; 800 225-1153). However, when sharpening any high-speed rotating tool, such as a router bit, there is a danger of changing the symmetry of the cutting edges. This not only can unbalance the bit but also can cause only one edge to do the cutting. If one edge sticks out more than the other, you'll have to reduce the feed rate to get the same quality of cut as if both edges were cutting equally. Finally, I don't know where HSS router bits can be purchased in any great variety. In contrast, carbide-tipped bits appear to be universally available and are used almost exclusively by professional woodworkers.

[Jerry Glaser is a retired aerospace engineer living in Torrance, Calif. He also manufactures a line of woodturning tools.]

Resawing spalted maple logs

I have some partially spalted maple logs that I would like to resaw into thick veneers. The logs are downed timber and windfalls that are only partially dry. Can veneers be cut from these semi-dry logs, or is it better to resaw into planks, dry as solid wood and then resaw them in one to two years? The rationale for resawing is that drying 1/8-in. veneers should be much faster than 5/4-in. planks. What precautions are necessary to ensure reasonably flat veneers without checking?

—Dean A. Regier, Upton, Mass.

R. Bruce Hoadley replies: Your question is an interesting one, and you seem to be aware of the apparent trade-offs. Sawing the veneers first would probably present two problems. The first problem is the difficulty of cleanly sawing the softer, punky areas of the spalted wood. Second is the problem of holding the veneers flat and preventing localized distortion and checking during subsequent drying. Drying the planks first would of course take longer, but the dried wood would probably machine more evenly than the wet, and little, if any, distortion or checking beyond that in the planks would result. Therefore, I'd be inclined to dry the planks first. Whichever way you choose, why not work up a

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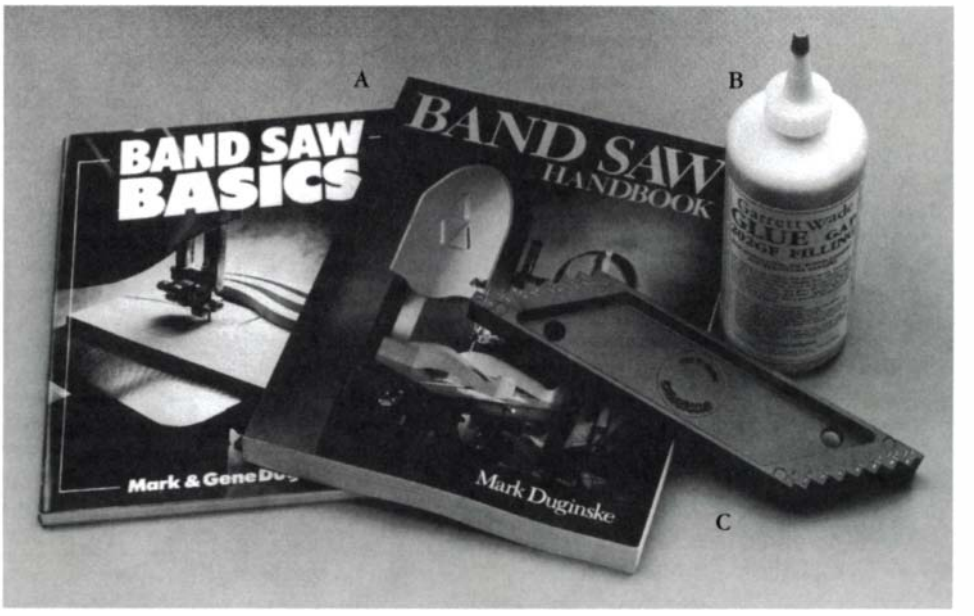

A/ Two Band Saw Books By Mark Duginske

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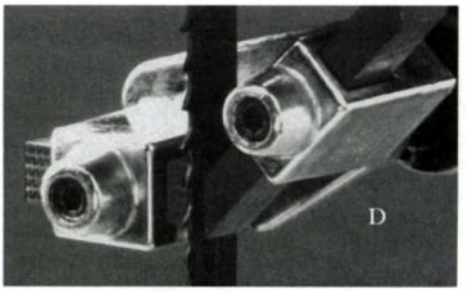

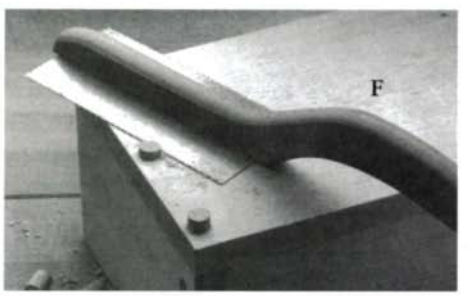

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33K11.02	¼" 4 tpi Cabinet	$11.95
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33K12.03	½" 3 tpi Cabinet	$11.95

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small batch the other way as a little experiment, and let the rest of us know which way seems best?

[R. Bruce Hoadley is a contributing editor to *Fine Woodworking* and a professor of wood technology at the University of Massachusetts at Amherst.]

Moving heavy machinery

What's the best way to take delivery of a large piece of woodworking machinery if your shop doesn't have a loading dock or a fork lift? Are there special methods or pieces of equipment for moving machinery too heavy for one or two people to lift?
—Michael S. Briggs, Huntsville, Alabama

Robert M. Vaughan replies: I have to confess that I have some contempt for woodworkers who risk injury by moving heavy machines themselves: I just don't like to see them suffering the pain or life-long handicaps that can result from a needless accident. Despite the added cost, the safest method for moving heavy machines, is to let professional equipment movers do it with devices designed for the job, such as fork lifts.

The best way to ensure that the delivery of a new machine will go smoothly is to orchestrate the whole process ahead of time. Let's say I order a new planer. First, I instruct the seller to have the shipping company call me when the machine arrives at my local terminal for pickup. Next, I drive my van or pickup truck to the terminal and have the shipping company fork-lift the machine onto the vehicle. Upon arrival at my shop, I would have a wrecker or tow truck there with straps and such to move the machine to the ground or to an awaiting stand. When you uncrate the machine, take care to bend over any exposed nails in the crate. Also, keep in mind that the machine may have to be crated up again and returned if it's damaged or defective.

To move the machine from the door of the shop to its final location, you're best off renting a piano dolly or Johnson Bar, which is a 7-ft. oak pry bar with wheels. By all means, exercise good judgment: If you don't think you can handle the job yourself, pay someone else to do it: You can find a rigging company in your local phone book.

[Robert Vaughan is a contributing editor to *Fine Woodworking* and a woodworking machinery rehabilitation specialist in Roanoke, Va.]

Colorless finishes for wooden bowls?

As a woodturner, I've been hoping to find a colorless water-white finish for wooden bowls that would allow the natural color of wood to show through and not impart a yellowish tinge. Is there a polyurethane or other type of finish that is truly colorless? ***—Peter H. Rohr, Hilton Head Island, S.C.***

Chris Minick replies: A true water-white finish, one that does not impart any color to the underlying wood, does not exist. But take heart, some finishes come pretty close. Each resin in a finishing system contributes a characteristic color to the final product. Acrylic resins impart a slightly bluish tint especially visible on light-colored woods such as maple and holly. Heavy acrylic coatings give the finished piece a cold plastic look that I find objectionable. Oil-based varnishes are distinctly yellow. These finishes obscure the subtle color highlights common in cabinet hardwoods. Varnishes also dramatically change the color of many exotic woods, like padauk and purpleheart.

In my opinion, nitrocellulose lacquers offer the best color balance among all the common woodworking finishes. These light amber-colored finishes add warmth and depth to the wood. And nitrocellulose lacquers accentuate the color and the figure

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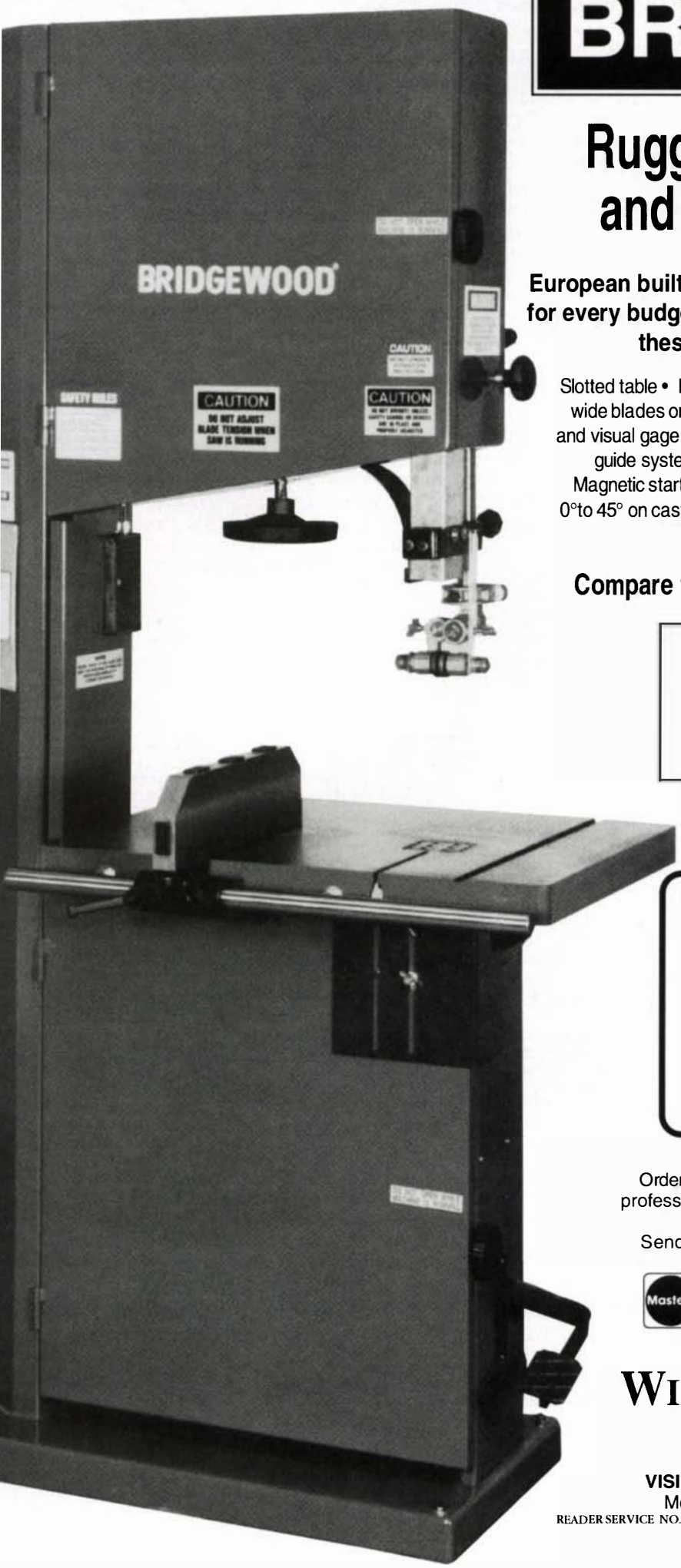

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of the wood rather than hide it like varnish finishes tend to do. [Chris Minick is a product development chemist and amateur woodworker in Stillwater, Minn.]

Drying and using manzanita wood

I have a friend who lives in the foothills of central California who has an ancient manzanita tree that must be removed. The tree's trunk is between 6 in. and 7 in. dia. How can we prevent the wood from cracking as it dries, and does manzanita work well? ***—Eugene E. Jurs, Oakland, Calif.***

Jon Arno replies: Although the common name *manzanita* is used in reference to a number of unrelated species, I suspect the one you are dealing with is bigberry manzanita, *Arctostaphylos glauca*. The *Arctostaphylos* genus contains about 60 species, and while several are native to California, bigberry is generally the largest. As a chaparral species, manzanita seldom exceeds 30 ft. tall and is more like a shrub than a tree. Only rare, large specimens yield much in the way of usable wood. But it is surprisingly popular among turners and carvers because the wood's color, a rich reddish brown, is exceptionally attractive.

The bad news is, manzanita is very difficult to air dry. While it is not a commercial timber species (accurate shrinkage data are unavailable) it is similar to Pacific madrone, *Arbutus menziesii*. These species both belong to the heath family, Ericaceae. Like madrone, with its very high average volumetric shrinkage of 18.1% (green to ovendry), manzanita develops serious drying stress, which results in warping and checking. On the understanding that no matter how careful you are there will doubtless be some loss due to drying degrade, I would recommend the following technique.

First, cut the log while it is still green into the desired boards or flitches. This will allow the wood to relieve some stress by warping a little, which is decidedly better than allowing it to split in unpredictable places. Next, coat the endgrain of each piece with a thick layer of yellow carpenter's glue. This will help minimize end-checking by retarding the escape of moisture through the pores while moisture in the interior of the wood slowly escapes through the sides and by mechanically holding the cells together so minute end-checks can't get started. The boards should then be sticker stacked in the usual fashion, so all surfaces are exposed to the air. With most woods, this represents adequate preparation. However, with manzanita, I would recommend that you partially cover the pile with a canvas tarp or plastic drop cloth for the initial phase of the drying process. This will help to prevent the wood from drying too quickly. It is important to check the pile every few days to make sure the moisture barrier is not too efficient. If you notice any signs of blue staining, or a strong mildew odor, reposition the tarp to allow more air flow. Once the inner surface of the tarp is no longer damp to the touch (usually about four to six weeks), the tarp can be rolled back a few inches each day and eventually removed.

As a rule-of-thumb, the wood should be allowed to dry for at least one year for each inch of thickness. In a warm climate such as in California, it should dry somewhat faster. Keep in mind though, it will *never* get too dry, so storing it in a stickered stack until it is used is a good idea.

[Jon Arno is a wood technologist and consultant in Troy, Mich.]

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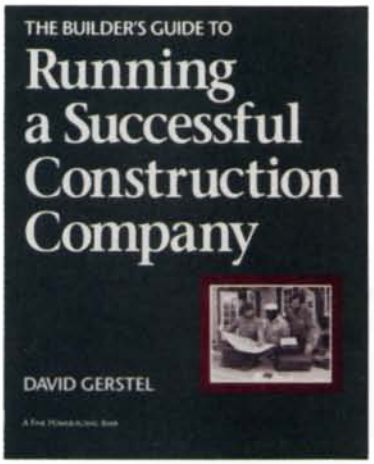

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31-080	1" Belt/5" Disc Sander	134	94
40-560	16" 2 speed Scroll Saw	266	179
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11-090	32" Radial Bench Drill Press	399	285
43-355	3/4" Shaper 1-1/2 HP	964	695
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22-540	12" Bench Top Planer	595	389
36-040	8-1/4" Compound Mitre Saw	224	165
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40-601	18" Scroll Saw with stand and blades	942	729
34-080	10" Mitre Box	Xtra Special	198
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33-990	10" Radial Arm Saw	818	589
37-280	6" Motorized Jointer	488	395
50-179	3/4 HP 2 stage Dust Collector	483	335
70-200	20" Floor Drill Press	1049	815
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34-670	10" Motorized Table Saw	511	395
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34-897	50" Delta Unifence	525	285
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DW947K	13.2 volt cordless 3/8" drill kit	377	209
DW306K	8.0 amp Recip Saw w/case var. spd	254	155
DW610	1-1/2 HP 2 Handle Router	250	138
DW411	1/4 sheet Palm Sander, 1.7 amp	87	54
DW705	12" Compound Mitre Saw	555	365
DW704	12" Mitre Saw	480	319
DW100	3/8" Drill, 4 amp, 0-2500 rpm, rev	110	65
DW250	4.5 amp Drywall Gun, 0-4000 rpm, rev	146	88
DW254	4.5 amp Drywall Gun, 0-2500 rpm, rev	146	88
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DW102	3/8" Drill, 4.5 amp, 0-1200 rpm, rev	154	92
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4024	3" x 21" variable speed Belt Sander	322	179

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2600	3/8" Drill 0-1200 rpm 4.5 amp	142	89
1703-1	10" Mitre Saw with 73-770 blade	313	179
4011	1/4 sheet Palm Sander	82	59
79-034	Workmate 400	175	105
1349-09	1/2" Timberwolf Drill 2 speed	489	279
1180	3/8" Drill rev. 0-1200 rpm 5 amp	182	104
2037	Drywall Gun 0-4000 5.0 amp	175	97
2038	Drywall Gun 0-2500 rpm 5 amp	175	99
3157	Orbital var. speed Jig Saw 4.5 amp	220	145
2665K	NEW 3/8" cordless 12 V Cyclone Drill	280	165
5045K	MACHO Rotary Hammer Drill	742	409
5071	3/8" Hammer Drill with case	239	138
5073	1/2" Hammer Drill with case	282	158
2054	Tek Gun 0-2500 5.0 amp	269	152
2660	Drywall Gun 0-4000 4.5 amp	142	77
2700	7-1/4" Worm drive Saw 13 amp	250	145
1321	1/2" Spade Hdle Drill 450 rpm 7 amp	292	165
2750	4-1/2" Grinder 10.000 rpm 6 amp	149	83
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D1232-2	32'	29'	53#	200.00
D1236-2	36'	32'	62#	239.00
D1240-2	40'	35'	73#	265.00

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D1316-2	16'	13'	26#	125.00
D1320-2	20'	17'	32#	145.00
D1324-2	24'	21'	39#	165.00
D1328-2	28'	25'	50#	195.00
D1332-2	32'	29'	62#	235.00
D1336-2	36'	32'	77#	270.00
D1340-2	40'	35'	85#	295.00

ALUMINUM FLAT STEP TYPE 1A - 300# RATED EXTEN.

D1516-2	16'	13'	31#	139.00
D1520-2	20'	17'	37#	159.00
D1524-2	24'	21'	45#	179.00
D1528-2	28'	25'	56#	215.00
D1532-2	32'	29'	66#	239.00
D1536-2	36'	32'(250# rating)	79#	279.00
D1540-2	40'	35'(250# rating)	89#	309.00

ALUMINUM FLAT STEP TYPE 1A+ 300# RATING

D520-2	20'	17'	42#	199.00
D524-2	24'	21'	49#	230.00
D528-2	28'	25'	66#	265.00
D532-2	32'	29'	74#	305.00
D536-2	36'	32'	89#	350.00
D540-2	40'	35'	99#	389.00

FIBERGLASS FLAT STEP TYPE 1A - 300# RATING

D6116-2	16'	13'	34#	175.00
D6120-2	20'	17'	40#	195.00
D6124-2	24'	21'	53#	225.00
D6128-2	28'	25'	60#	259.00
D6132-2	32'	29'	74#	298.00

FIBERGLASS FLAT STEP TYPE 1A - 300# XTRA HEAVY

D7116-2	16'	13'	37#	198.00
D7120-2	20'	17'	43#	229.00
D7124-2	24'	21'	58#	269.00
D7128-2	28'	25'	66#	298.00
D7132-2	32'	29'	79#	359.00

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Model	Description	List	Sale
VSRE500KNEW	v/spd 5" Random Sndr w/cs	279	149
VSRE600KNEW	v/spd 6" Random Sndr w/cs	284	155
HBSE75S	3" x 21" var. speed Belt Sander	299	168
ABSE15S1	1/2" cdls 12 volt Drill complete w/cs	389	235
FSPE100	Barrell Grip var. speed Jig Saw	265	145
BSPE100K	Top Hdle var. spd Jig Saw w/cse	275	145
EZ560	3/8" cordless 7.2 volt Drill 2 speed	205	139
OFS50	1 HP Plunge Router	299	175
TXE150	New 6" var spd Rand Orb Sander	220	145

HITACHI TOOLS

Model	Description	List	Sale
C7SB	7-1/4" Circular Saw	214	109
DTC10	3/8" 7.2 volt cordless Drill	138	78
C7BD	7-1/4" Circular Saw with brake	230	118
M12V	NEW 3 HP variable speed Router	447	225
TR12	Plunge Router 3 HP	354	167
F1000A	12" Planer/6" Jointer	2835	1549
P12R	12-9/32" Planer	1361	719
P12RA	Planer/Joiner	1797	885
C10FA	10" Deluxe Mitre Saw	538	268
C12FA	NEW 12" Mitre Saw	632	298
C8FB	8-1/2" Slide Compound Saw	899	445
FREUD	LU91M0088-1/2" carb. blade 48 tooth	68	43
C15FB	15" Mitre Saw	745	368
FREUD	LU85M01515" carb. blade 108 tooth.	180	99
F20A	3-1/4" Planer 3.4 amp	172	95
G12SA	4-1/2" Grinder 6.9 amp	147	75
DS10DVAK	NEW 12 volt Cordless Drill Kit with 2 batteries	385	199

Hitachi Air Tools

NR83A	Framing Nailer 2 - 3-1/2 Full Head.	680	398
NR83AA	Framing Nailer 2 - 3-1/2 Clip Head.	740	419
NT65A	16 ga. Brad Nailer 1 - 2-1/2	590	318
NT45A	18 ga. Brad Nailer 13/16 - 1-3/4	484	275
NV45AB	Coil Roofing Nailer 7/8 - 1-3/4	740	425
NV83A	Coil Nailer 2 - 3-1/4	740	419
NV50A1	Coil Nailer 1-1/4 - 2	534	305
N5008AA	7/16" Stapler - 16 ga. 1 - 2 length	578	315
N3824A	1" Stapler 16 ga. 1/2 - 1-1/2	626	329
N3804A	1/4" Stapler 18 ga. - 1/2 - 1-1/2	520	299

DREMEL TOOLS

Model	Description	List	Sale
3950	Moto Tool Kit with bits & case	129	79
3952	Super Moto Tool Kit with accessories	145	95
1671	16" Scroll Saw - 2 speed "Best buy"	278	165
290	Electric Engraver with point	24	15.50
8508	Cordless Moto Tool Kit with case	104	68
1731	5" Disc/1" x 30" Belt Sander	178	114

DAVID WHITE INSTRUMENTS

Model	Description	List	Sale
LP6-20	Sight Level package - 20x	310	195
L6-20	Meridian Level - 20x	290	185
LT8-300	Level Transit - 26x	650	439
LT8-300P	above Level with optical plum	769	519
LT6-900	Level Transit - 20x	389	245
ALT6-900	Automatic Level - Transit - 18x	549	385
ALTP6-900	above Level with tripod & rod	600	438
AL6-18	Automatic Level - 18x	439	315
ALP6-18HD	above Level with tripod and rod	550	369

QUAL-CRAFT PRODUCTS

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2201	Pump Jack Brace	30	20
2203	Pump Jack guard rail holder	31	21
2204	Work Bench & rail holder combo	53	39
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2601	Wall Jack	167	114
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PASLODE IMPULSE GUNS

Model	Description	List	Sale
IM250	Tripulse Finish Nailer Kit complete drives 3/4" - 2-1/2" brads	849	615
IM325	Impulse Framing Nailer Kit complete drives 2" - 3-1/4" nails	849	615
402500	Extra battery	Sale	42.95
402502	No-Mar Work contact element	Sale	19.25

Pasiode Nailers not available in MN, WI, IA

SENCO AIR NAILERS

SFN1	Finishing Nailer 1" - 2"	377	255
SFN2	Finish. Nailer 1-1/2" - 2-1/2"	571	375
SN325	Nailer 1-7/8" - 3-1/4"	665	395
SN4	General purpose 2" - 3-1/2"	685	468
SLP20	NEW Pinner with case 5/8" - 1-5/8"	399	269
SKS	Stapler 5/8" - 1-1/2"	351	239
SPS	Stapler 1" wide - 3/4" - 1-1/2" length.	460	335
PW	Stapler 1" wide - 1/2" - 1-1/4" length.	505	345
M2	Stapler 1/16" wide - 1-3/8" - 2" length	490	345

Not available in all states

EXCALIBUR Fences & Tables

Model	Description	List	Sale
TT45R24L9	24" Fence	369	299
TT45R50L12	50" Fence	399	329
EXSLT30	Sliding Table	599	475
EXSLT60	Sliding Table	745	585

RECORD WOODWORKING VISES

Model	Jaw Width\Opening		List	Sale
53E	10-1/2"\15"	Quick release	189	105
53P	10-1/2"\15"	Plain Screw	174	100
52D	7"\8"	Quick release w/dog	137	84
52-1/2D	9"\13"	Quick release w/dog	175	99

REMINGTON POWER FASTENING TOOLS

Model	Description	List	Sale
75707	476 Power Hammer with case	35	28
77550	480 Power Driver with case	169	109
78480	482 Multi Driver with case	369	235

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Table Stays Sturdy Despite Drawer Openings

Hidden strongback is the key

by Mac Campbell

***This harvest table was built as a companion piece** to a set of Windsor chairs. The large drawers that penetrate the side aprons provide plenty of storage, but weaken the table, so the author added a strongback that became the backbone of the frame.*

I was delighted when a client asked me to build a dining table to match some Windsor chairs I had previously made for her. However, I was concerned that her design requirements would affect the strength and rigidity of the table. She wanted a table that would seat six people comfortably (and eight without undue suffering), with plenty of drawer space to store table linens. A table of this size is weakened when drawer openings are cut through the side aprons. Also, the possibility of humidity-caused warp or bow is increased. So I added a strongback that runs the length of the table. To the strongback I fastened the drawer runners, drawer kickers, end aprons and tabletop. Though it may seem like overkill, this unitized construction uses the top as a structural element, which strengthens the frame even as the frame flattens the top.

Designing the table

The rule of thumb for sizing a dining table is to allow 24 inches of perimeter for each person, but I have always thought this wasn't enough for real comfort. I prefer to allow about 30 inches or more, if possible. Similarly, 33 inches is the standard table width, but another eight or ten inches makes seating at the ends more comfortable and leaves lots of room for serving dishes in the middle. Maximum seating flexibility and maximum drawer space result from placing the legs as close as possible to the corners of the top. I measured the client's dining room with these guidelines in mind to determine the table's overall dimensions (see the drawing on p. 39).

The table has four drawers, two on each side, as shown in the photo above, with internal dimensions sized to accommodate place mats up to 19 in. wide. To keep the 4-in.-wide aprons as strong as possible, I made the drawers just 2¼ in. high, which provides ample storage for place mats and napkins. These dimensions left the drawers looking rather small, however, so I used an overlapping drawer front with a ¼-in.-wide lip on all four edges to increase their apparent size.

The strongback (see the top photo on p. 38) not only increases the rigidity of the table but also supports the drawer runners and kickers that span the entire width of the table. This extra support helps prevent the bowing in drawer runners that

Photo: Keith Minchin

causes sticky drawers and unhappy calls from clients. By tying these parts together, as shown in the drawing, the strength of any one part is shared with every other part of the table.

To simplify both finishing and delivery, I usually build large tables in three or four separate assemblies: top, frame (consisting of aprons and drawer supports), legs and drawers, if included in the design. After the finishing is complete, I secure the frame to the top, allowing for the inevitable expansion and contraction, and attach the legs to the frame with hanger bolts through maple corner blocks. I prefer maple corner blocks over the commercially available metal braces because the maple is stronger and looks better. I've used this system for years without any problems or complaints.

Constructing the table

Because the top is the table's most prominent feature, I make it first, carefully arranging and rearranging the curly maple stock for the best grain match. The legs, turned from laminated blanks, suit the overall concept of the table's design. I used an enlarged and slightly modified pattern for a Windsor chair leg, so the table would blend with the chairs that I had previously built for this client. When all turning and sanding was finished, I chamfered the inside corner at the top of the leg, as shown in the corner-block detail in the drawing. I've found a clamp set across the leg is good insurance against the splitting that can occur while screwing the two hanger bolts into each leg.

The frame assembly consists of the aprons, corner blocks, strongback and drawer runners and kickers. With corner-block construction, there is no need to allow for tenons when cutting the aprons to length. The end aprons are simply ripped to final width and cut to length, but the side apron stock needs to be about one-half inch wider than the finished aprons. To create drawer openings in the side aprons, I rip the apron stock into three strips, with the center strip being the height of the drawer. Reference marks, drawn across the apron stock in the middle and near each end, will help align the pieces after cutting the openings.

I layout and cut the drawer openings from the apron's center strip. Then I align the remaining apron parts on my bench, adjusting the three parts of the middle strip to produce the required openings. After carefully clamping the pieces together, I drill for alignment dowels in each joint, smooth out any visible sawmarks with a

Doweling odd-shaped pieces

Dowel joints are a wonderfully simple and effective solution to several joinery problems: carcase joints, edge-to-edge alignment (see *FWW* #84, p. 64) and especially for joining odd-shaped pieces. The drawer runners in my harvest table are a case in point.

The joint between the runners and the aprons is tricky because the runner must be precisely placed or the drawer won't work smoothly. Also, the runner-to-apron joint must be strong enough to support the drawer and its contents. And, while the joinery must be strong and accurate, I didn't want it to show from the outside. A mortise and tenon would be difficult to locate precisely; using plugged screws would mar the appearance. The best solution I've found is a dowel joint, using a one-time doweling jig, as shown in the photos below.

Making a doweling jig

To make a doweling jig for the drawer runners, I glue up or shape the runner stock, making one of the runners about two inches longer than needed. After cutting both ends true and square, I cut the runners to length, leaving a piece of drawer runner about 1½ in. long that becomes the doweling jig. Using a drill press to ensure that the holes are square to the end of the jig, I drill two dowel-sized holes through the jig, parallel to the grain. A third hole, countersunk on both ends of the jig, lets me screw the jig in place on the aprons and drawer runners.

Using the jig

To use the jig, mark one side of it as the top, and mark the top of each drawer runner. With a runner clamped in the vise, align the jig with the end of the runner, so the top face of each is in the same plane. Drive the 2-in.-long screw through the jig into the runner, locking the jig firmly in place. Now drill the two holes in the end of the runner and remove the jig.

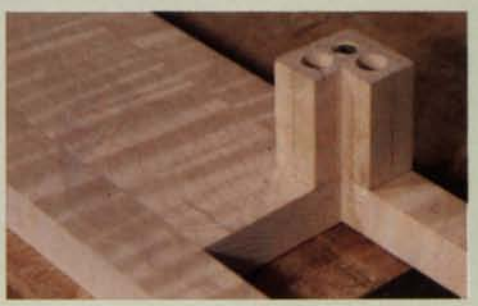
The process is the same for drilling the apron. Place the jig exactly where you want the runner to be, making sure the top face is properly oriented, and screw it in place. Drill the two dowel holes, taking care to use a depth stop so that you don't poke through the outside face of the apron. Remove the jig, and the joint is ready for assembly.

This system works easily in a wide variety of situations, but for best results, use a high-quality dowel that has been compressed and has glue-relief grooves. These dowels almost become self-clamping, expanding when exposed to the moisture in the glue for extremely tight joints. *—M.C.*

***Create a special-purpose doweling jig** by cutting a short section from the end of an extra-long piece of dimensioned and shaped stock. Drill dowel holes in the table apron for the strongback (top photo), which will be positioned exactly where the jig was.*

***The jig works well** when drilling odd-shaped stock (bottom left), such as the end of the drawer runners where it would be almost impossible to clamp other doweling jigs.*

***The drawer-runner doweling jig** is screwed into place on the side apron (bottom right). Be sure to use stops to prevent drilling through the apron.*



cabinet scraper or handplane and glue the apron sections back together, as shown in the bottom photo. When the glue is dry, I sand the faces, rip the aprons to final width and trim to length.

Corner blocks for removable legs—The easiest way to set the corner blocks is to rout a dado across the inside of each apron. The corner blocks are then fitted to the dado. Cutting the blocks is straightforward, if somewhat tedious, tablesaw work. Follow the dimensions shown in the drawing on the facing page, and make some spares so you can fine-tune the fit by trial and error.

The aprons and corner blocks should be assembled with screws, but no glue, before beginning on the table's internal structure. In cases such as this, where the pieces may be assembled and taken apart several times during construction, I use undersized screws until final assembly. Even if some holes become stripped, the final assembly will still be strong and tight.

The drawer runners, kickers and strongback are doweled to the aprons using the jig described in the sidebar on p. 37. The drawer runners are installed first and used as a guide to mark and notch the strongback. When notching the strongback, I like to spread the runners about 1/16 inch farther apart at the center of the table than they are at the drawer openings. This gives the drawers an easier action and is good insurance against binding. The kickers can then be installed after notching the top of the strongback.

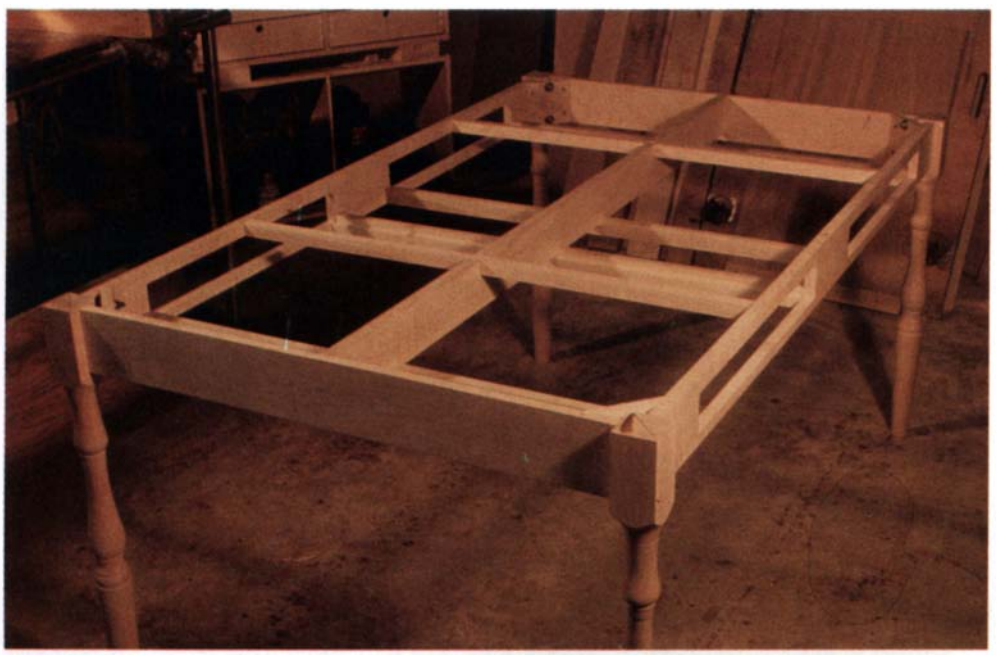
Assembly and glue-up—Before everything is assembled and glued, I provide for attaching the top to the frame. I prefer to hold the top down gently in a lot of places, so I drilled four slotted holes in each drawer kicker, two near each end and two about nine inches in from each end. I also drilled five counterbored holes through the strongback, so I could drive screws up from the bottom into the tabletop. In addition, I used hardwood cabinetmaker's buttons anchored in routed slots to attach the top to the inside faces of the apron. By interconnecting the internal structure with the top and aprons, the entire table becomes much more rigid.

After cleaning up any glue squeeze-out and bolting on the legs, I begin working on the drawers. If you prefer flush front drawers, you can use the pieces of apron you cut out to make the drawer openings for an almost perfect grain match. I found overlapped drawers look better on this table. However, if the lip on the drawer front is the drawer stop, it may eventually crack or break off. So I cut the drawer sides about an inch shorter than the distance from the outside face of the apron to the strongback, and I install an adjustable stop on the drawer runner. I dovetail the drawers front and back, using half-blind dovetails in the front and through-dovetails in the back.

I prefer solid wood for drawer bottoms because of its appearance and feel, but in this case, I used ¼-in.-thick plywood for its strength and stability and to maximize the interior height of the drawer. Once the corner joints are cut, I rout the sides and front for the drawer bottom and then assemble the drawers, checking for square. Mushroom-style pulls turned from curly maple are appropriate for the overall simplicity of this table.

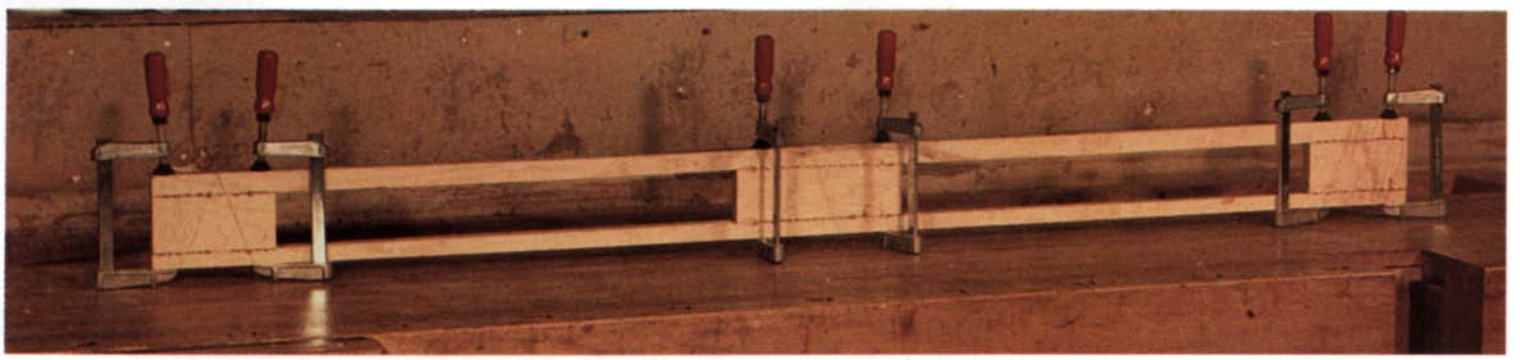
Now disassemble the table to its components and finish each part separately. Because my client's family includes young children, I applied an acid-catalyzed lacquer topcoat. Acid-catalyzed lacquers, available through industrial suppliers, are the most durable finish I've found. A possible down side is that this lacquer is so tough that most strippers won't affect it. When dry, put everything together for the last time, and enjoy your table. □

After 14 years of professional furniture-making, Mac Campbell is now studying theology in Halifax, N.S., Canada.



The strongback runs the length of the table *and is secured to the end aprons, the drawer runners and kickers, and the top to tie the components together into a strong unit.*

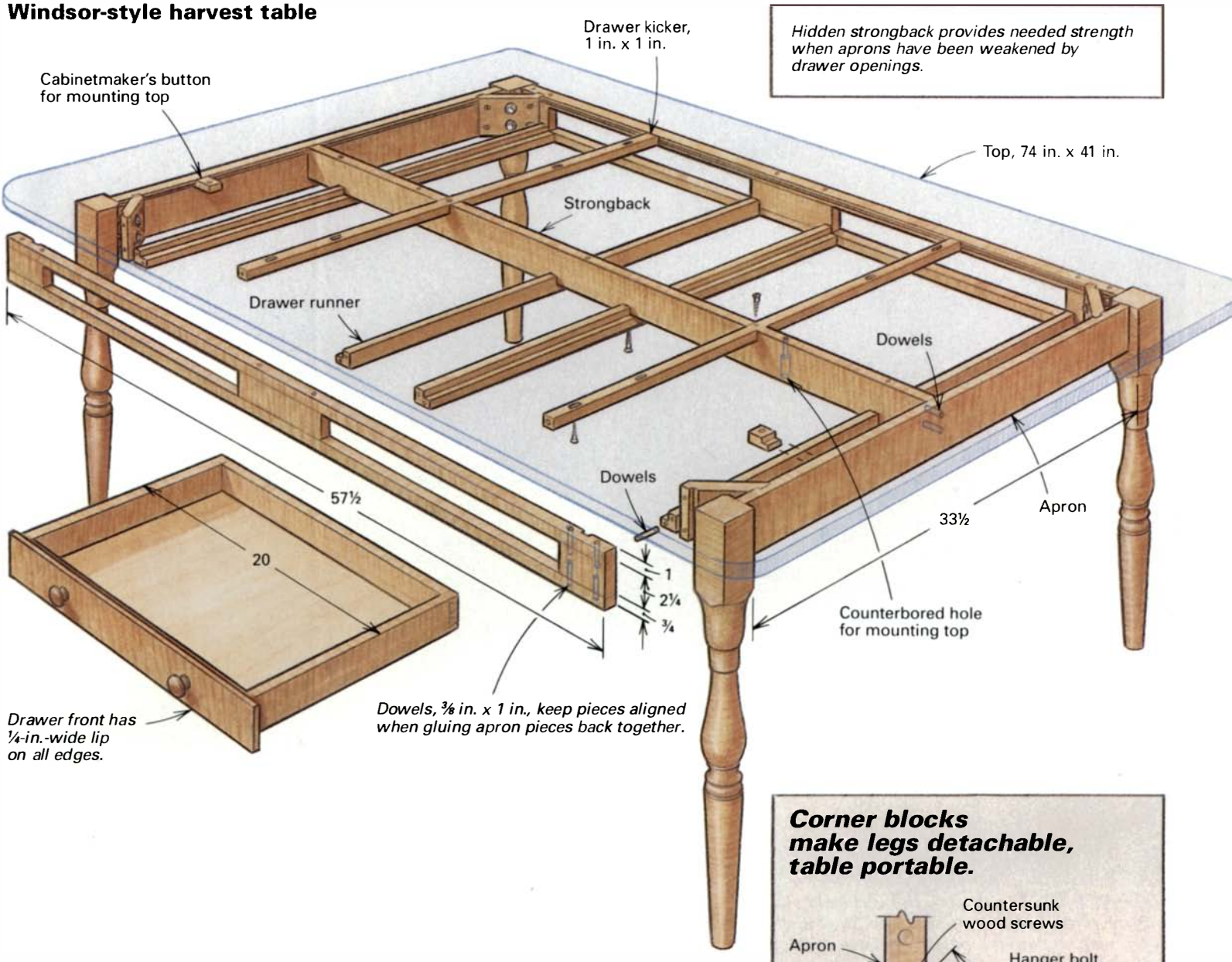
Create the drawer openings in the side aprons *by ripping the apron stock into three strips, removing the sections in the middle strip where the drawers will go and then gluing the remaining pieces back together.*



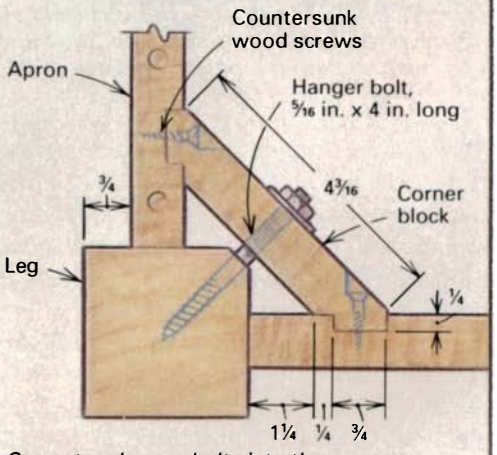
Photos except where noted: Mac Campbell; drawings: Bob La Pointe

Windsor-style harvest table

Hidden strongback provides needed strength when aprons have been weakened by drawer openings.

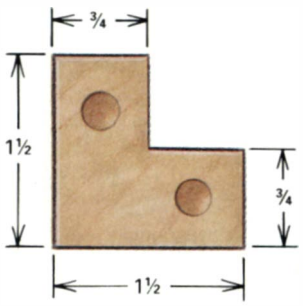


Corner blocks make legs detachable, table portable.

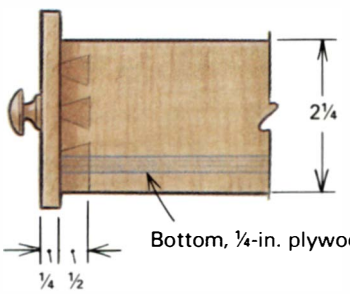


Screw two hanger bolts into the inside corner of each leg. They protrude through the corner block to secure the legs to the table.

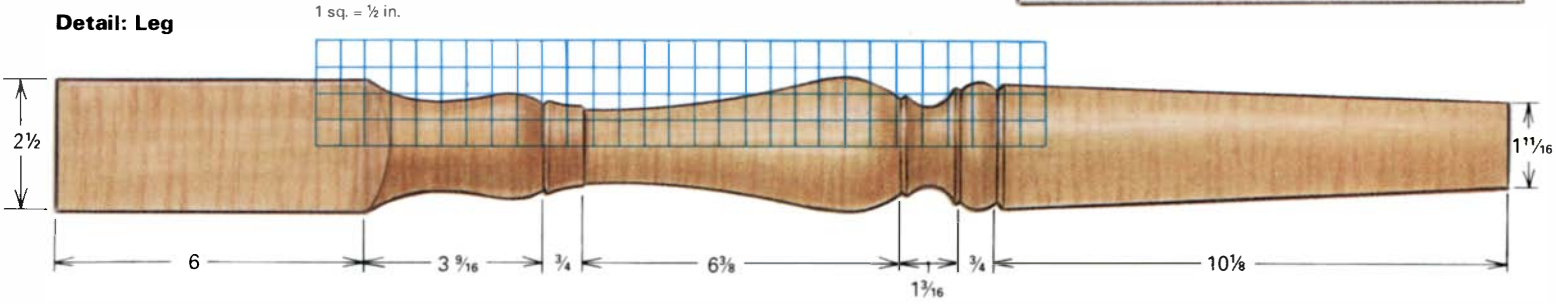
Detail: End view of drawer runner



Detail: Drawer front



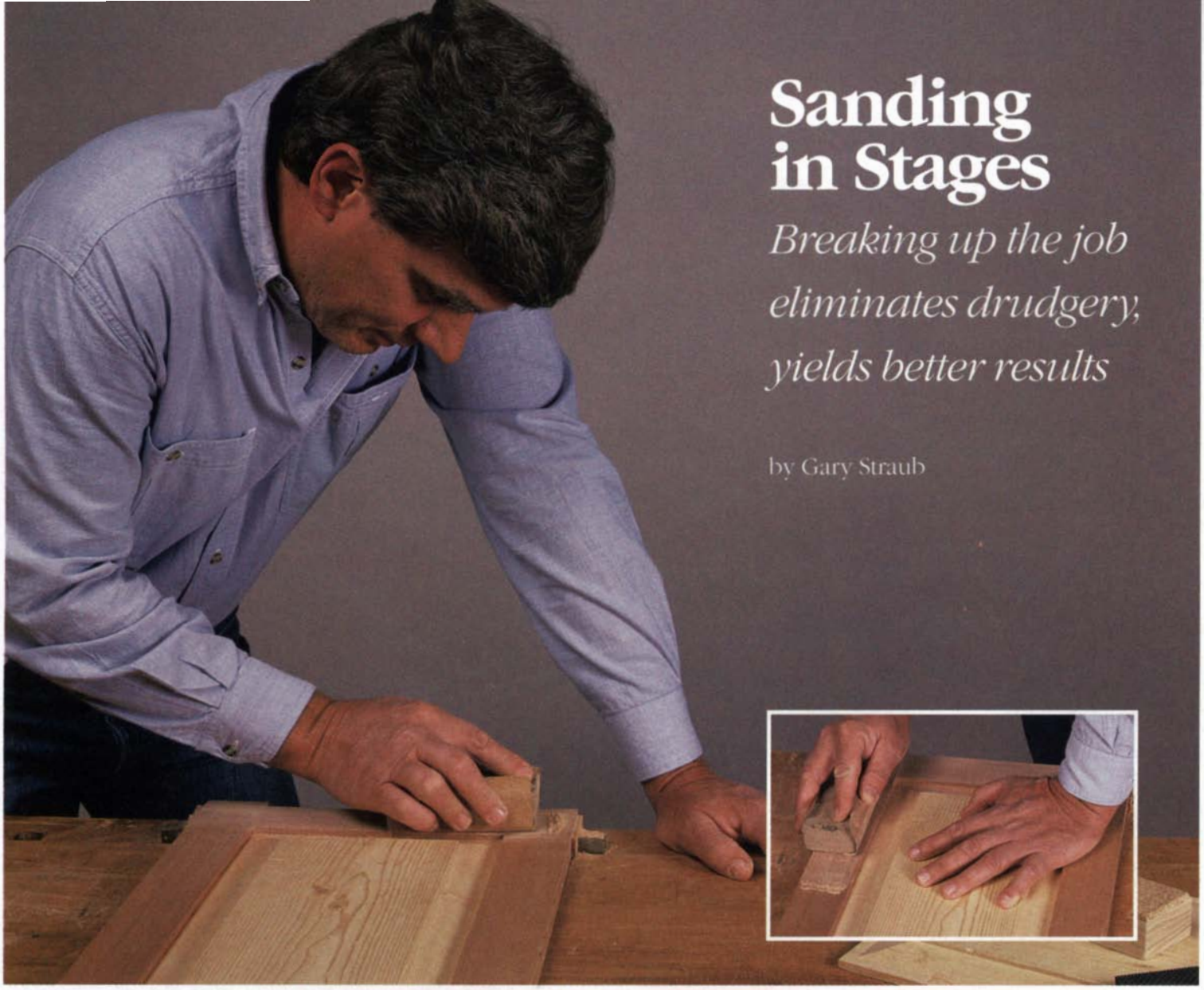
Detail: Leg



Sanding in Stages

Breaking up the job eliminates drudgery, yields better results

by Gary Straub



***Sanding is just as critical to the ultimate success** of a piece of furniture as its design or joinery. Here, the author sands the frame of a frame-and-panel door, taking care of the tenoned rail first and then sanding the mortised stiles, thereby eliminating any stray scratch marks caused by sanding across the joint line. This process is repeated with each subsequent grit.*

Everything from sharp stones to sharkskin has been used to smooth wood. Today there's a seemingly endless array of sanding tools, aids and abrasives available, all designed to make our work faster, easier and better. If we look back at the methods used to smooth wood, we should appreciate the ease with which we can produce results far superior to those of our predecessors. Even so, most woodworkers still dread sanding.

That's too bad because sanding is one of the most important aspects of producing a fine piece. No matter how much time and care go into the making of a piece, its overall beauty is in large measure determined by how well it's been sanded. Although some finish representatives will tell you differently, no finish can cover up a mediocre sanding job.

Sanding doesn't have to be sheer drudgery, however, if you break the job down into its various stages and integrate the smoothing process with the construction of a piece of furniture. Before I've even ripped a board to width or crosscut it to length, I've beltsanded it to 100-grit. I remove all flaws with this preliminary sanding so that the only reason for further sanding is to remove the scratches created by the previous coarser grit. By the time I glue-up, everything's been sanded to 150-grit, which makes post-assembly sanding a breeze.

The result of this division of labor is a better sanding job, less tedium and a finer finished piece. The sanding system I've developed over the past twenty years of furnituremaking takes advantage of a wide range of abrasive materials. But before I explain my techniques, let's look at what's available today.

The materials

Sandpaper was invented when someone figured out how to glue screened particles of glass or sand onto a paper backing. Today, of course, true sandpaper and glasspaper are practically unavailable. They have been replaced by papers that use much harder and sharper minerals, both natural and synthetic. New abrasive materials, more sophisticated screening methods and superior papers and glues have transformed the ways we smooth wood. Not long ago, abrasives came in grits from 12 to 600; now they go into the thousands (see the photo on the facing page). As if that weren't enough, we also have steel wool, abrasive cloths, pads, powders, liquids and pastes. Knowing what to use has become a challenge.

Abrasives—In ascending order of hardness, the materials used for coated abrasives are glass, silica sand, garnet, aluminum oxide, silicon carbide and zirconia alumina. The abrasive is applied to a backing as an open or closed coat. A closed coat means there is complete coverage while an open coat has 40% to 60% coverage. Closed-coat-

Photos: Susan Kahn

ed abrasives are more aggressive but clog easier. Open-coated abrasives are less aggressive but don't clog as easily. Most wood sanding is best done with open-coated paper, but some very hard woods can be sanded with closed coat. Wet sanding can be done with closed-coated paper (the liquid keeps the abrasive from becoming clogged).

***Paper- and cloth-backed abrasives** are available in a huge range of grits, which are bonded with a variety of adhesives to backings of widely differing weights. They are all still called "sandpaper" even though none are made with sand.*

Backing materials—Backing materials come in weights from A to X, with A-wt. being the lightest. I use mostly A-wt., or finish paper, and C-wt., cabinet or production paper. A-wt. is very flexible for hand- and finish-sanding. C-wt. is heavier but still fairly flexible for machine sanding. Discs are often E-wt. paper, cloth-backed sheets are J-wt. and sanding belts are usually X-wt. cloth.

Bonding agents—The abrasives can be bonded to the backing material with several different glues: hide glue for its flexibility, resins for their strength, or a combination of both. The grains may be electrostatically arranged, and often another coat of resin is added to maintain orientation. This is resin over resin and is used on better sanding belts and in other applications where strength of bond is more important than flexibility.

Reading the paper—Each company has its own method of displaying product information on the back of the sheets of sandpaper (see the top photo on p. 42). The type of abrasive is often written out fully (aluminum oxide or garnet, for example). The grit is displayed by a number, sometimes preceded by a letter, such as P100, and the coating may either be written out fully or abbreviated (Open Coat or OP). The backing weight may be shown as A or A-wt., or combined with either the grit designation (120A) or the information on coating density (AOP).

Choosing a paper—Generally, I use aluminum oxide papers with my portable sanding machines and switch to garnet for hand-sanding. Aluminum oxide lasts longer than garnet because it's a lot harder and so is more suited to machine sanding. It doesn't break down, however, so the sharp edges will become dull. The combination of a dull belt and the speed of the machine (especially a belt sander) can severely burnish the wood, which could affect how it finishes. Dull belts should be replaced. Garnet continuously breaks down, exposing fresh sharp edges, but because it's softer than aluminum oxide, I use it only for hand-sanding.

I sand from 80 to 220 using aluminum oxide and garnet papers but use silicon carbide for grits 240 to 320. I also use coated abrasives on occasion. These papers are often silicon carbide, coated with a material, such as zinc stearate, that prevents the papers from clogging. I've found them helpful in sanding oily or resinous woods, but (contrary to what the manufacturers will tell you) there's a possibility of the residue contaminating the finish.

Non-paper abrasives—In addition to sandpaper, I also use 3M's Scotch-Brite or Norton's Bear-Tex nylon pads and steel wool. The pads are made of abrasive-coated fibrous nylon. They're very flexible, they last much longer than steel wool and they come in different grades, from coarse to ultra-fine. They're also good for wet sanding because they're unaffected by water, oil or solvents.

I use 00, 000 and 0000 (progressively finer) steel wool for finish work and sometimes use the coarser grades for stripping or for routine chores like metal cleaning. I like the steel wool for finish work because it cuts better than the abrasive pads, and the steel wool burnishes the wood slightly, which gives it a better sheen.

The method

The sanding process needn't be the hassle that we often make it. I've found that sanding as I go produces better results and takes much of the monotony out of the work. I first plane or re-plane all lumber for a piece before I start. I keep my blades very sharp, and I never take more than 1/32 in. per pass. On smaller pieces, I use a handplane. Lumber planed at either the lumberyard or mill is very crudely done and of poor consistency. Trying to sand mill-planed lumber flat is a waste of time.

Using machines—After planing all the lumber to a consistent thickness, I sand each piece with a portable belt sander and a 100-grit belt. This sanding is crucial because this is when I remove any flaws. It's tempting to decide that you've sanded enough and that the next grit will take care of the rest. This is never true. If you remove all the flaws on the first sanding, subsequent sandings need only remove the scratches left by the previous grit, thereby saving time overall.

Using a portable belt sander takes some practice because it's quite easy to remove far more wood than you want. Most sanders are not well-balanced, usually weighing more on one side or the other, or more toward the front or back. To compensate for this, you must exert a slight pressure opposite the weight, striving to maintain total contact with the surface. At the same time, you must keep the pressure equal in all directions. Leaning the machine to one side or the other will create long gouges. Applying too much pressure either to the front or back will cause dips.

The proper technique is to move the balanced machine back and forth slowly, with the grain, reaching comfortably but not stretching. Don't move the machine directly to the side but rather let it drift to the side as you go back and forth. Moving it sideways will cause zig-zag dips that usually remain hidden until the first coat of finish is applied.

I change belts as soon as I feel myself applying more pressure to get the belt to bite. Increasing pressure as belts dull is a primary cause of a poor sanding job. Unfortunately, the high cost of belts stimulate this bad habit. Cleaning the belt with a crepe-rubber bar belt-cleaning stick will stretch the life of your belts, but when they're dull, they're dull.

Having a brand new belt clog up with resin or glue can be very frustrating. I've had some success cleaning belts with a brass-bristled brush and in worse cases, using pitch cleaner with the brass brush. I do save all my used belts because they're still good enough for lathe work and for hand-sanding curved surfaces. I like Hermes aluminum oxide, resin-over-resin, open-coated belts. They're good belts at a fair price.

After sanding all flaws out of the lumber, I cut all stock to size, joint all the edges (finishing with a handplane), make all my joints and then dry-assemble. Next I glue up any wide panels such as tabletops. While they're drying, I sand the rest of the flat parts with a belt sander using 120-grit. All the parts that can't be sanded with a machine, I'll hand-sand with the same grit. Before sanding and

between each grit, I brush each piece thoroughly to remove any residual grit—the cause of those mysterious scratches that often appear.

This sanding goes very fast, but you must be careful, especially on the edges. The only object of this sanding is to remove the previous sanding scratches because I've already removed all defects with the initial sanding. I then check for any dings that may have occurred while cutting, and if there are any, I'll put drops of water on them to raise the fibers. By this time, any wide-panel glue-ups are dry enough to remove the clamps. I use an old plane blade to remove excess glue before it dries completely; otherwise, it will lock moisture into the joints, causing problems later on.

Next, I handplane any irregularities in the glued-up surface because it's just not possible to make a large panel flat with a portable sander. Once I get the surface satisfactorily flat, I sand it with the belt sander using a 120-grit belt. I sand the back first so that I don't take a chance on scratching the top when I turn it over. I then do any decorative routing, inlays or carving, and I plane or hand-sand the panel again with 120-grit paper. Now all the pieces are made and sanded to 120-grit, which is fairly smooth.

All you need to know about a sandpaper is printed on its back. Manufacturers usually indicate grit, coating density (open or closed coat), backing weight and sometimes other information, such as whether a no-clog coating has been used, as is the case with the first (Lubrisil) and second (No-Fil) sheets above.

***For stripping paint** or varnish and for cleaning metal or going over a finish, steel wool and abrasive pads work better than sandpaper.*

Now I change to a half-sheet orbital sander and 150-grit aluminum oxide paper (I like Diamond Grit paper, made by the Carborundum Abrasives Co.), and then I go over all the flat surfaces before assembly. This makes problem areas—such as joints where the grain goes in different directions—much easier to deal with after assembly. I then dry-assemble the piece to check for any variation in wood thickness at the joints. Sanding these flush now makes post-assembly sanding much easier and pleasant.

When everything looks and fits right, I glue up. Because there's no turning back now, I make sure I'm satisfied that all is ready. I use glue sparingly, so there is minimum squeeze-out (but I make sure there's a little, so I know the joint isn't starved). While waiting for the glue to set, I sand any wide panels to the same 150-grit.

A good orbital sander does an excellent job of sanding, removing wood quickly while maintaining flatness. I use a Porter-Cable 505 half-sheet sander and a Makita quarter-sheet sander. I always use the largest sander that will do the job, usually the half-sheet machine. I move the machine back and forth slowly with the grain, letting the machine do the work. I apply only enough pressure to maintain control. The quickest way to ruin both furniture and machine is to apply a lot of pressure. By applying just a *little* more pressure on the back of the sander on the forward stroke and on the front on the return stroke, I have more control and the machine performs better.

Moving slowly is key to minimizing swirl marks because it gives the paper a chance to erase them. Just as with the belt sander, I shift sideways slowly as I'm moving back and forth to avoid creating any swirl marks, and I brush my work often to prevent pieces of grit from getting caught under the pad. On very large panels, I sand one area at a time so that I don't forget where I've been.

The next step depends on the finish I'm using. I put oil on most of my work (except tabletops) because I like the way it allows the texture of the wood to be seen and felt. When finishing with oil, I stop at 150-grit. Oil is a penetrating finish, and the finer you sand, the less penetration you obtain. I apply the first coat (which does the most penetrating) before I go to finer abrasives.

For items requiring more protection, I use a surface finish such as varnish or lacquer. When I'm putting on a varnish finish, I continue machine sanding to 220-grit and for lacquer to 320-grit.

Hand-sanding—Regardless of the finish, I always hand-sand all the pieces (except bottoms, backs and other parts that will not show) with the same grit that I used on the last machine sanding. This removes any remaining swirl marks and provides a good opportunity to examine every inch of the work.

Hand-sanding is labor-intensive, but it's also the most rewarding part of sanding. Using machines requires good balance and steady hands, but handwork lets you feel what you're doing. You must learn to detect slight imperfections with your hands to judge whether a curve is fair or an edge consistent.

When sanding flat surfaces by hand, you must use a sanding block to keep the surface flat (see the top photo on the facing page). I prefer a solid-cork block, but I've also made sanding blocks by gluing bulletin-board cork (obtainable at most hardware stores) to a block of wood. Cork is firm enough to keep the paper flat and resilient enough not to destroy the paper. Some prefer felt- or rubber-faced sanding blocks. What's important is that you not use a block of wood alone, or it will quickly destroy the paper. The block I use takes a quarter sheet of paper.

I apply firm pressure to the block, stroking back and forth, carefully following the curves of the grain. I'm very careful with edges and corners, taking care not to round them off or taper them. If they're square, I try to keep them sharp for now. For miters, I hold the block at the same angle as the joint and sand up to the intersection from each direction. I deal with right-angle joints by sanding the tenoned section first. Then, when sanding the mortised section, I can remove any stray scratches.

Overexertion quickly leads to a hurry-up and get-it-done attitude. I take my time as if I were cutting feather-thin dovetails, sanding a small portion at a time and stopping often to brush away any loose grits. I check my progress frequently, using my bare hand to tell me where I need to sand a little more. When I finish one section, I dust thoroughly, wipe with a soft clean cloth and then feel the surface again, making sure it's right.

The last step is to eliminate any sharp edges that I've left. Using the finest grit I've sanded with to this point, I go over the edges by hand, without a pad. I twist my hand slightly as I'm moving forward, which softens the edge more quickly than if I kept my hand fixed, and it prevents the edge from getting stuck in a groove in the paper. A very light touch will produce a corner that cannot be duplicated

by any machine. A little more pressure will yield a 1/16 in. radius in no time.

Sanding irregular surfaces—Sanding curved pieces is much the same as sanding flat surfaces except you have to begin hand-sanding right from the start. A flexible sanding block is important; I use rubber sanding pads, varying in firmness. Their flexibility allows them to bend to fit most curves.

For smaller curves and for sanding on the lathe, I tear a strip of whatever size I need from a used sanding belt I've saved. The heavy cloth back of the belt is pliable enough to fit the curve yet firm enough to maintain the shape. For small concave shapes, such as on moldings, I cut a piece of dowel that fits the groove and wrap it with A-wt. paper.

I also use rubber Tadpole Contour Sanding Grips (available from many mail-order woodworking catalogs). They come in various diameters, both concave and convex, and the flat grip section is shaped at the top to allow sanding in tight places. They come in sets, some include flexible sanding pads. They've made life easier, and they're very inexpensive.

Carve as smoothly and crisply as possible, so only minimal sanding is required. Carvings present the most difficulty because any sanding will alter the character of a carving. If it's a geometric carving or a large in-the-round carving, sanding with A-wt. paper works well. For heavy carvings, without fine detail, steel wool or abrasive pads conform well to irregular shapes. When I do a lot of sanding with my fingers, I wear finger rubbers (available at most office supply stores). They're made for office workers to flip easily through papers, but they're also perfect for protecting fingers, and giving a good grip on the sandpaper.

For highly detailed carvings, I use a stiff nylon-bristled brush—shaped like a toothbrush—and a slurry of powdered pumice and mineral spirits. Pumice is made from a type of lava and has been used through the ages as an abrasive both in the solid and crushed form. Powdered pumice is graded like steel wool except in *F*'s instead of *0*'s. I use the finest grit that will work.

Smoothing the finish—After I'm satisfied that everything is smooth and ready for the finish, I wipe everything down with a soft rag dampened in mineral spirits. This serves three purposes: first, it cleans any contaminants that may have gotten on the wood, especially oils from my hands or drops of sweat from working on a hot summer day. It also gives me an idea how the piece will look finished and reveals any remaining imperfections. These are far easier to deal with now than after applying a finish.

The smoothing process isn't over when the finish goes on. Each coat must be abraded slightly before the next is applied either to ensure adhesion, as with varnish to remove dust specks in lacquer, or to finish the smoothing of an oil finish. I sand varnished and lacquered surfaces with 320-grit silicon carbide paper, often with water on varnish. But for my oil finish, I use steel wool starting with 00 and changing to the next finer grade with each coat. I prefer steel wool to the nylon abrasive pads because it not only smooths the surface by abrasion but also gently burnishes the oil-filled wood, creating a higher luster and a smoother feel.

***Always sand with a cushion** to keep your surface flat. Cork blocks, cork-faced blocks and rubber sanding pads all will work. The rubber Tadpoles (right, background) allow sanding of concave and convex moldings, and the finger rubbers protect the fingers while providing a good grip on the sandpaper. The solid wood block is useful as a backing for the nylon abrasive pads.*

***Polishes further refine the finish.** They include pumice and rottenstone as well as modern ultra-fine automotive products. In either case, felt is the best applicator.*

The final coat of finish must also be smoothed or polished. A slurry of rottenstone (a very finely powdered mineral) mixed either with water or paraffin oil makes an excellent polish. Mixed with water, it gives a higher polish; mixed with oil, it gives a more satin finish.

Felt is the best material for the final rubbing. Felt blocks that look like sanding blocks are available commercially, but you can also make your own. The best felt comes from old felt hats that you might find in your father's attic or in used-clothing stores. The texture of that felt is very uniform, and it's stiff enough to use without a block for curved and carved parts. I just dip the felt in the slurry and rub with the grain. I rub with the felt by itself (no rottenstone) for oil finishes because I'm able to get the luster I want without abrasives. I rub harder and longer, though, because there's no danger of cutting through, now that the finish has become part of the wood.

There are many polishes for wood today that surpass rottenstone, so rottenstone is fading into history. Most finish companies either make a polish for their finish or recommend one. Also there are many automobile polishes that give excellent results on varnished or lacquered finishes. In fact, there are so many polishes available today that it's difficult to keep track of them all. I've been happy with Meguiar's Mirror Glaze, a brand I find at the local auto parts' store. It comes in varying degrees of abrasiveness. One caveat: Be careful when using polishes on wood whose grain has not been filled. The residue of many polishes will fill the grain and dry to a very unnatural color, which is extremely difficult to remove.

The last step is to remove any remaining polish with a very soft cloth. Cotton diapers are excellent but in short supply in this disposable society. Lint-free polishing cloths are available from finish suppliers or auto parts' stores. Wipe your piece down, and step back to admire a job well-done. □

Gary Straub has been building (and sanding) furniture in Columbia, Mo., for 20 years.

Sources of supply

Sanding (and other abrasive) supplies are available from many general woodworking catalogs. There are also a number of companies whose specialty is abrasive products. Below are two that the author buys from.

Pyramid Products Co., 7440 E. 12th St., Kansas City, MO 64126; (800) 747-3600

Skates Belting, 321 Southwest Blvd., Kansas City, MO 64108; (800) 821-5041

Angled Tenons on the Tablesaw

Sliding table, crossfeed box and wedges ensure accuracy, ease and repeatability

by William Krase

***Angled tenons** can be difficult to cut—especially if they're compound. Krase's system greatly simplifies the process. The workpiece seats securely against the wedges at the juncture of the crossfeed and sliding table, while the sliding table guides the whole affair through the blade.*

Lots of furniture—especially pieces intended to accommodate the human body—require joints that are not square. Chairs may have as many as 16 such joints, some of which are compound (angled in two planes). That's why chairs can be difficult. They don't have to be.

With my addition of a crossfeed box to Kelly Mehler's sliding table (*FWW* #89, p. 72) and the use of purpose-made wedges, you can cut even compound-angled tenons quickly, accurately, time after time (see the photo at left). The wedges establish the tenon angle while the crossfeed box positions the workpiece to get the correct length, width and thickness of tenon.

I arrived at this method of cutting angled tenons because I wanted to make the stool in the photo below. Since then, I've used it on four more pieces of furniture—over 60 angled joints in all. Though now I wish I'd made the sliding table and crossfeed box of a better material, I've been completely satisfied with both the apparatus and the results.

I used regular particleboard (the kind often used for floor underlayment) for the sliding table's base and for the crossfeed box (see the drawing for critical dimensions and construction information). Particleboard is what I had handy, but if I were to build another, I'd use medium-density fiberboard (MDF) or a good-quality birch plywood instead. Particleboard seems to be susceptible to changes in humidity, resulting in some binding whenever the humidity becomes extreme.

I make wedges for projects as I need them. They must be long enough to support the workpiece securely in the upright position. I've found that 1-ft. sections of 2x stock work well.

To make the thumbscrews that fasten the crossfeed box to the sliding table, I bought a length of 1/16-in. by 1/2-in. brass strip (from a hobby shop), cut pieces to size and soldered them into the head slots of slotted brass machine screws. The resulting homemade thumbscrews are oversized, so it's easy to tighten the crossfeed box in place. I use large washers beneath the thumbscrews to prevent them from digging into the crossfeed box.

***Angled tenons**—some compound—were used almost exclusively in the construction of this walnut chair, stool and side table. Legs on two of these pieces splay in two directions, requiring slightly angled tenons at both ends of apron pieces, stretchers and seat supports.*

Cutting tenons

Generally, the first thing I do when cutting angled tenons is to cut the end of the workpiece parallel to what will be the shoulder of the tenon, using the sliding table and wedges. Then, when I position the wedge (or wedges), I make sure the end of the workpiece flushes up against the crossfeed box (for cutting shoulders) or the base of the sliding table (for the cheeks). This helps orient the workpiece and minimizes the chance of my ending up with an expensive piece of kindling. That's happened only once using this jig, when I measured to the wrong side of the sawblade.

Tenons angled in one plane require one wedge; compound-angled tenons require two. I use the same wedges for cutting both the shoulders and cheeks. The wedges just have to be manipulated to reposition the workpiece properly with respect to the blade—in practice the orientation is obvious. As a rule, I cut the shoulders first and then the cheeks. This creates a crisp shoulder, makes cutting the cheeks easier and minimizes the chance of pinching the blade with the small offcuts.

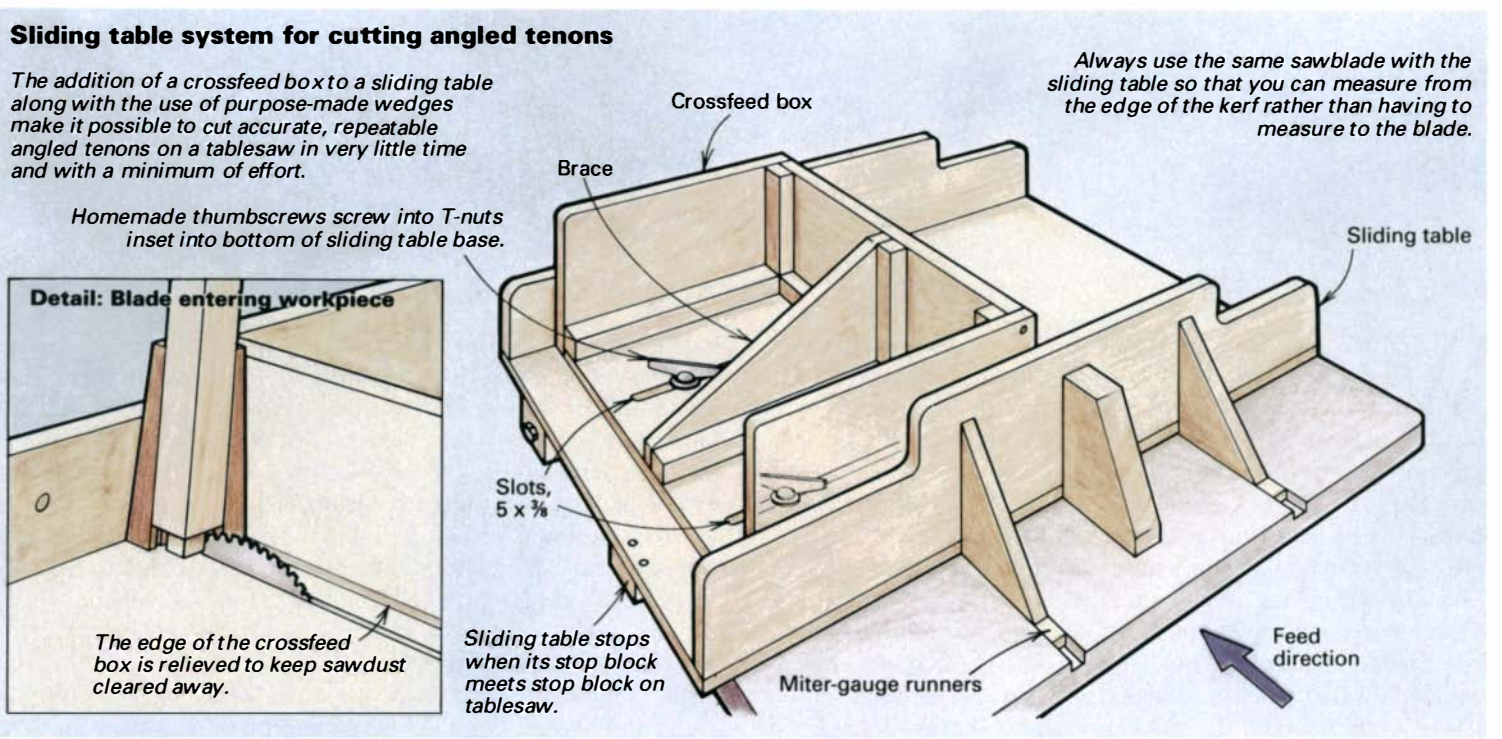
With the workpiece bearing against two surfaces oriented 90° to each other and with the force of the blade only serving to seat the workpiece more securely, I'm comfortable handholding the workpiece. If it makes you feel safer or more secure, by all means, use a clamp, but just be sure the clamp doesn't vibrate loose and fall into the blade. □

Bill Krase is a retired aerospace engineer who builds furniture and boats in Mendocino, Calif.

Sliding table system for cutting angled tenons

The addition of a crossfeed box to a sliding table along with the use of purpose-made wedges make it possible to cut accurate, repeatable angled tenons on a tablesaw in very little time and with a minimum of effort.

Always use the same sawblade with the sliding table so that you can measure from the edge of the kerf rather than having to measure to the blade.



Photos: Vincent Laurence; drawing: Maria Meleschnig

"Together we win." *This quote on the wall poster appropriately conveys the successful teamwork of public television's program,* The New Yankee Workshop. *Producer Russell Morash (foreground), discovered a host, Norm Abram (a carpenter at the time), in his own backyard. As Abram proved that he could build a project, Morash proved that he could build a show.*

Norm Abram: Carpenter Turned Furnituremaker

Profiling the host of 'The New Yankee Workshop'

by Jim Boesel

When Norm Abram took a job building a small barn in the backyard of a television producer's house on the outskirts of Boston, he had no idea that his life was about to take a dramatic turn. At the time, Abram was a young general contractor trying to steer his business toward quality renovations. Impressed by Abram's chintzy scrap pile and efficient work habits, Russell Morash, creator of public television's *This Old House*, approached Abram with the idea of Norm the carpenter appearing and talking about home restoration. Abram, figuring he didn't have much to lose because work was scarce, said okay. Since accepting that offer in 1979, his career has continued to blossom. And the barn? Well, it resides next to the lush garden featured in *The Victory Garden*. The barn's not so small either—it has been expanded into *The New Yankee Workshop* (see the photo above).

As host of *The New Yankee Workshop*, Norm Abram builds projects in front of 4½ million loyal viewers each week. With those fans and more than a few skeptics wanting to know what really happens behind the scenes of his show, I thought it was high time to look at what goes into, and what comes out of, television's best loved woodshop. Through a visit to the shop and interviews with Abram and producer Morash, I learned how this Yankee's woodworking—from carpentry to furnituremaking—is evolving.

The man behind the saw

While growing up in Milford, Mass., Abram learned much of his craft from his carpenter father. By age 15, he was working con-

Photos except where noted: Alec Waters

struction with his dad. Once through high school, Abram studied engineering and business at the University of Massachusetts and then worked for three years as a site supervisor of a large construction firm before going into business for himself in 1976. For a time, Abram kept up his company, Integrated Structures Inc., while appearing on *This Old House* and finally began attracting the kind of up-scale remodeling jobs he'd hoped for. But as the success of the show grew, so did the demands on his time. After four years as a contractor/builder, Abram felt out of touch with the day-to-day work, so he let his business go dormant.

***Learning from* This Old House**—In 1980, *This Old House* debuted nationally on PBS. Host Bob Vila and Norm the carpenter soon became familiar characters to millions of do-it-yourselfers, woodworking wanna-bes and casual viewers. In the early episodes, Abram played second banana, and his laid-back style proved the perfect foil to Vila's gameshow-host persona. Norm came across as the one with know-how while Vila sold viewers on how easy it was to remodel an old bathroom or install new windows.

Eventually, Vila's propensity for salesmanship caught up with him. In spite of the noncommercial nature of PBS, Vila, from the beginning, was allowed to endorse products on the side. When competing underwriters threatened to withdraw more than $1 million in support, WGBH insisted that Vila stop the promotions. He refused, so WGBH hired a new host, Steve Thomas, for the tenth season in 1989. Interestingly, Abram came through the whole ordeal with his integrity unscathed—in good position to become top dog on his own show. Although he's had offers, he's never directly endorsed any brands. He does make personal appearances at regional home shows, but those are paid for by either the sponsors of the show or by WGBH underwriters, and he makes a point of plugging the program instead of products.

***Building* The New Yankee Workshop**—Before Morash could launch *The New Yankee Workshop*, he needed a convenient place to videotape. So he had Abram design and build the barn addition in 1988. The shop's layout and equipment (see the top photo on p. 48) are mostly Abram's preferences, and when looking back on how the shop has functioned, Morash said: "We did everything right. There's not much we would change." That's because *The New Yankee Workshop* is a real shop, not a studio set. If you showed up on a day when the show wasn't being taped, you'd easily mistake it for what it is—a well-equipped suburban shop of a successful executive with a serious woodworking hobby.

Ever wish you had the right tool for every job?

Making sawdust is easy in *The New Yankee Workshop*, thanks to the tool manufacturers eager to donate tools with the hope that Abram will use them on the air. The heart of the shop (and the only major tool that wasn't donated) is a Delta 10-in. tablesaw, a vintage 1966 model that was a birthday gift to Morash from his wife. For crosscutting, there's a 12-in. radial-arm saw and a 10-in. chop saw. There's a 6-in. jointer, a 12-in. planer, a 14-in. bandsaw and a floor-model drill press. The shop also sports an extra tablesaw, a portable dust collector, a ¾-in. spindle shaper, an air compressor and two lathes: one for duplicating and one for using on a benchtop. And there's quite an array of hand tools, clamps and finishing supplies as well as bits, blades and accessories.

Of course, no shop is complete without a complement of portable power tools, but these Yankees have more than a fair share. There's no end of sanders, routers, pneumatic nailers, drills and saws. Morash makes no promises and takes no money in exchange for airing tools or hardware. Abram doesn't automatically

Norm talks safety

Despite the safety discussion that begins each episode of *The New Yankee Workshop*, experienced woodworkers have criticized the show for being soft on safety. So I asked Norm about shop safety, and here's what he told me:

"First of all, we never tell people what to do on the program. It's always in the first person, 'I'm going to do this, that and the other thing.' And we try very hard not to show something that could cause someone to get hurt. I'm very conscious that my audience has less experience than I do, so I approach each task from their skill level. For example, while I've been known to cut a tenon freehand, holding the work upright against a fence, on the show I use a tenoning jig and clamp the workpiece.

"There are some things that I've been criticized for that I don't necessarily agree with. For example, bringing the sawblade up through a workpiece for a stopped cut. If done properly (using a stop block), this is a perfectly safe operation—unless you're silly enough to have your hand where the blade comes through.

"Even blade guards can't make all situations safe. When I use a dado head on my radial-arm saw, for example, I often have to remove the guard. Luckily, guards are getting better. But even so, most shop accidents happen because people are doing something they shouldn't be doing (with or without a guard).

"Doing the show has raised my own safety awareness, so even off camera I've gotten in the habit of using jigs (see the photo below) and not taking shortcuts where safety is concerned. I figure that every day that goes by, the odds start to work against me, and if I hurt myself, it won't look good on the show and I may be out of work. I've only been nicked once—on the tablesaw. And it was typical of most workshop injuries; I was tired, in a hurry and I did something stupid."

***Finger-saving finger joints:** Abram uses jigs, especially when a machine's guard has been removed for photographic clarity (or otherwise). To make tablesaw operations logical and safe, he builds jigs, for example, that ride in the saw's miter grooves, as shown here.*

use donated tools on the show either. If he likes the way a new gadget works, it will likely get on the show; if he doesn't like it, it won't. When deciding how they'll show a tool being used, Abram and Morash discuss safety (see the box on p. 47). To avoid being accused of featuring a particular tool to the exclusion of others, they usually remove or obscure labels (manufacturers do get their names listed in the credits at the end of the show). When it comes to materials, though, Abram and Morash draw the line. Rather than accept donated materials, they prefer to choose their wood at the lumberyard and order supplies for each project themselves.

Video woodworking without a net

When I went to see how they videotape *The New Yankee Workshop*, I expected to find more show business than woodworking—

***Ready on the set:** After Abram explains what he's going to do, Dick Holden, whose camera work has earned him three Emmy awards, and Hugh Kelly, Holden's integral grip, videotape Abram cutting a tenon shoulder with his radial-arm saw. This improvisational rapport between host and crew results in unique, low-budget productions that don't sacrifice quality.*

Photo: Mark Sant'Angelo

***Rolling...**The front of a barn, which resembles a garage, functions as the potting shed for* The Victory Garden, *as Abram's finishing room and as* The New Yankee Workshop*'s recording suite shown here. Engineer Bill Fairweather's no-nonsense mixing of visuals and sounds means Abram never has to add studio voice-overs, which leads to what, Russ Morash calls "easy-assembly editing."*

I figured Abram would show up, go through the motions with a router, maybe a tablesaw, while reading from a script and working with spare parts made by somebody else, and then be on his way. Well, I figured wrong. Here's what really happened.

Setting the scene—Producer/director Russ Morash and crew are taping episode #11 for the 1993 season. Abram is assembling two redwood arches to form a trellis that covers a slatted bench. It's obvious that he's not just working with mocked-up parts. He's actually building this project, and the camera is a visitor like me.

The show is made with a six-person crew, but besides Morash, there are only three people in the shop: Abram, spreading glue on the tenoned ends of several 1¼-in.-sq. crosspieces; Dick Holden, a few feet away with a big video camera balanced on his shoulder; and Hugh Kelly, known as the grip, keeping Holden's camera cable out of the way (see the top photo).

Lights, camera—A pair of studio lights, mounted on tall stands, illuminates the scene as Morash watches on a 20-in. monitor located in the corner of the shop. Occasionally, Morash picks up a walkie-talkie to speak with the other two members of the crew, engineer Bill Fairweather and his assistant Kate Cohen, about 15 yards away. The engineers' recording suite, which includes audio mixer and camera controls, is set up in the entrance of the original barn (see the bottom photo). Back in the shop, Morash and Abram fine-tune the monologue:

Explaining to Morash how the arches join, Abram offers, "Crosspieces with tenons cut on each end join the arches...." Morash interrupts, "*The arches* are joined.... Make the lead-in stronger, like the beginning of a paragraph since we left off talking about crosspieces." Abram responds, "*The arches* are joined with the crosspieces that have tenons cut on each end." Morash, making sure Bill is ready at the board, says, "Good, let's do it."

Action—With Morash's "okay, action" cue, Abram says his line and drives the tenon home with a mallet. Morash: "Did you get that Bill?" Bill's "got it," crackles back over the walkie-talkie, and Holden relaxes while Abram starts clamping up the assembly.

That's it. It took less than five minutes to plan, rehearse and shoot the scene. There is no written script, no preplanned camera angles, no make-up and no second take (in five years of taping, only one episode needed a reshoot). It all looks too easy until you realize that the key players, Morash, Holden and Abram, have been working together for more than 12 years. Each man knows his craft and respects the skills of the others at theirs. None of them waste time second-guessing another. But while it's clearly a collaborative effort, in Morash's words: "It's not a free-for-all. It only works because someone is definitely in charge."

The man behind the curtain—*The New Yankee Workshop*, which costs under $100,000 to produce per show (a modest figure for television), is just the latest in a long list of successful ventures that Russell Morash has created for PBS. The list includes *The Advocates*, *The National Theatre of the Deaf*, *The Victory Garden*, Julia Child's cooking shows and *This Old House*, PBS's top-rated half-hour program. Morash has received six Emmys and is widely accepted as the guru of how-to television.

According to Morash, the thing that's unique about his methods is that he sees and hears each shot. For example, when taping takes him away from his benchtop monitor (see the top photo on p. 50), Morash directs remotely via a shirt pocket-sized television, whose picture is sent from the recording suite. The day I visited, the tiny monitor came in handy to shoot the closing scene of

My workshops: old, New Yankee *and new*

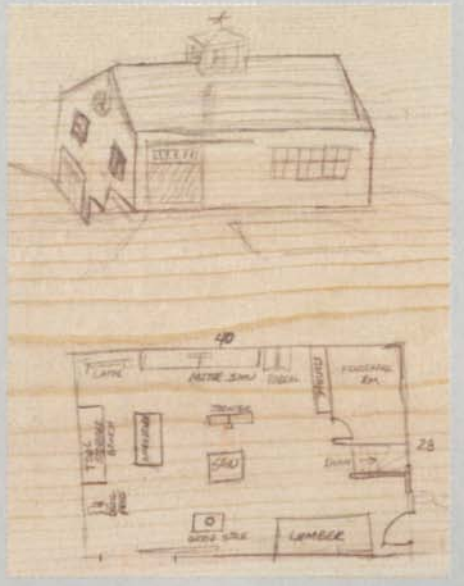
by Norm Abram

After I built *The New Yankee Workshop*, my producer gave me a key and said, "You're welcome to use this anytime." Well, I've certainly taken him up on that offer. While I don't have loads of free time to do personal woodworking projects, I use *The New Yankee Workshop* as my own. The show only ties up the shop for about 65 days a year: two days for each of the 13 episodes, plus about three days to build each prototype. The rest of the time, the shop reverts back to making sawdust.

At home, I've got a dusty little shop, which has your basic woodworking tools and a bench where I can cobble things together—repair work mostly. Fortunately, I'm building a new two-story Colonial/timber-framed house that's going to have a nice shop. Because I've gotten spoiled by the extra room at *The New Yankee Workshop* (and believe me, the 936 sq. ft. comes in handy), my new shop, which will be a little bigger and in its own building (see the staked-out site in the photo at right), is patterned after *New Yankee*'s 26 x 36 space.

Originally, I thought about building the shop with an open truss roof, giving me 9 ft. of clearance. But, because it's nice not having overhead obstructions, I chose a gable roof, like in *New Yankee*'s shop (see the photo on p. 46). I'll probably put in skylights for more daylight as well. The building's grade is stepped, which means I'll have a storage basement underneath, with 7 ft., 4 in. of headroom. The basement will have a garage door, and the shop level will have a sliding door. The shop's floor, rather than being a concrete slab, will be wood, which should be easier on my feet.

I haven't laid out the exact floor plan yet, but I've worked up a rough thumbnail on a board (at left) showing where I'll most likely place machines, benches and tool cabinets. Although it'll be quite a while before I'm set up in the new area, every chance I get, I think about how I'm going to organize things. My stepson's already got a boatbuilding project slated for whenever the new shop is finished.



***Shop on a shingle** (left) lets Abram refine his new shop's layout.*

***Shop stakeout:** Abram (below), scoping out where his new shop will go, says he's looking forward to trying all kinds of high-end woodworking at home once his shop is built. His new house, under construction, is in the background.*

Photo: Richard Howard; drawing: Norm Abram

Abram commenting on the location of the installed arbor, which just happened to be in Russ Morash's front yard.

Making projects: from prototypes to profits

Decisions about what projects to include in the show are made by Morash and Abram. Each season, they include a mix of carpentry, like a shop cabinet or a seating arbor, and furniture, like a Shaker tall chest or an English sideboard (see the front cover photo). Abram and crew usually tape a segment to show where a piece's inspiration came from, such as at the Hancock Shaker Village near Pittsfield, Mass., or at a London antique shop (see the bottom photo on p. 50). On one occasion, the show highlighted the retrieval of 200-year-old cypress logs from a river in Georgia. Although these "historicals," as Morash calls them, are meant to add authenticity, the projects are not reproductions but are Abram's adaptations that often combine elements of several originals.

Measured drawings—When building the prototype for each project, Abram works from a rough sketch, refining proportions and joinery details as he goes along. Next he draws a preliminary plan based on the finished piece. An illustrator then prepares a pencil drawing that Abram checks and adds notes and dimensions to. The final drawing is inked and then sold individually or with a video. Each drawing includes details, construction notes and a materials list, which footnotes that all dimensions are approximate. Abram believes that an exact cutting list is a recipe for failure that ignores the many variables inherent in working with wood.

Three for one—For each episode of *The New Yankee Workshop*, Abram himself must build the featured project, not just once, but

***Video choreography:** When the crew is taping on location, such as to show Abram installing and using this seating arbor, Morash uses a portable monitor. This lets him see procedures that might, due to foreshortening of the picture, look awkward or dangerous—something that Abram may be unaware of.*

Photo: Richard Howard

***To find inspiration for 1993 projects,** Abram traveled to the U.K. to view country furniture at The Saunders Home in Weedon and at several famous antique shops. He learned that many overpriced dealer antiques are, in fact, remakes from old architectural remnants. Abram adapted his own prototypes, which take about three days to build, mostly from authentic English period pieces.*

three times. First Abram makes a prototype the week before the show is taped. While building the prototype, which will air as the finished piece (see the top photo), he makes any needed jigs or templates. He also decides which processes to feature. Sometimes he saves time by milling stock and cutting out enough parts for the other two pieces, but he does this only if he is sure those steps won't have to be taped.

Next, with the prototype still fresh in his mind, Abram builds a second piece over a two-day period with Morash and crew on hand to tape key processes (see the top photo on p. 48). Abram tries to organize his work to reduce the time that the others wait for him to finish operations or clamp glue-ups. The third piece is built later, often on a weekend when Abram can find the time, so that a photographer can take stills for the season's eventual book. Except for an occasional helping hand from one of the crew members, Abram builds all three pieces himself.

Abram's home is furnished with many of the pieces he's made on *The New Yankee Workshop*, especially Shaker style furniture, his preference. But he confesses to having a storage bin full of unfinished projects. Parks Corp., one of the show's underwriters, also gets a piece now and then to promote its line of finishes. Morash keeps the rest of the pieces for posterity, filling up his house, the shop and wherever else he can find storage.

Responding to critics

Despite the successes of *The New Yankee Workshop*, a few woodworking writers have criticized the program for pushing power tools, trivializing furnituremaking and looking too much like Hollywood woodworking. Abram acknowledges that WGBH might have brought some of the criticism on by using the term *master carpenter* to describe his job.

"*Master carpenter* is a title that Russ gave me," Abram said. "It may be a legitimate title in the theater, but there's no such thing in the construction trade, just a journeyman. But I look at the term as meaning someone who is always trying to improve his skills—who continues to learn with each project—as opposed to one who has reached top level, because there's so much to learn in the field."

Speaking of his loyal following, Abram continued: "Originally we were after people that already had a shop set up, maybe in the basement or garage. We wanted to give them some nice projects to do—to help them enjoy their woodworking. Surprisingly, we've not only attracted that audience but we've also attracted viewers who might never do woodworking. Some of them say, 'Look, we know it's not high-end woodworking, but we've learned something from it.' And basically, that's all the show is really meant to do."

While I was having lunch with Abram (sitting at a picnic table he had built for the program), I asked him why he persists in wearing a carpenter's tool belt on the set. Abram just chuckled and said, "It's become a trademark for me...a carryover from *This Old House*. And besides, what difference does it make? Just the other day, I said something about my tool apron getting pretty ratty, and maybe I should get another one, but Russ said 'No, no, it's fine.'"

Working around a grueling schedule

Although 43-year-old Abram agrees it's fun to be paid well to do what he loves, it's also a lot of work. Last year he taped 26 new episodes of *This Old House* and 13 of *The New Yankee Workshop*. Then, in his spare time, he did 30 personal appearances, which at times, he confides, conflicted with his family schedule (he's married with four children). In past seasons, the taping for *The New Yankee Workshop* was spread out over six months. But this year, they've speeded up the schedule so Abram can help on a new house he's having built. He admits to being a bit frustrated because he doesn't have time to build the house himself, but he's satisfied that he'll at least be making the staircase and a new shop (see the story on p. 49). Meanwhile, Abram and his wife, Laura, who helped design the house, are also working with a ghostwriter on a new book about the home's construction.

Abram said he might eventually develop and market his own line of country furniture. But for now, not knowing how long his high-profile television roles will last, Abram wants to ride the wave as far as it will take him. And it's likely that viewers will stay tuned because, just like other woodworkers, Norm Abram is learning and improving as he goes along, except that he's also bringing quite a few others along with him. □

Jim Boesel is a writer and furnituremaker in Vancouver, Wash. He is a former executive editor of Fine Woodworking.

A close look at the Yankee's work

With success comes scrutiny, and *The New Yankee Workshop* is no exception. Although Norm Abram fans rally behind their woodworking hero when critics take aim, the show and its host still have a share of rational detractors. For example, furnituremakers have criticized Abram for making heavy-handed adaptations of classic designs and for failing to allow for wood movement in a few of his pieces. I wanted to see for myself—examining both old and current work—if these criticisms are valid.

Past: When reviewing project plans from previous seasons, I found a few examples of wood movement problems and an instance where Abram screwed into the endgrain of a bed rail; a fastener here is totally unnecessary if the mortise and tenon fit well. But I was impressed that on a reproduced Shaker style clock, Abram remained true to the original by using a solid panel in the clock's door with its beveled surface turned inward.

Present: I also looked at a few projects from the newest season, which are based on English country furniture. One of the most ambitious pieces is a 6-ft.-long white oak sideboard (see the cover photo) with three drawers and bandsawn legs braced with a wide shelf just above floor level. Abram said the piece was patterned after several larger sideboards.

Abram's sideboard made a good first impression: It was well-proportioned, and the beveled drawer fronts and arched framing showed a good eye for English period details. He used Baltic-birch plywood for the drawer sides, although solid wood would be plenty strong enough and more in keeping with the rest of the piece. Perhaps the weakest part of the piece was Abram's failure to adequately sand the applied moldings, which clearly show tell-tale ripples from having been hurried past a router bit.

The sideboard suggests that Abram has taken seriously the admonitions about allowing for wood movement. He pointed out that the 10-in.-wide tenons where the sidepieces join the legs are glued only along the top 3 in. or so, with the remainder of the tenon left unglued to float in the mortises in the legs. This solution allows expansion while avoiding the use of a frame-and-panel construction, which would spoil the authentic country look. The wide shelf is also free to expand. It is pinned at its center to the cross braces, notched to fit around the legs and restrained from cupping by being dadoed into the inside faces of the legs. Abram designed these joinery details because all the original pieces had splits in their wide boards.

I found the other pieces I examined, a butcher-block table, a bow front corner cabinet and a pine kitchen table, all to be without any glaring instances of faulty construction. For example, the endgrain, butcher-block top, as shown in the photo below, was beveled on all four sides and floated within a 2x6 frame. Abram wanted to be sure his design allowed for wood movement.

Future?: When evaluating the quality and value of *The New Yankee Workshop*, it's important to remember that it is not meant to be a complete course in woodworking. The show is designed to appeal to a mass market by tapping into an existing audience of people who are fascinated with woodworking and woodworking tools. The show has also been accused of blurring the line between commercial and non-commercial television. But, as long as Abram is not trying to palm off inferior tools on hapless viewers—and I saw no evidence that he was—then I consider this a non-issue.

I believe the most valid criticism of *The New Yankee Workshop* is that it trivializes the process of building furniture. Surely, more goes into the design and construction of a quality piece of furniture than a half hour show can do justice to. Abram is a carpenter turned furnituremaker. He understands power tools and is certainly qualified to demonstrate their use. But, like all self-taught furnituremakers, Abram is learning about design and construction as he goes along—and he is clearly improving with each season. If the show would take an on-the-air trip to a professional furnituremaking shop to discuss the elements that refine and elevate a piece of furniture, it would go a long way toward giving both Abram and his craft the credibility they deserve. *—J.B.*

The New Yankee Workshop, *a co-production of WGBH, Boston and Morash Assoc., Inc., began its fifth season in January. Check your local stations for broadcast times. Project videos, drawings and books (published by Little, Brown & Co.) are available from* The New Yankee Workshop, *P.O. Box 9345, South Burlington, Vt. 05407-9345.*

Handling wood movement gets top priority. *This table's endgrain butcher-block top is beveled on four sides and floated within an oppositely tapered 2x6 frame. Although Abram admits the construction is experimental, he says it's designed to allow an expanding top to slide upward in the frame. As the author looks on, Abram explains how the top works and how the rest of the table was built.*

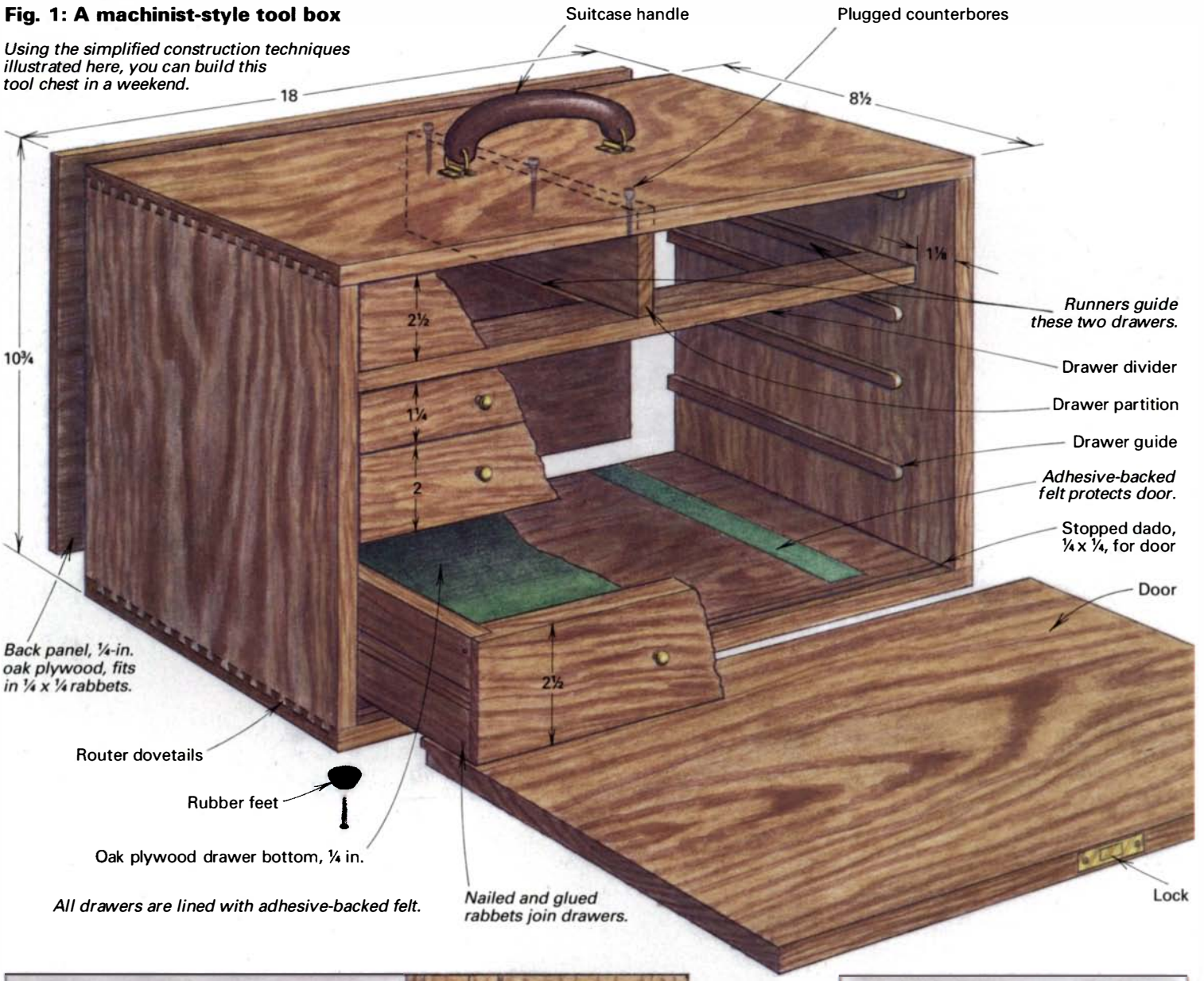
Making a Machinist-Style Tool Chest

Weekend project helps clear workshop clutter

by Ronald Young

Fig. 1: A machinist-style tool box

Using the simplified construction techniques illustrated here, you can build this tool chest in a weekend.



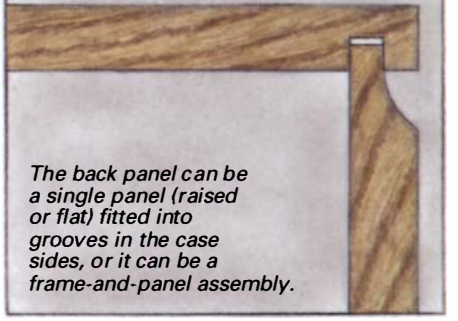
Alternative construction methods

The basic tool chest shown here can be enhanced by using different construction techniques. Here are just a few of the possibilities.

Fig. 2: Frame and panel door

A frame-and-panel door dresses up the plain box and reduces the chances of the door warping or sticking with humidity changes.

Fig. 3: Back panel



The back panel can be a single panel (raised or flat) fitted into grooves in the case sides, or it can be a frame-and-panel assembly.

Fashioned after the old-style machinists' boxes, this small tool chest provides convenient, portable storage for your finest tools, instruments, rules and other small items. The original machinists' chests were traditionally made of walnut or fumed oak. I made mine of oak and stained it to match the rich brown tone the old-timers achieved through the chemical reaction that occurs when oak is exposed to ammonia fumes. The stack of graduated drawers helps prevent small objects from being inextricably buried at the bottom of the box. A separate door can be locked covering the drawers for security during storage. The door also keeps the drawers from falling out when you're carrying the box from job to job. When you're using the box, the door slides neatly into the chest under the bottom drawer, as shown in the photo at right.

My 18-in.-wide by 10¾-in.-high tool chest suits my space and storage requirements, but you should modify these dimensions and the drawer configuration to suit your particular needs. I used 9/16-in.-thick oak for most of the chest. The drawer backs and sides are 5/16-in.-thick poplar, and the back panel and drawer bottoms are ¼-in.-thick oak-veneer plywood. All the hardware for my chest came from Constantine's (2050 Eastchester Road, Bronx, N.Y. 10461; 212-792-1600). I suggest buying your hardware before you begin construction, so you can be sure you've dimensioned the chest appropriately.

The main body of the chest is a dovetailed box, which I constructed using a commercial dovetail jig and ¼-in.-dia. dovetail bit (see p. 58). You could tablesaw finger joints instead (see *FWW* #84, pp. 74-75), or you could use this project as a great opportunity to practice handcutting dovetails.

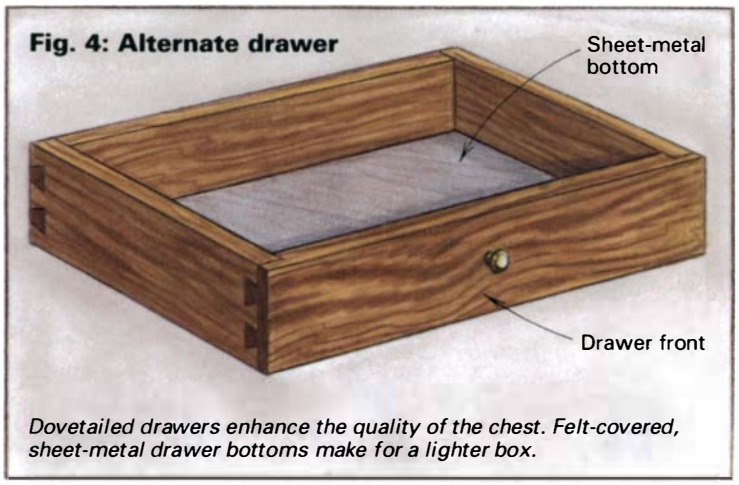
***A machinist-style tool chest** is a perennial favorite for storage of treasured tools because the stack of felt-lined drawers provides easy access and a safe haven.*

Constructing the carcase

After selecting the stock for the carcase, lay out and cut the pieces to size, as shown in figure 1 at left, selecting the best wood for the top and sides. You will assemble and disassemble the parts several times while cutting the dovetails and constructing the chest, so be sure to mark the pieces on the inside faces to prevent layout mistakes.

After cutting the joints, dry-assemble the four sides, and check for square fit. Disassemble and cut the back-panel rabbets in the top, bottom and sides. Because I ripped the rabbets on my tablesaw, I had to fill the gaps that resulted in the dovetail joints with small blocks of wood during final assembly. Using a plunge router, I cut a stopped dado along the front edge of the case bottom for the door. Although I chiseled out the mortises in the carcase sides for the drawer divider, it would have been as easy to cut them with the plunge router. Next you should cut out the drawer partition, and then lay out and attach the drawer guides and runners with glue and small brads to the drawer partition and the carcase sides, as shown in figure 1. The drawer divider is cut to size, tenoned and screwed to the drawer partition.

A final dry-assembly lets me check the sides, divider and runners for square before I bore and counterbore holes for the drawer partition to the carcase top. If everything is square, I cut and fit the plywood back. I then disassemble and reassemble the chest with glue, screws and clamps (checking for square as I go) and allow the assembly to dry overnight.



Dovetailed drawers enhance the quality of the chest. Felt-covered, sheet-metal drawer bottoms make for a lighter box.

Making the drawers

Drawer construction is straightforward with simple butt and rabbet joints, as shown in figure 1. Be sure, however, to cut the drawer-slide grooves slightly oversized to allow for smooth movement. I did mine with a dado head on my tablesaw before assembling the drawers. A little paste wax or paraffin on the drawer runners contributes to smooth operation.

Finally, cut and fit the door, mortise the lock and attach a suitcase handle to the top. A large chest might be better off with a handle on each side. To finish the chest, I rubbed on two coats of Watco Danish oil and then sprayed two coats of Deft spray polyurethane on the exposed surfaces. And to protect my finest tools, I lined the drawers with adhesive-backed felt.

Because of the simple construction shown in figure 1, I was able to build this chest in a couple of days. If you would prefer less of a plain-vanilla chest, you might want to consider using some alternate construction methods, as shown from left to right in the bottom drawings. These techniques will probably take you a little longer and call for a little more material. □

Ron Young is a woodworker in Decatur, Ala.

Photo: Charley Robinson; drawing: Lee Hov

Floral Visions

How Ron Fleming turns and carves his vessels

by Bob Hawks

Although Ron Fleming bought a lathe 25 years ago to turn a candlestick, he really wanted to carve more than he wanted to turn. So he let his lathe sit idle for almost 20 years, learning to do some carving in the meantime. But being an artist and a commercial illustrator for more than three decades, Fleming's paintings started to have an influence on his woodworking.

"When I did illustrations of flowers, I started to see vessel forms within them, and I realized that turnings could provide a great canvas for carving these forms," he said, describing his first carved-and-turned piece, inspired by a rosebud from his wife's garden. After dusting off his lathe, Fleming learned to turn by taking classes and watching professional turners work; he said, "It's not enough to just read about it in a book."

That was about seven years ago, and Fleming has persevered, nurturing and refining both his turning and carving skills, creating dozens of pieces along the way, including the ones shown in the photo on the facing page. Working in his converted home/studio in Tulsa, Okla., Fleming combines carved shapes from nature, such as leaves, flowers or petals, with simple, well-proportioned turned vessels.

Fleming's work, besides achieving national notoriety, has undergone an evolution. In his earliest work, Fleming strived for realism in his carvings and used them primarily to decorate the edges of his vessels. However, these early carvings were too fragile and often broke. Now, he leaves some heft for strength at the core of each petal or leaf (it's only fitting that his college background was as a structural engineer).

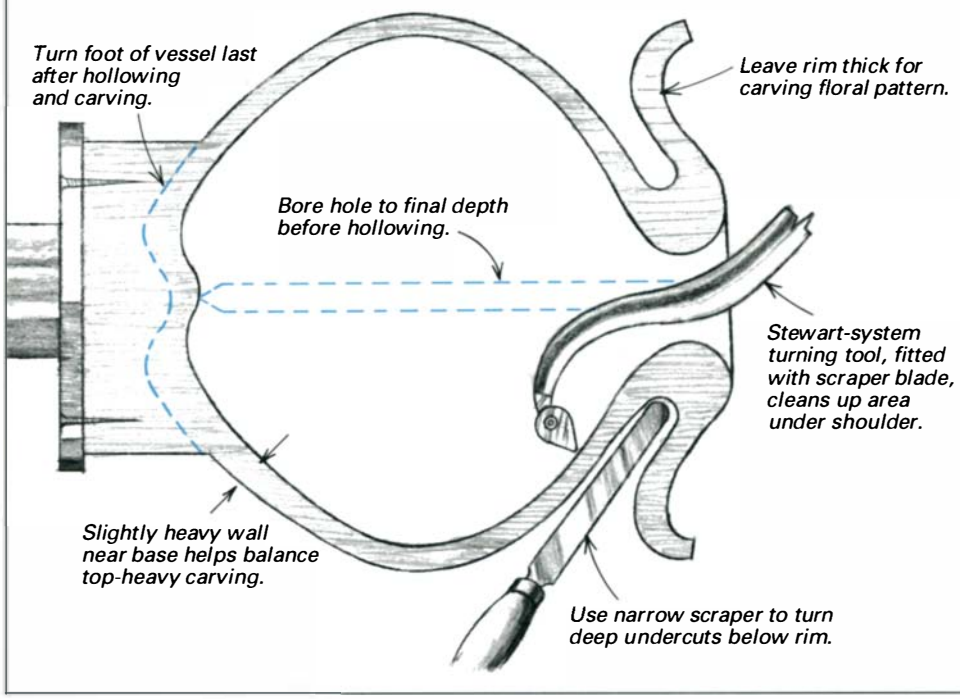
In some of his latest work, the whole piece is carved, and his floral patterns have become more stylized, showing a bit of an Art Deco influence. Fleming occasionally applies his painting skills directly to his turning, using acrylics for colorful effects. He turns straight-grained, cross-grained, burls and spalted woods, preferring to do the initial turning green. The photo above shows the beginning of one of Fleming's turned-and-carved vessels, and the entire process is illustrated and described in the pages that follow. □

Bob Hawks is a retired professional photographer in Tulsa, Okla.

***Hollowing the vessel**—After turning most of the outside of a vessel, Fleming starts the hollowing process by boring a hole to final depth using a hand auger or a boring bar. He uses a Stewart-system tool with a standard 1/4-in.-high-speed steel cutter to remove most of the interior, working from the bored hole to complete the inner wall. Then, with a Stewart-system tool fitted with a scraper blade, he turns the area under the shoulder to a wall thickness of between 3/16 in. to 1/4 in. He leaves the bottom 1/4 in. to 1/2 in. thick to add weight to balance the heavy carved rim.*

Hollowing the vessel

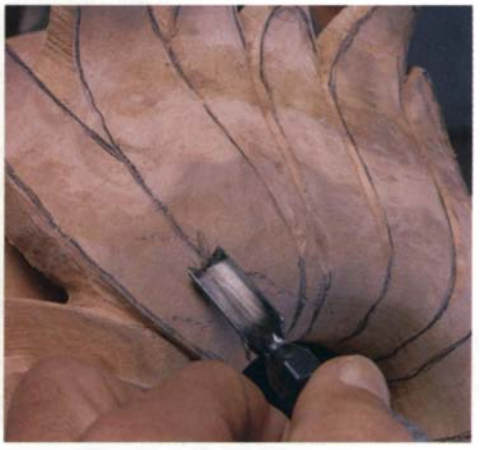
After the center waste is removed by boring, the inside of the vessel is hollowed out using a Stewart-system turning tool.



Photos: Bob Hawks; drawing: Maria Meleschnig

Marking the carving pattern

Sawing the waste



Roughing out the floral forms

Marking the carving pattern—*The vessel is removed from the faceplate only after carefully marking its position, so it can be returned to the lathe to finish turning the foot after carving. Fleming then screws the bottom of the vessel to the mechanical Power Arm carving stand (available from Woodcraft, P.O. Box 1686, Parkersburg, W.V. 26102; 800-225-1153) that allows the piece to be locked at any position, so he can easily use both hands to carve all surfaces. Fleming occasionally sketches the forms of his carved petals or leaves on paper and then transfers the pattern to the wood, as shown. To get the design of the carving to flow, he often adapts petal size and placement to the wood's grain and figure.*

Sawing the waste—*After the design is laid out, Fleming uses a coping saw to cut away the waste between petals or leaves around the edge of the carving. He stays well outside of his pattern lines to leave ample wood for carving, and he's careful not to scratch or gouge the turned part of the vessel with the saw.*

Roughing out the floral forms—*To rough out the leaves and/or petals, Fleming uses a V-shaped gouge fitted in a reciprocating carving chisel. This allows him to hew the basic shapes out as quickly as possible before he refines the details. Fleming says the electric chisel works best in greenwood; the tool doesn't have enough power to cut through totally dry hardwoods or dense exotics, for which he'll switch and use one of the grinders described below.*

Shaping the leaves—*Fleming has a small arsenal of power carving tools, including both electric and pneumatic die grinders, Dremel rotary tools and a Foredom shaft-driven grinder. He fits them with a variety of carbide carving burrs for refining and detailing his carvings. In the photo, he uses a ball-shaped carbide burr to hollow the cupped areas of the leaves. Fleming carves each leaf to look as thin as possible, but he actually retains a thick area down the center of each leaf for strength. This keeps the piece from being too fragile to handle.*

Refining the details—*One of his favorite burrs, tapered like a pencil point, does the undercutting where the leaves overlap and shapes the edges and undersides, as shown in the photo. Fleming always keeps two power tools ready to go; as one gets too hot to hold, he switches to the other.*

Shaping the leaves

Refining the details

Sanding the carving smooth

Finishing the piece

***Sanding the carving smooth**—Surface preparation is the key to a good finish, so Fleming does a lot of hand-sanding on his vessels. He glues a piece of illustration board (thin, stiff cardboard) to the back of sandpaper strips to help remove small lumps and valleys left by the rotary grinding, so the leaves are smooth and flowing. On rougher areas, he uses his air grinder fitted with a 3-in. sanding disc. He sands the body of the vessel with 150-grit sandpaper to remove any turning marks and finishes with 220-grit. To lend the carving more texture and dimension, he usually lightly sandblasts just the carved areas with fine silica.*

***Finishing the piece**—Fleming turns the foot of the vessel by remounting the piece on the lathe with a padded cone at its mouth to provide steadiness. For stability, the foot is finished in a slightly concave design. Now Fleming coats the entire piece with two coats of urethane oil finish or Waterlox, allowing it to thoroughly penetrate the wood. After that's dry, he masks off the carving and applies 10 to 15 coats of acrylic lacquer. Finally, he power-buffs the body of the vessel using a dry compound normally used for honing tools (available from Craft Supplies USA, 1287 E. 1120 S., Provo, Utah 84601; 801-373-0917) to give it a high luster.*

Just Plain Drawers

Router jig makes them quick

by John Lively

Router dovetails are ideal for built-in drawers *like these in a floor-to-ceiling storage center. Sturdy, durable dovetail joints you can cut without any fuss are a great improvement over the nailed rabbet joints usually found in these situations.*

The built-ins and utility furniture I make usually call for lots of drawers. I could spend a couple of days hand-cutting the dovetails for a big casework project. Or, going to the opposite extreme, I could rabbet and nail the drawers together and be done in a couple of hours. But what I really want is the strength and durability of dovetails, without spending the time it takes to do them by hand. That is why I cut the drawer joints for projects like the ones shown here with a router and dovetail fixture.

Router dovetails

I use an inexpensive router fixture I bought from Sears 20 years ago. It cuts only half-blind dovetails (meaning they're visible from one side only). Sears and most of the woodworking tool catalogs offer a similar fixture now for less than $100. I've thought about buying more expensive and more versatile fixtures that cut through dovetails, as well as half-blinds, and which promise the variable spacing of hand-cut work. But then I might as well cut them by hand if that's the look I'm after.

Hand-cut dovetails consist of pins, which are typically cut on drawer fronts and backs, and tails, which are cut on drawer sides, as shown below. Router dovetails, however, get pins on the drawer sides and sockets on the fronts and backs. With hand-cut dovetails, you can tailor the joint to suit the dimensions of the piece. With router dovetails, you can't.

One thing that makes router dovetails fast is that you don't have to lay them out. The fixture clamps two boards at 90° to each other (drawer front or back on top, side hanging down). On top of both boards goes a finger template that controls the router and dovetail bit by means of a template-following guide bushing. The thickness of the drawer stock can vary from a little less than one-half inch to more than one inch. Width can vary too, from about three inches to 12 inches. But regardless of the width and thickness, the size and geometry of the pins and sockets stay the same.

That means you have to size your drawers to the geometry of this cookie-cutter joint. You want to end up either with a whole pin at the top of the joint or a half-pin. Anything less than a half-pin looks awkward and is liable to splinter away.

Two adjustments control the fit of the joint. The router's vertical depth of cut determines whether the joint is too loose, too tight or just right. The in/out positioning of the finger template controls the lateral travel of the router and thereby determines the depth of the sockets. If the sockets are too deep, the drawer sides will be recessed below the ends of the front and back; if the sockets are too shallow, the drawer sides will stand proud.

Once the fixture and router are set up and adjusted, you can cut both parts of the joint at once. When you get used to the routine, clamping up the stock, routing and unclamping take only a couple of minutes. Doing the joints for an entire drawer takes less than ten minutes.

This method lets me complete and fit six drawers, pretty much regardless of size, in about as many hours, starting from uncut (but thicknessed) stock. What about the time it takes to set up the router and fine-tune the cut? You can eliminate that completely, as explained in the sidebar on the following page.

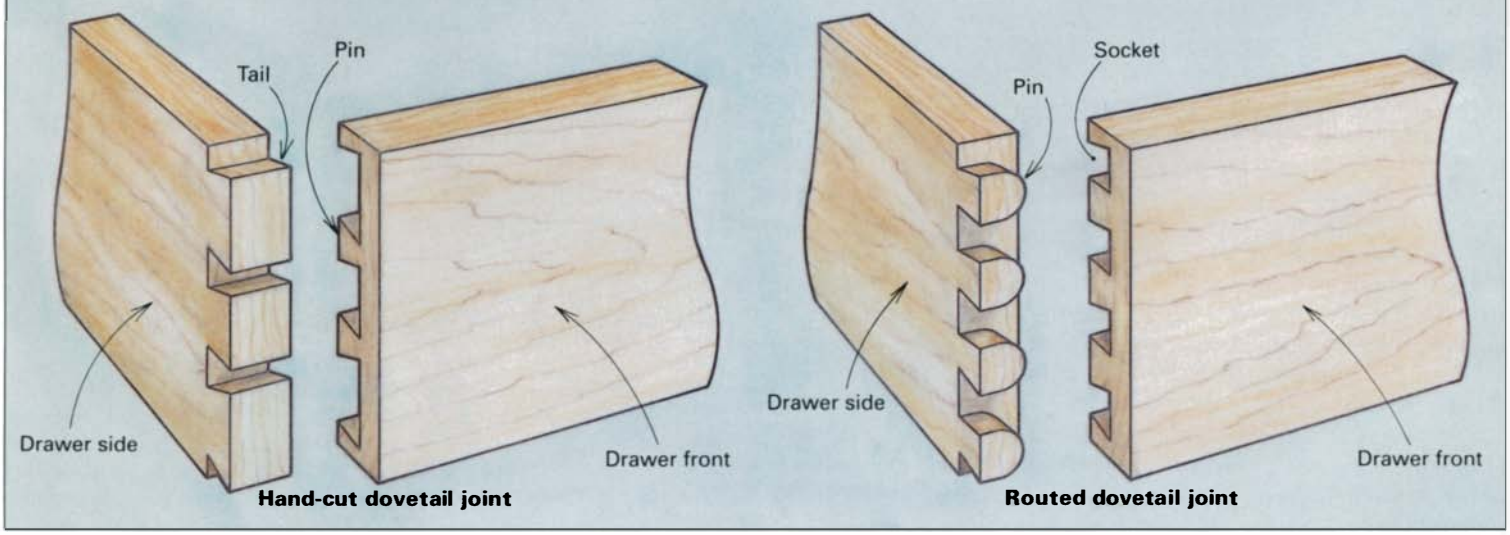
***Workmanlike utility furnishings,** like the author's little cabinet for storing nails and screws, make the shop efficient and pleasant. Rabbeted corners, screwed and plugged, join the pine case, which measures 17 in. by 24 in. by 10½ in. deep.*

Buy unwarped stock

For the drawer sides and backs of utility projects, I buy 8-ft. planks of 1x12 #2 pine from the local lumberyard. Lauan and poplar are also good choices, although better suited to more upscale projects. Find a yard that will let you pick through the stock. Prepare to spend some time eye-

Hand-cut vs. router-cut dovetails

The beauty of hand-cut dovetails comes from proportions that suit the project. Router dovetails have equally sized pins and sockets, so the project must be dimensioned to avoid awkward part-pins.



Photos: John Kelsey; drawing: Mark Sant'Angelo

balling the planks. Everybody wants to buy boards as knot-free as #2 grading will allow. But in selecting drawer stock, wood clarity is less desirable than flatness. You want pieces free of twist and cup, though a slight bow or crook is tolerable. Reject those twisted and cupped boards because you'll pay the devil later if you don't. Twisted boards make twisted drawers that will never fit right, and cupped stock requires a lot of fussy clamping during glue-up.

So what I do first is select the flat stuff and then go through it for clarity. I avoid boards with a lot of large knots or with any loose knots. And when I plan to make the fronts out of pine, I make sure the boards have enough clear cuttings in them.

Rip first, then crosscut

Pine 1x12s are about 11 inches wide and three-fourths inch thick, and unless your drawers are really deep and wide, you can get several drawers out of a single board. Start by jointing one edge of the eight-footer, and then rip to width, larger drawers first. Avoid the temptation to rip slightly undersized to eliminate trimming to fit later. Every time I have done this, I've been sorry. Shoot for parts that fit snugly in their openings.

Another reason for ripping first is that long offcuts are good for moldings, battens, cleats, face frames, story poles and tomato stakes. Long scrap is always more useful than short scrap.

While drawers for a single project may vary in depth, most likely they will all be uniform in plan. This means you can set a saw stop and crosscut all the fronts and backs in one session, all the sides in another. Use a clean-cutting crosscut blade here because rough endgrain won't glue well and because ragged edges will show up in the joints and on the faces of the pins. One more thing: you don't want knots in the joints, so be sure to crosscut so all knots are two inches or more away from the ends.

Now stack the drawer parts in discrete piles. From this point on, each drawer is a family of four members, and shuffling them around will introduce error.

Which piece goes where

Begin by clamping the fixture to your bench. Take a stack of drawer parts and mark their outside faces. Draw lines about where you'll plow the grooves for the drawer bottom. On the bench immediately behind the fixture, stand the members on their bottom edges and position them just as they'll be in the finished drawer, with the front facing you. Now push the

Ditzy setup: what the manual won't tell you

The owner's manual for your dovetail fixture will cover the details of setting up, but there are some important points that it probably won't mention.

The precise depth of cut, which determines joint tightness, seldom is exactly what the manual calls for. My Sears manual says to set the cutting depth to exactly 17/32 in., a measurement that requires a machinist's combination square and a thick magnifying lens for people over 40. But setting my carbide dovetail bit by this rule produces too loose a joint. A slightly deeper cut tightens the joint. The owner's manual will get you in the ballpark, but you'll have to discover the setting that's right for your bit, router and template (see the photo at right).

Another thing the owner's manual won't explain is what's too tight a joint and what's too loose. What I've learned is that glue takes up space, and a joint that I have to tap together dry, I'll have to bang together during glue-up. You should be able to push the dry joint together by hand without recourse to your mallet.

The manual describes how to control socket depth, but it probably won't discuss the correct depth. If you've cut your drawer fronts to fit snugly in their openings, then you want the pins on the drawer sides to lie about 1/64 in. below the tops of their sockets. This condition lets you beltsand the endgrain edges of the front and back flush with the sides and provides just enough clearance between the sides of the drawer and the opening. If you do this right, the side-to-side fit should require no further fiddling.

No manual will admit that setting up and adjusting both router and fixture is tedious and time-wasting. It can take a half-hour to go through the steps: install the guide bushing in your router, chuck and adjust the bit, make a trial cut, fine-tune the depth of cut, try again. At last you've got it. But next time, you'll have to go through the whole ditzy routine again.

About six years ago, I got fed up with setting up, so I went out and bought myself a new plunge router. This meant I could dedicate my old Sears router to dovetails, and since then, I haven't had to remove the bushing or adjust the bit. —*J.L.*

Bit setting determines joint tightness. *Owner's manuals typically specify a depth-of-cut setting, which determines how the joint fits. The deeper the cut, the tighter the joint. But finding that just-right setting for your router and template is really a matter of tedious trial and error. A carbide-tipped bit is best for dovetailing because you cut to full depth in a single pass, which calls for cutting edges that stay sharp.*

sides over flat, as shown in the top photo below. The lines representing the grooves will keep you oriented when you clamp the pieces into the fixture. You'll need the help because they go into the fixture inside out and backward, and it's easy to get confused.

I begin at the front right-hand corner of the drawer, which means that I clamp it on the right side of the fixture with its bottom edges facing right. Temporarily clamp up the drawer side, so its end protrudes about half its thickness above the baseplate of the fixture. Now slide the drawer front under the clamp bar, and butt its end against the protruding drawer side. At the same time, shove the front into contact with the fixture's registration pin.

When the joint end of the drawer front butts hard against the side and its bottom edge hard against the registration pin, tighten the clamp bar. A little pressure here goes a long way. Now put the finger template in position, and tighten its locking knobs. Next, back off on the vertical clamp bar, and raise the drawer side up flush against the finger template. To keep the template from flexing upward, hold it down firmly with one hand while you butt the drawer side into it with the other. Once the board is in position, hold it there with your thumb, and tighten the clamp bar, as shown in the bottom left photo.

Give everything a final check to make sure you've properly positioned the pieces. The drawer front should be on top, the drawer side should hang down vertically. The inside faces of the front and side should face out with the groove lines to the outside. Both pieces must be indexed tight against the registration pins. Be sure about this because imprecise registration will make a joint that doesn't fit. If you mix up the pieces, you'll cut the pins on the wrong board, which means wasting wood and wasting time.

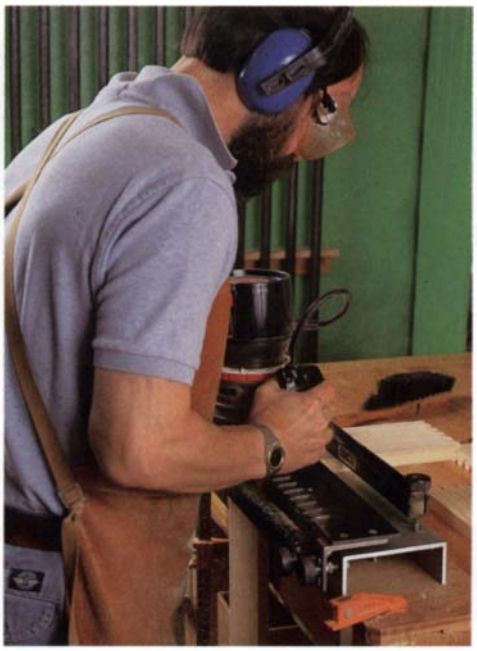
Driving the router

The actual routing is surprisingly quick. Hold the router firmly down against the finger template while cutting, and never lift it upward. If you do, the bit will cut through wood you don't want to waste, and possibly through the template as well. Always exit the cut by pulling the router out horizontally.

Begin routing by making a light right-to-left pass down the front of the drawer side. If you take too deep a bite when cutting right to left (climb cutting), the router will self-feed right into the fixture, so go easy. This initial cut keeps the bit from tearing out the wood at the base of the joint.

***Carefully arrange the parts** of each drawer to keep track of the pieces. Stand them up drawer-wise behind the dovetail jig, then push them over flat so their bottom, inside edges, marked with pencil for grooving, face one another.*

***Position the parts in the jig.** Clamp up the front right corner of the drawer. Insides of the pieces face out, the drawer front goes on top, and the side goes vertical. Both pieces index hard against the jig's registration pins, one of which is visible by the author's right thumb. The black plastic comb is the template that guides the router.*



***Steer the router** in and out of the template slots by pressing its guide bushing against the phenolic plastic. Make a light climb cut from right to left, then return left to right at full depth. The router always exits horizontally (an upward exit would chew into the template).*

The completed joint, *still in the jig, shows how pins (on vertical board) will interlock with sockets (on horizontal board). Routing four joints takes less than ten minutes.*

Use a stiff brush *to work glue down into the pins. Don't apply glue in the sockets because it can pool up and keep the joint from closing.*

Glue-up. *Blocks set just behind the joint allow the clamps to pull the pins tightly into their sockets. The drawer bottom goes in during assembly, not after.*

Now you're at the left side of the joint. Follow the finger template in and out, moving the router from left to right. As you round the template fingers, twist the router slightly counterclockwise, as shown in the bottom right photo on p. 61. This helps you negotiate these hairpin curves smoothly and quickly. Because you're cutting to full depth in a single pass, don't force the router. Listen to the bit's whine, and if its bright voice begins to dull, slow down. But don't go so slowly that you burn the stock and glaze or overheat the bit. A carbide-tipped dovetail bit will put less stress on you and your router.

After cutting the joints for the front right corner, go to the front left, then to the left rear and, finally, to the right rear, moving around the drawer in a clockwise manner. The drawer front or back always goes horizontal on top of the fixture; the side always goes vertical. Before moving on to the next drawer, mark conjoining parts with a number, so the joints that were cut together will be assembled together.

Grooves for drawer bottoms

For drawer bottoms, I use 5mm lauan plywood captured in grooves on all four sides. Rather than use a dado set to cut a ¼-in. groove, too wide for standard plywood, I make two passes on the tablesaw to make a groove that leaves but a little play.

Set the rip fence so that the first pass cuts just to the inside of the bottom socket on the drawer back and the blade depth to cut clear of the bottom of the socket. Now saw the first groove on all the drawer members, making sure to register the bottom edge of each against the fence. Your pencil line helps here. Move the fence and make the second series of cuts. One nice thing about router dovetails is that you don't have to stop any grooves in the drawer fronts or backs because the groove enters in and exits from a socket, which gets filled with a pin.

Dry-assemble one drawer to measure the length and width of the drawer bottoms. Cut the plywood about 1/16 inch shy of the full dimension to ensure that your joints will close completely on the first try.

Assembly and glue-up

The fastest way to get good glue coverage is to paint the pins with a stiff bristle brush. While you're clamping up one drawer, keep the brush soaking in a jar of water, and wipe it dry when you're ready to glue up the next one. Squirt a couple of tablespoons of yellow glue into a shallow container—I use a plastic coffee-can lid—so you can dip your brush often. Thoroughly coat the pins on both ends of one drawer side (see the center photo). Now slip the drawer front and back onto the pins, and lightly tap the joint together. Slide the bottom into the grooves, apply glue to the pins on the other drawer side and tap it into the sockets.

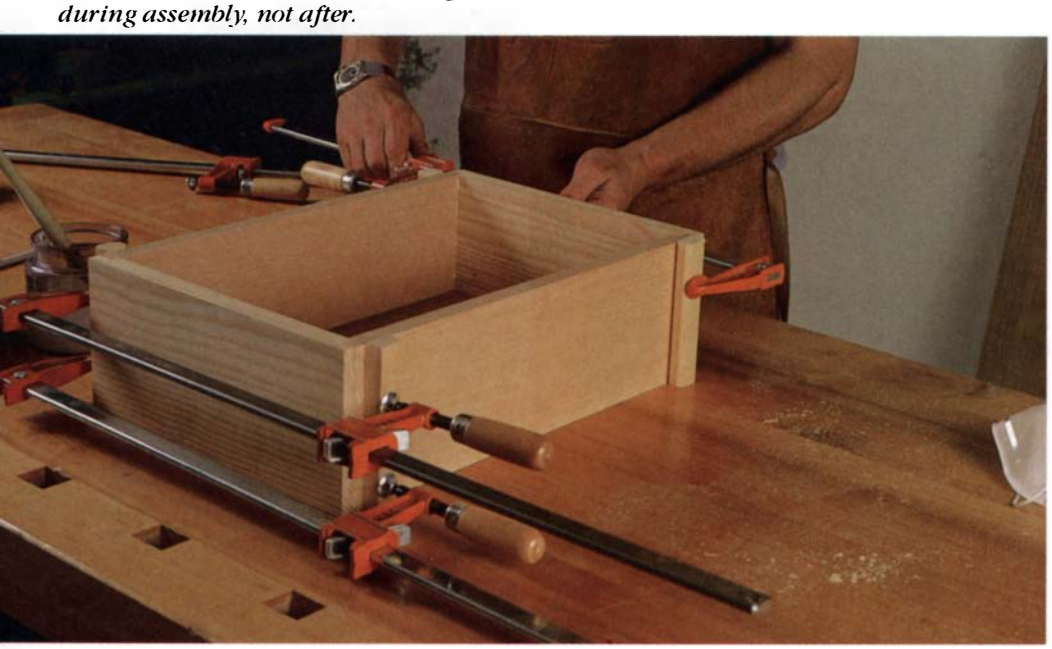
Squeeze the whole thing together with bar clamps and blocks. Position the blocks at the baseline of the pins, so the clamping pressure will pull the sides until the pins bottom out in their sockets, as shown in the bottom photo.

Fitting the drawers

If you've cut the drawer members to fit tightly, the assembled drawer won't slide freely in its opening and might not even enter. To trim it for an easy fit, beltsand the endgrain edges of the front and back flush with the sides. Test fit the drawer. If it still won't go into the opening, most likely the sides are a bit too wide, so handplane a little off the top and bottom edges all around until the drawer runs in and out without binding. Chamfer all the inside and outside edges (block plane or router), and wax the edges top and bottom, along with the back outside corners.

There's a sweet place in fitting a drawer. If you don't trim it down enough, it will fit too tightly and bind. The same thing will happen if you remove too much wood because the drawer will cock in its opening and bind. And, to make a bad matter worse, too much air around a drawer's edges looks sloppy. But if you trim off just the right amount, the drawer will whisper in and out. □

John Lively is publisher of Fine Woodworking *magazine.*



***Curly figure is most evident—and dramatic—in traditionally stained pieces** like this reproduction of a William and Mary lowboy. Different types of figure were used skillfully to distinguish different parts of the piece (drawer front figure differs from the molding surrounding the drawers, which differs from the top).*

Finding Figured Woods

Desirable defects and irregularities

by Lane DeCamp

I build mostly Colonial and Federal style American furniture in my shop, most of it in figured woods, with maple predominating. On my first projects, I'm sure I was paying well north of $20 per board foot for this lumber, even though the price sheets at the mills said $2.50 or less. Yield was awful. I was picky, and I couldn't reliably get the quality and type of figure I wanted. In those days, I ended up burning a lot of poor curly maple in my woodstove as I balanced my checkbook in disgust.

Since then, I've been fortunate enough to become acquainted with several mill owners who showed me their side of the game, and I've talked with a number of professional cabinetmakers about how they built their own woodpiles.

***Texture is the key to the identification** of curl, both on the faces and edges of rough boards. Curly figure results from wavy grain which—because it's not all in the same plane—appears as alternating bands of smooth and fuzzy wood when it's in the rough, and reflects light unevenly when it's planed.*

Figured woods, regardless of the species, share a family resemblance. What is true for identifying a spectacular board of curly maple in the rough will generally hold true for identifying curly cherry, fiddleback walnut, quilted mahogany or any other figured wood. This being the case, I've chosen to discuss maple because that's the wood I use the most.

Regardless of wood technologists' or furnituremakers' distinctions, most mills distinguish only between hard maple and soft maple and then get pretty fuzzy about what is curly, fiddleback or even quilted. Nature didn't draw clear distinctions, so the mills don't either. Still, by learning what to look for, you can end up with the kind of figure you want.

Most figure only occurs in wood close to

the bark (bird's eyes are an exception). Thus, a wide board whose center comes from deep inside the tree will have curl on the sides but not in the middle. A tree will only yield a few wide boards with superb, consistent figure across their width, and the mill usually collects a dollar or two more per board foot for those boards. They're worth the extra cost, provided you can use the width to full advantage. If you're going to end up trimming the edges and cutting off the best figure, you're better off buying narrower boards or boards in which the figure is interrupted. You'll enjoy considerable savings without compromising your design in the least.

Sometimes figure jumps right out at you. Other times it's much more subtle. The physical cause of curl, the most common type of figure, is wavy-grained wood. When a log is cut into boards, the surface plane of each board becomes a section through the wavy grain. The waves present facets of different angles at the board's surface, causing light to reflect in such a way as to create the familiar rolling washboard effect (see the bottom photo on the facing page). In the rough, all you'll see are raised ridges of fuzzy grain in roughly parallel rows. Be careful, however, not to confuse sawmarks for grain. Sawmarks show up as fuzzy, raised ridges, either in arcs from a mill's circular saw or as striations from a band mill.

You should also be aware of whether there's any heartwood in a board. Unlike cherry or walnut, the desirable part of a maple tree is its sapwood. In maple, the heartwood is a small core of darker, gray-brown color. Some modern furnituremakers like boards with heartwood, but the old masters never used it, so contemporary furnituremakers who specialize in traditional furniture don't either. Often you'll find heartwood showing on one face of a board but not the other. That wood should be cheaper than boards that are heart-free on both sides. If you buy wood that's got heart on one side and you're planning to use the other face, you should anticipate losing a board every now and again as you hit heartwood while planing the sapwood side.

Where to go

I buy most of my figured lumber in eastern Pennsylvania because the selection is reliable, the kiln drying is of consistently high quality, and the prices aren't bad. If I lived in Ohio, I'd buy in Ohio or western New York. If I lived in Massachusetts, I'd go to northeastern Connecticut, Maine or New Hampshire. The point is to go to where the trees are, but not to go too far.

Many of the better mills advertise in the back of *Fine Woodworking*. I've never had a bad experience with any of them, but I always call ahead to confirm what they have in stock. These mills vary tremendously in size and character, from backyard operations to extensive warehouses. If you know what you're looking for and are courteous, you're likely to end up with some beautiful lumber.

Looking at a stack

Expect to see lumber in three states: loose in bins, in bundles on pallets and in stickered stacks. Only the endgrain is visible when lumber is stacked in bins, so you will have to remove and examine each board. It's a lot of work because the best and widest boards are usually at the bottom.

Bundles are convenient to sort through, but if you're going to have a bundle opened, plan to buy enough to make it worth the mill's time. Always check the edge-grain on a bundle you think you might be interested in—figure is usually obvious as vertical stripes on the edges. The mill will usually move a bundle into the light and provide a pallet (or a couple of logs) onto which you can transfer boards. Build a new bundle as you flip through, stacking boards flat with the ends and sides evened up. This way the mill workers can easily strap and stack it with other bundles again.

When boards are stickered, it's more work pulling, inspecting and returning them to where they belong. That's because stickering usually indicates that the lumber in question has been stacked in the order it was sawn from the log. Figure and grain will match from flitch (a horizontal section through the log) to flitch, and that commands a premium price—as long as boards are kept in order. If you mix up the boards, you destroy part of the lumber's value. If you're interested in some boards in a stickered stack, you should plan to buy several flitches at least, if not the whole stack.

Carting it away

After you've measured your purchases and paid up, it's time to pack the wood. I used to eye longingly each flatbed trailer I passed on my way to and from the mills, but no longer. For Colonial and Federal furniture construction (and for most non-architectural cabinetmaking), you'll find you can cut your rough stock down to 24-in. and 36-in. lengths without much waste. Look at cut lists or drawings for most pieces of furniture, and you'll find lengths one, two or three inches shorter than each of these nominal lengths. Because I have a pickup truck, I'll often cut 6-ft. sections (which translates to three 24-in. or two 36-in. lengths), but as my back gets worse, shorter pieces become more attractive.

If you have to transport longer lengths, be sure to bring a red flag. I use an oversized piece of fluorescent red nylon (available at most fabric stores) attached with a couple of roofing nails and some duct tape. Hardwood mills don't usually stock disposable flags, and even if they do, the plastic film they're made from won't last the drive home.

Lumberyard etiquette

Experienced cabinetmakers stand out from the Saturday shoppers almost from the moment they arrive at a mill. Act like a professional, and you'll probably find prices very flexible. A few suggestions follow.

Bring your own tape measure and a pair of gloves. If you're going to want to cut stock to different lengths, try to bring a small chainsaw in case the mill's saw is busy. I also bring a notepad. I never seem to find precisely what I came for, so I have to recalculate at the mill.

Park your car or truck away from the wood sheds until you've selected your lumber, or you'll find yourself getting in everyone's way.

Watch your language. In many of the eastern Pennsylvania mills where I shop (Amish country), both owners and workers are quite religious. What might seem like very mild profanity to you may be highly insulting to them—and not soon forgotten.

Always replace lumber you've pulled out but not taken, and restack bundles if the mill broke one open for you. Leave all lumber as you found it. If you're only looking for a couple of boards, don't ask to have a bundle broken up or for a forklift to move lumber for you; if you're planning to buy a hundred board feet or more, that's a different story. *—L.D.*

Soft curly maple

Curly maple is a staple of most specialty mills, and most of it is soft maple. Soft maple is lighter in weight than hard maple and dents with your fingernail but is, nonetheless, a good furniture wood. It doesn't warp badly, it works well with both power and hand tools and it finishes evenly. Also, it's available in wide boards (15 in. isn't unusual) and in all lengths (see the photos at left).

Soft maple curl varies widely. The boards in highest demand have tight, parallel figure of consistent intensity across the board. Depending on the tree and the way the wood was cut, the curl may travel diagonally, interlock or create many different kinds of patterns. There's no one right figure for all furniture. Instead, pick a figure compatible with your design, and pick boards with a consistent figure. Designs with mixed types of curl rarely work.

Finding good boards for the carcase seems easy after I've looked for decent legs on which to set the box. I ***always*** buy good curly maple in any thickness over 8/4. It's just too rare to pass up.

Good curly leg stock—if you can find it—has to meet several criteria. First it has to be free of any cracks or other kiln defects. These problems occur in plain (unfigured) maple as well, but they always seem to be worse in figured stock. I use 8/4 curly leg stock for most turned cabriole legs and usually buy this stock kiln dried. For 10/4 and thicker, I look for air-dried stock instead.

For carved cabriole legs, I usually use plain rock maple. Curly maple is harder to turn and carve anyway, and with unfigured legs, mediocre figure won't interfere with the appearance of the casework. You'll see this solution on many historic pieces.

It's a myth that Colonial and Federal cabinetmakers always had wide boards available. They too either glued up boards or settled for mediocre figure. Those old cabinetmakers also understood that wood figure doesn't have to be spectacular for a piece of furniture to be successful. There are many elements to a design, all of which contribute to its success or failure. Relying on the character of the wood to offset weaknesses in basic design is a greater mistake than using bland wood in an otherwise well-conceived design.

***Soft curly maple boards** run much wider than hard curly maple. The board in these three photos (the same board, rough, planed and stained) is about ten inches wide, but the quality of curl is excellent. Even in the rough, beneath the arcs of the sawmarks, the curl is evident in the dirty, parallel bands of raised grain running across the board.*

Hard curly maple

Picking hard curly maple is about the same as picking soft, but takes less effort. That's because the boards are thinner (hard maple leg stock is all but unheard of), narrower (4 in. to 6 in. is typical) and usually shorter as well. Curly hard maple has a beautiful creamy iridescence that soft maple can't offer, and the tightest curl of all (⅛ in. to ¼ in. apart or less) comes only in hard maple (see the photos at left). The wood burnishes somewhat when it's planed, so I hand scrape it just before staining to prevent an uneven finish. Otherwise, it's a beautiful, stable wood that's limited only in the dimensions available. Expect it to run a little higher in price than soft maple.

In the same way that mixed types of curl in soft maple seldom seem to work, hard and soft maples don't mix well either. Both the figures and the way they stain and finish are noticeably different. Unless you're trying to achieve a particular effect, don't use them in the same piece of furniture.

***Hard curly maple** differs little from soft curly maple other than that it's slightly creamier in color and available in comparatively narrower widths. Curl occurs near the outside of the tree, hence the bark on this board. The tightest curl occurs in hard maple, but there's some variation. As with soft maple, the parallel bands of fuzzy grain are the key to recognizing hard maple in the rough.*

Blistered and quilted maple

Blistered and quilted maple are particularly common in the Northeast. Blister is my favorite type of figure, bar none. At the mills, both blister and quilted figure go for the same price as curl and sometimes for less. I've often found the best blister in the leftovers from a curly maple bin. In the rough, blister looks like very irregular curl. As long as it covers a good part of the board, you'll probably have some interesting figure. I recently picked up two 16-in.-wide boards of gorgeous quilted maple that had been part of a pallet (see the photos at left). When you find them, boards with unusual figures will surprise you, but they are worth throwing in the truck for that job you haven't planned yet.

***Blister (above) and quilted figure (below)** aren't usually distinguished as such at the mills. Often you can find some outstanding examples of these figured woods in the dregs pile because in the rough, they look like extremely irregular curl—something for which the furniture industry has no use. The quilted boards were wetted with alcohol to show the figure more dramatically.*

Bird's-eye maple

Bird, or bird's-eye maple, is the wood that cabinetmakers hate. It warps badly in the kiln, wide or long boards are rare, the figure is inconsistent and it's difficult to machine and finish. If only it wasn't so beautiful.

When you look at bird's-eye maple at a mill, look for straight lumber above all. Because of its tendency to warp, I always look for extra thickness when I buy bird. Straight boards are a blessing when you find them, but you should always try to give yourself a margin.

Consistency is the other thing to look for in bird. The eyes can vary in density, pattern and size. Everyone seems to like boards densely peppered with little eyes. In terms of workability, small eyes tend to plane and finish easily. The bigger the eyes get, the more they pull out, chip and interfere with practically any finish. Like curl, bird commands a premium price when it doesn't include any heartwood. Unfortunately, the best bird these days always seems to have some heart (see the photos at left). Japanese builders and furnituremakers discovered American maples in the last decade or so and are buying much of the best stock today.

***A good example both of bird's eye and of heartwood,** this board may be representative of the future of bird. Because of its relative scarcity and of increasing demand for it, both here and abroad, good heart-free bird's eye is commanding a steep price and is becoming much more difficult to find.*

Worm scars

Another "defect" (depending on how you view these things) common to maple is worm scars, especially in soft curly maple. Gray-brown like the heartwood, but more concentrated, these consist of the scar tissue with which the tree has filled old worm holes (see the photos at left). They take a finish with no problem, but the long dark streak is always very evident. I happen to like worm scars, but some people don't. Boards with worm scars generally cost the same as those without. □

Lane DeCamp injured his back moving curly maple into his workshop in Westport, Conn., so he is temporarily confined to word*working.*

***An oddity that hasn't yet become fashionable,** worm-scarred maple still has an interesting look and a certain exotic appeal. Some boards have only one or two scars (rough and finish are opposite sides of the same board here), but other boards are covered with the scars, creating interesting patterns.*

Straight Talk About Planes

Picking the tool's size, edge and angle makes handplaning a cinch

by Richard Starr

Handplanes, are essential woodworking tools. They've been found in just about every shop for the last 2,000 years. Even in modern shops with plenty of power machines, handplanes have an important place. Why? Because with a plane, you can chamfer or round a corner, trim a door edge or true up a twisted board. You can clean the sawmill fuzz off a rough plank, leaving a smooth surface that's nearly sinful to caress. While you're at it, you can straighten a pair of board edges, so they'll butt together for a perfect glue joint (see the photo at left). You can even use a plane on a lathe to smooth a long tapered shape, like a baseball bat.

Just as every planing situation is unique, each woodworker uses and chooses planes differently. One person says to turn the adjuster this way, another says to turn it that way. I know a wonderful woodworker who uses his massive jointer plane on short sections of endgrain, which is a tricky job commonly assigned to a miter or block plane. He says that he likes the heft and solidity of a large plane for this delicate work. He's right, of course—for him. That's what is neat about these tools; everyone has his or her ideas about handplanes.

I'll pass along a few bench-plane and block-plane tricks I've picked up while teaching woodshop to kids over the past 21 years. Does this mean that what I'm going to tell you is the final word? Heck no. But, hopefully, it will help you sort through the variety of planes that are out there, so you'll see what works best for you in your situation. And maybe it will encourage you to tune and try planes in new ways.

How to determine which plane to use for what

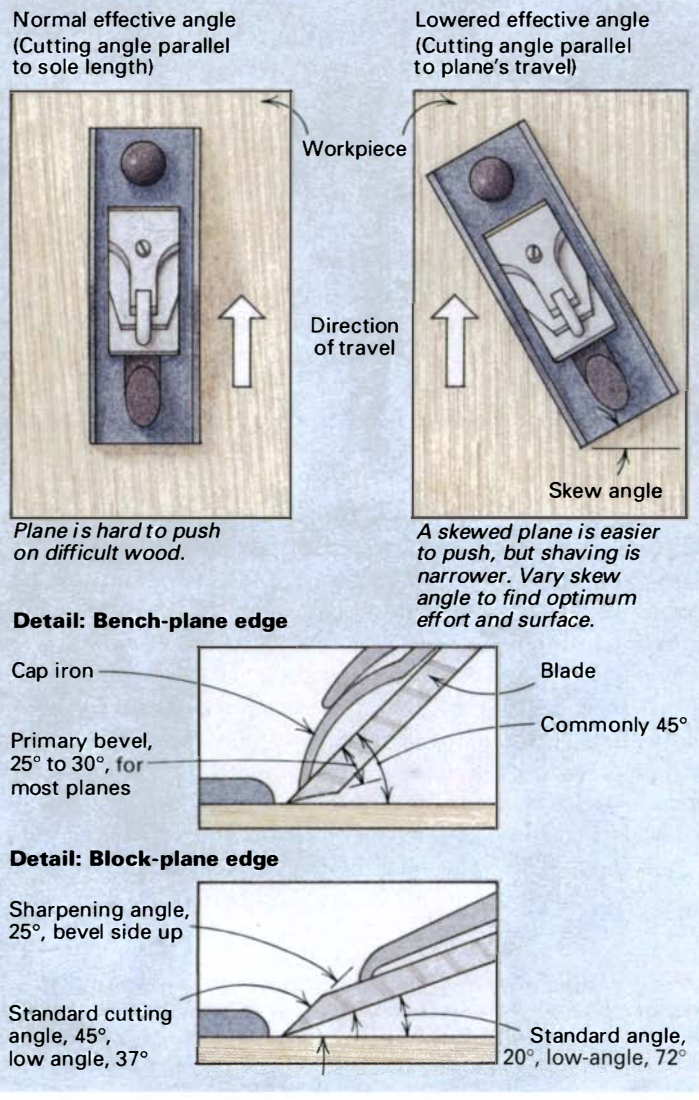
Bench planes are usually identified by the numbers given them by the Stanley company over a century ago (see the photo on the following page). The biggest standard metal plane (Stanley #8) is 24 in. long, and the smallest in common use is a #3, which is 8 in. or 9 in. long, depending on which company made it. Aside from appearance, the biggest difference between planes is the kind of shaving each is set up to cut. Of course, there is overlap: By virtue of their adjuster mechanisms, modern metal planes are versatile enough to do different tasks. However, making drastic shaving alterations takes time and may even require irreversible modification to the tool, such as filing the throat wider (for more on this,

Straightening a pair of mating edges with a jointer plane. *To prepare boards for edge-to-edge glue-up, Starr matches up their face grain and folds them over. Then he evens up the edges and clamps the pair in his bench vise, so he can plane slightly downhill. Any error cancels itself when the edges are butted.*

Commonly available metal handplanes. *The back row (from left to right) displays Stanley-style bench planes: #2, #3 and #4 smoothers; #5 jack; #6 fore and #8 jointer. The front row shows block planes: a low-angle Stanley (left), a standard-angle (right) and an old low-angle type that has a knuckle-joint lever cap (center). Both low-angle models have adjustable throats.*

Getting the best cut

Getting the best cut from your handplane is a matter of adjusting blade angle. For straight-grained woods, pushing your plane askew (right) lowers the angle of cut. Common bench-plane blade angles are shown in the upper detail. To prevent tearout in figured woods, try grinding a top bevel on the blade. Both standard- and low-angle block planes have their blades bevel up (see the lower detail).



see the story on the facing page). Despite the possibilities, you can't expect a plane that's been set for fine work to hog off thick shavings, nor can a plane designed for scrub work be made to leave a shining, flat surface. So for starting out, it's wise to select a plane based on its length.

Sole length—A plane's major function is to make things flat and/or square by cutting down high areas. By bridging over low spots and shallow undulations in a board, long planes can true up a board's face or edge easier and more accurately than shorter planes. This is true, provided the plane's sole is flat, of course. To find out how to check if the sole on your plane is sprung, see the sidebar on p. 70.

In my shop, I keep a 24-in.-long jointer plane that's set to take a fine shaving in difficult wood. However, this doesn't necessarily mean that every time I need to flatten a board, I grab that 24-in. plane. If I'm working on a board that's only 18 in. square, or an edge that's a foot long, that huge plane is overkill. For stock in this range, I use a plane that's easier to handle—an 18-in.-long #6, traditionally called a *fore plane*. In my woodshop class, we call the #6 a finishing plane because it's often the last one we surface the face of a board with.

Blade width—What about the width of cut? Blades can vary in width from 1⅜ in. for a block plane to 2⅜ in. for a jointer. Longer planes generally have wider blades. An exception to this rule is the wide-body planes that have a ½ appended to their number designation. For instance, Record currently produces a #5½, which is 14 in. long and has a 2⅜-in.-wide blade (compared to 2 in. for a regular #5). If you shop for used tools, you'll occasionally come across others, like Stanley's 4½ and 6½ models. You may even find a 5¼ body, which has a 1¾-in.-wide blade. One advantage of a wider blade is it takes a broader shaving and covers a board faster. A more subtle advantage occurs at the blade's edge.

Slightly crowned blades cut better

Many cabinetmakers grind a plane blade with a very slight crown or curve at the edge. A crowned blade takes a shallower cut toward its sides. A plane with a straight edge can leave obvious tracks on the board's face due to the square corners of the blade. With a properly crowned blade, you can produce a shaving whose edges feather to zero thickness. A crowned blade's tapered cut leaves a slightly rippled surface with no obvious tracks. The amount of crown must be minimal (we're talking paper thicknesses here) or else you'll wind up with a surface that's too wavy. That's why wider blades are a plus; they allow the crown to be flatter, yielding a shaving the same thickness as a narrower blade but with much less tell-tale overlap.

In addition, the wood fibers at the edges of a crowned blade's shaving are cut from the surface rather than being torn away. Imagine using a chisel to plow a groove across the grain of a board. The tool is hard to push, and you tear out wood left and right. Now do the same job with a gouge, which, because of its U-shape, severs wood along the sides of the cut. The groove is clean, and the tool pushes easily. Similarly, it's easier to push a plane with a crowned blade. This is true even if you set it deeper to remove the same volume of wood as a straight-edge plane. The best example of this principle is a scrub plane, which has a narrow, highly crowned blade that removes stock quickly. Scrub or hogging planes work best diagonally or at right angles to the grain, where rising or falling wood fibers are of no consequence. The resulting wavy surface is easy to clean up with a fine-set smooth plane. For more on making and using a scrub plane, see *FWW* #90, p. 65.

Photos: Alec Waters; drawing: Vince Babak

Getting a plane to work the first time

You've just bought a new handplane, and you're in a hurry to get it working properly. To set up a plane for general planing around the shop, here are the tune-up steps that I recommend:

1) Chamfer all around the plane's sole, as shown in the photo below. Factory edges and corners are often so sharp they'll leave marks on the wood.

2) Set the frog so it makes a continuous surface at the beveled back of the throat (see the photo below). Moving the frog forward of this position leaves the cutting end of the blade unsupported where it counts. A few of the better (older) planes have stepped frogs, which support the blade even when the throat is small.

3) Smooth the convex surface of the cap iron's chip breaker, and undercut the lead edge of the chip breaker so that it makes tight, uniform contact with the blade. Both of these jobs are easily done on a coarse diamond stone (see the top photo at right). Finally, make sure there is enough bend in the cap iron, so it will make tight contact at its front edge.

4) Flatten the back of the blade on the coarse diamond stone. Hone until the first half inch is gray, which indicates that there's complete contact with the stone. Next, surface the blade's back on a fine diamond or Carborundum stone. Use a similar procedure to sharpen the bevel (see the drawing on the facing page). Although entire articles have addressed sharpening (see *FWW* #81, p. 55), I get good results using the following method: Start on a coarse diamond stone, and then go to a fine one before finishing up both sides of the edge on a hard Arkansas stone or water stone.

5) Assemble the cap iron and blade and tighten the screw. Check for light between the contact points of the two parts (see the lower right photo). Any gap between chip breaker and blade, however small, will clog with shavings, and the plane will choke and stop cutting. Resurface the edges, if necessary, and set the front of the cap iron between 1/32 in. and 1/16 in. from the end of the blade.

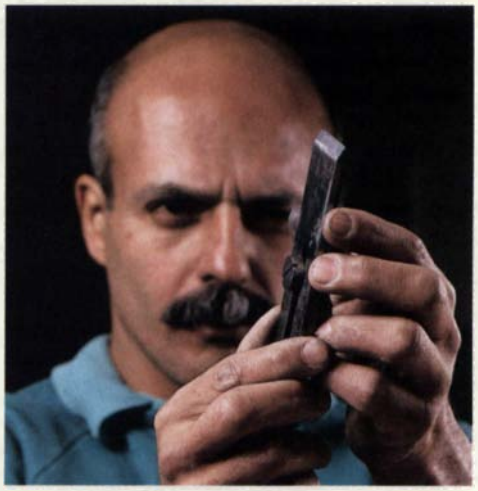
6) Examine the leading edge of the lever cap. If the edge is blunt, dress it using a rocking motion on the diamond stone. Also, flatten the edge's bottom (see the photo below), so chips won't jam where the lever cap contacts the cap iron.

7) Put the plane together, and check the size of the throat. Because I always adjust the frog so it supports the blade best, the throat is always open to its maximum. Even so, I often find that the throat is too small and not always parallel to a properly set blade. The only fix is to file metal sparingly from the throat's leading edge (see the photo below).

When I buy a used handplane, I basically follow the same tune-up routine, although I pay more attention to the tool's condition initially (see *FWW* #98, p. 90). If the plane's throat doesn't need filing and if the sole is flat (see the sidebar on the following page), I can get a plane ready to go in under an hour of careful work. The best thing about well-cared for old planes, like Stanley planes made around 1920, is that most of them have heavy bodies, good-fitting cap irons and lever caps, and blades that hold a nice cap. —*R.S.*

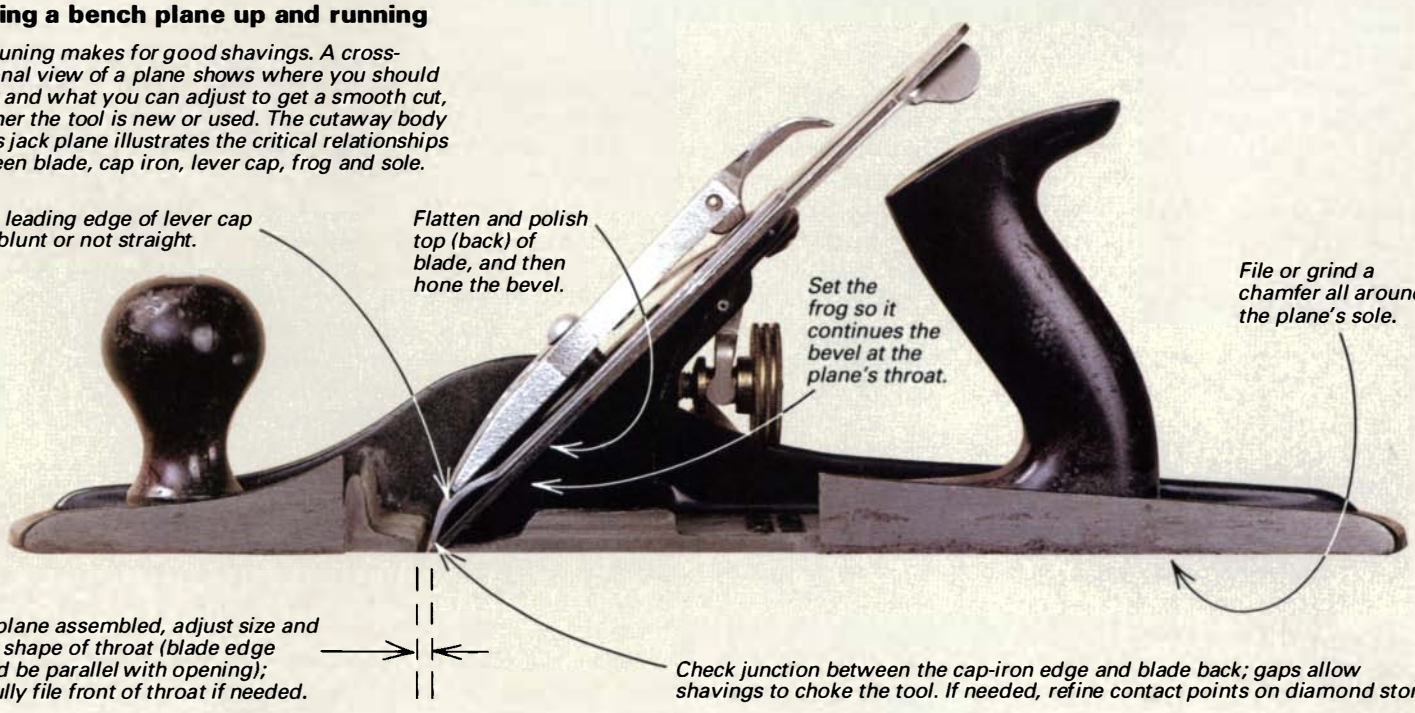
Flatten the edge *of a cap iron using a sequence of coarse, medium and fine diamond stones. Next flatten, or lap, the back of the plane's blade before honing its bevel. Then dress the edge of the lever cap.*

Light reveals gaps*—Cabinetmaker Mario Rodriguez slides the back of a blade along the mating edge of the cap iron to reveal where chips may clog. If no cracks of light appear, he sets the contact point 1/16 in. or less from the end of the blade.*



Getting a bench plane up and running

Fine-tuning makes for good shavings. A cross-sectional view of a plane shows where you should check and what you can adjust to get a smooth cut, whether the tool is new or used. The cutaway body of this jack plane illustrates the critical relationships between blade, cap iron, lever cap, frog and sole.



Plane soles vary mostly in width and length, *but there are other differences, too. From the bottom up: a wooden scrub plane with horn-beam sole, a #8 jointer plane with narrow throat, a #4 smooth plane, a #4 with corrugated sole and a low-angle block plane with adjustable throat.*

Blade angles: different cuts for different woods

Nearly all bench-plane blades form a 45° angle with the wood. For most work, this is ideal. But, there are other considerations, both in theory and practice. In his book, *Understanding Wood*, (The Taunton Press, Newtown, Conn.) Bruce Hoadley explains what effect a plane's blade angle has on wood at the microscopic level. The Victorian expert Charles Holtzapffel in volume II of *Turning and Mechanical Manipulation* (reprinted by Early American Industries Assoc., Levittown, N.Y.), suggests various (iron) pitches for woods of increasing hardness. He names them as follows: 45° (common), 50° (York), 55° (middle) and 60° (half). Holtzapffel, always the pragmatist, goes on to say that really tough woods, like boxwood, may require a vertical blade or one that leans slightly forward to provide a scraping action.

Same tool, different slants—Making a wooden plane lets you choose a cutting angle appropriate for a job. What surprises many people is that you can also select the angle of a metal plane.

To increase the angle of cut, you can grind a top bevel on the blade. The price of a steep angle or of a cap iron set very close to the cutting edge (which accomplishes almost the same thing) is that the plane becomes harder to push. But reducing the blade angle makes planing easy and requires no tool modification at all. You simply push the plane askew. Normally, the effective angle of cut is parallel to the blade's length. If you measure the angle of the blade to the wood in line with a skewed plane's direction of travel (say 45°), you'll find that the effective angle is seriously reduced.

Flattening a plane sole by hand

by Mario Rodriguez

To many woodworkers' surprise, the sole of an antique plane or even a new plane can need flattening. Even if the sole is flat when you buy the tool, heavy planing eventually wears a sole out of true. When this happens, you don't have to send your plane to a machine shop or spend tedious hours passing your plane over stones.

The flattening method I use still relies on an abrasive surface for the final step, but I begin with more aggressive means to speed the job along. The technique also works on flattening backs of chisels and plane blades. I learned the procedure from a master machinist friend, Eric Mingrino, who recommends first flattening the sole of a block plane. Later, you can work your way up to wider, longer plane bottoms.

Check if the sole is out of flat: To determine whether a plane sole is out of true, first apply a film of DYKEM Hi-Spot, a non-drying blue ink, over the entire sole. The ink is available from machinist-supply houses or from Dapra Corp., 66 Granby St., Bloomfield, Conn. 06002; (203) 242-8539. Using a precision straightedge (I suggest a good square or rule like those carried by Bridge City Tool Works, Garrett Wade Tools, or L.S. Starrett Co.), identify any high spots by dragging the straightedge across the sole, as shown in the top left photo on the facing page.

Level high spots with a scraper: To quickly level high spots of the sole, I use a tool that may be unfamiliar to woodworkers: a 14-in.-long machinist's scraper (also available from machinist-supply stores or from Dapra). Both old-style scrapers, which have brazed-on tips, and newer ones, which have indexed carbide-tips, have file-like wooden handles. Experimenting with various scraping angles yields cuts ranging from fine scratches to coarse swirls. You don't want to remove excess material, or you'll risk opening up the throat too much. I flex and push the scraper vigorously on needed areas only (see the top right photo on the facing page), and then I recheck the bottom. It's critical that the sole be dead flat ahead of the throat, where most of the wear occurs. Once the straightedge removes large patches of ink, it's time for filing.

Surface the whole sole with a file: Go over the entire sole with a 12-in.-long, flat, second-cut mill file (carried by machinist-supply stores or from Eastern Tool & Supply Co., 149 Grand St., New York, N.Y. 10013; 212-925-1006). These large mill files are heavy and long enough to make the job easy, and they flatten the surface uniformly. Filing slightly askew, cleanly remove the last traces of bluing (see the bottom left photo on the facing page).

At this point, the sole should be true. Now it needs to be polished. To remove file marks, draw the file's teeth toward you perpendicular to the sole's length (called *draw filing*). Because much of the file overhangs the plane, be sure to keep the contact area flat while maintaining even pressure.

Sand out scratches with abrasive paper: The next step is to pass the plane back and forth over emery paper spray-glued to a flat machined surface (I use my jointer's feed table), as shown in the bottom right photo on the facing page. If you're not sure whether your jointer or saw table is flat, overlay it with a piece of ½-in.-thick plate glass, which is perfectly true, then the paper. When the plane bottom has a uniform look and checks out flat with the straightedge, repeat with increasingly finer grits of wet/dry paper until the plane bottom has a bright, reflective finish. □

Mario Rodriguez is a cabinetmaker, teacher and woodworking consultant. He offers clinics on plane restoration at Warwick Country Workshops in Warwick, N.Y.

The farther you turn the plane, the lower the cutting angle and the narrower the shaving. Shavings cut askew no longer curl up on themselves, but form spirals as though each strand of wood steps sideways to make room for the next. The same logic applies to both chisels and planes, regardless of whether they're cutting face, edge or endgrain.

Block planes—A block plane's blade is installed upside down, or bevel up, which eliminates the angle problem. Standard block planes are usually 5 in. to 7 in. long and seat their blades at 20°. The low-angle variety (see the drawing on p. 68), which are great for planing endgrain, have blades tilted at 12°. A block plane's actual cutting angle depends on how steep you grind the bevel. If the bevel is 25°, then adding a standard blade angle of 20° yields a bevel-to-wood, or cutting angle, of 45°. Honing a secondary (micro) bevel, usually 5° or so, at the tip of the primary bevel will increase the angle of cut.

When block-planing, always try skewing the tool 45° while holding it firmly with two hands. I like to keep a few block planes set up for different cuts. The more sophisticated block planes have adjustable throats. Lightweight and easily handled, these little friends are instantly ready for precision trimming, for quick-and-dirty jobs or for smoothing a wicked piece of wood.

Planing made easier

As a general rule, it's the blade's width, not its length, that makes a plane difficult to push. If you're sweating too hard, try a narrower plane. Another effort improver is to minimize the friction between the plane and your board. Planes with wooden soles slide quite well because they lightly burnish the work. Japanese planes go a step further. Their shaped soles touch a workpiece in four places only: at the front, ahead and aft of the blade, and at the rear (see *FWW* #75, p. 82). A few metal plane manufacturers have also tried to reduce surface contact. Take a plane with a corrugated sole (see the photo on the facing page), for example. Stanley claims the grooves prevent suction between the plane and the board, but I've never been convinced. Instead, I rub the sole of all my planes every few minutes with a paraffin block. I coat the area where the most friction (wear) occurs: at the section of the sole just ahead of the blade. Waxing or oiling other places on the sole doesn't seem to matter.

Of course, the best way to ease any handplaning project is to select your stock carefully. Finding straight-grained lumber is worth the premium in time and dollars. Finally, for the woods that demand special skills, experiment and develop. If you are working curly maple or a twisted chunk of hard exotic, for example, just be patient as you try various blade settings and planing motions. □

Richard Starr, author of Woodworking with Your Kids, *reprinted in 1990 by The Taunton Press, P.O. Box 5506, Newtown, Conn. 06470, teaches middle school in Hanover, N.H. He also hosts a public television program* Woodworking for Everyone. *Check your local television station for broadcast times.*

Check for flatness. *Machinist's bluing and a good straightedge allow Rodriguez to find high spots on the sole of this block plane (top left). On bench planes, he retracts the blade, but doesn't remove it, so that the body of the plane stays stressed.*

Reduce high areas *(identified by a lack of ink) using a machinist's scraper (top right). Scraper tips, which may be permanent or replaceable, like the carbide tip here, produce a fine graphite-like powder that accumulates on the sole.*

Smooth the plane's bottom *with a mill file (bottom left). Remaining high spots show up as dull gray. Once the ink disappears, draw-file the surface.*

Remove file scratches *and burrs from the sole with emery paper adhered to a flat table (bottom right). Eliminate other imperfections with wet/dry abrasive paper.*

New Tools Make Laminating Easy

Big baggies and vacuum pumps put the squeeze on veneers

by Monroe Robinson

Premium wood veneers can turn a perfectly ordinary woodworking project into a spectacular display of color, pattern and light. It's just too bad that many woodworkers shy away from veneering because veneer presses cost a lot of money and take up a lot of shop space to boot.

But now there is an inexpensive and space-saving solution to veneering, which is almost foolproof in operation, stores easily out of the way and can exert a force of 1,900 pounds per square foot. It's a vacuum press. A giant zip-lock bag with a vacuum pump attached, this startlingly simple device can replace the old-style mechanical press for veneering, laminating and some bending operations. And curved forms can be veneered without complicated matching molds, as shown in the photo below.

Woodworkers have also discovered that vacuum pumps can hold workpieces safely for routing, drilling and a variety of other operations. There are now at least six companies that offer a variety of vacuum systems. And most of these systems are priced well under $1,000.

***Because vacuum presses** can easily clamp and form contoured shapes as well as flat panels, they are opening up veneering and bent laminating to the average woodworker. Their reasonable cost, convenience and storability make them appropriate for most shops.*

How vacuum bagging works

At sea level, atmospheric pressure applies 14.7 pounds per square inch (psi) of force on everything, in all directions. As you draw a vacuum within a bag, you remove the air at equilibrium with the atmospheric pressure, which (measured in inches of mercury) then bears in on the bag from all directions. Thirty inches of mercury (in. Hg.), which is the maximum possible, is equivalent to 14.7-psi pressure at sea level. The systems we use in woodworking are designed to remove up to 90% of the air for a vacuum pressure of 27 in. Hg. (13.23 psi) at sea level.

Types of vacuum pumps

Two different types of pumps are used to draw a vacuum for these presses: an electric-powered rotary-vane vacuum pump and a compressed-air-powered venturi pump. Rotary-vane pumps work like an air compressor in reverse, sucking air from inside the bag. Venturi pumps send compressed air rushing through a restricted orifice, which generates the vacuum. They're lightweight, compact and have no moving parts.

To compare the pumps, I put a curved, 7-cu.-ft., hollow form in a standard-sized 4-ft. by 8-ft. bag. I connected each pump via its own hose to this setup and timed how long it took the pump to reach a vacuum of 23 in. Hg.

All four of the rotary-vane units shown in the top photo on the facing page use the same setup: a ¼-HP, electric motor and an oil-less rotary-vane vacuum pump rated at five cubic feet per minute (CFM). In spite of this similar setup, their performance ranged from four minutes to 11 minutes to draw 23 in. Hg. in the test bag (see the chart on p. 75). The difference can be explained in two words: *flow restriction*. The pumps from Vacuum Pressing Systems and Mercury Vacuum Presses avoid flow restriction by using ⅜-in.-inside diameter (ID) hoses. The poorer performing units

Photos: Vincent Laurence

from Woodworker's Supply and Vacuum Tool Co. have ⅛-in.-ID hoses. More than about six minutes could become a problem, depending on the working time of the adhesive and the complexity of the piece being pressed.

Vacuum Tool Co.'s pump is manually controlled; the other rotary-vane pumps have automatic controls with an adjustable switch for setting the vacuum pressure at which the pump shuts off. On Vacuum Pressing Systems' and Woodworker's Supply's systems, setting the switch is an easy screwdriver adjustment.

These automatic switches have a preset lower level to turn the pump back on when the vacuum drops to the preset point, usually 19 in. to 20 in. Hg. The gap between upper and lower levels is called the dead band. The narrower the dead band, the more often the pump will recycle. A narrow dead band coupled with a leaky bag could cause a pump to cycle on and off every few seconds.

The dead bands for the supplied units ranged from 3 in. to 5 in. Hg. and all worked well except Woodworker's Supply's system. This pump dropped 2 in. to 3 in. Hg. at cutoff, effectively reducing the dead band to only 1 in. to 1½ in. Hg.

While venturi pumps are generally less expensive than rotary-vane pumps, there is the additional cost of an air compressor. Venturi pumps are available in automatic and manual models (see the photos at right). The automatic venturi pumps use an electrically operated solenoid valve to turn the pump on and off at a desired vacuum level. All these pumps have a dead band of about 3 in. Hg., and all their switches are easy to adjust. Each of the automatic switching units worked well.

The venturis' pumping rates ranged between 1 CFM and 4 CFM, and their performances generally fell in the middle of the rotary-vane systems. Unlike rotary-vane pumps, the performance differences of the venturi pumps are almost directly related to their rated capacities (see the chart).

Venturi pumps work best if they have a filter on the vacuum line to remove particles that might plug the venturi and a water-catching filter on the compressed air line. Unless filtered out, water passing from the compressor through the venturi decreases the pump's efficiency. Mercury Vacuum Presses' automatic venturi has a filter on the vacuum line that's easy to see and to clean and a filter on the compressed air line. Vacuum Pressing Systems also filters the vacuum line. If missing, filters can be added easily to either the vacuum or the compressed air lines.

***Rotary-vane vacuum pumps**, arranged from left to right according to increasing list price, include units from Vacuum Tool Co., Woodworker's Supply, Vacuum Pressing Systems and Mercury Vacuum Presses. Rotary-vane pumps are the best choice for moderate-to-heavy vacuum pressing requirements. Also shown under each unit are its closure systems and vacuum line connections.*

***Automatic venturi pumps** with bags, arranged from left to right by price: Quality VAKuum Products, Vacuum Pressing Systems and Mercury Vacuum Presses. Powered by an air compressor, venturis are generally a little slower than rotary-vane pumps but usually a little cheaper as well and are suitable for light-to-moderate vacuum pressing.*

***Manual venturi pumps**, arranged from left to right by price: Gougeon Brothers, Quality VAKuum Products, Vacuum Pressing Systems and Mercury Vacuum Presses. Manual venturi pumps offer a low-cost introduction to the many benefits of using vacuum.*

Vacuum bags and bagging films

Most vacuum bags are made of either vinyl or polyurethane and come in many sizes. I looked at standard-sized bags that could handle a full 4x8 sheet of material. The bag systems require a grid board inside the bag that serves as the bottom platen. The grid board is typically made of ¾-in.-thick medium-density fiberboard (MDF) with ⅛-in.-wide by ⅛-in.-deep grooves cut on 4 in. to 10 in. centers in both directions. The hose from the pump connects to the bag and to a cross in the grid. The grid permits free flow of air throughout the bag. The two systems in this review that employ films rather than bags use a breather fabric in place of the grid board.

A bag could hold a vacuum almost indefinitely were it not for the leaks that develop at the closure, connections, filters, check valves and in the bag itself. To minimize leaks, check and tighten fittings and take proper care of the bags. Regular cleaning of glue and debris and not stress-

ing the seams will prolong a bag's life.

The bagging materials offered by the manufacturers are 2-mil, modified nylon-resin film (from which you can make a bag), 20-mil vinyl, 30-mil vinyl and 20-mil urethane. Of the three types of bags, the 20-mil vinyl bags are the least expensive and most commonly used. Although more prone to punctures and tearing at the seams, they'll last for years under normal use. Vacuum Pressing Systems' 20-mil bag comes with a clear top and a solid-blue 30-mil bottom.

The tougher 30-mil vinyl bag is recommended for medium-to-heavy use. It's also stiffer, which I found made it easier to load the bag.

Vacuum Pressing Systems also sells a 20-mil polyurethane bag. The urethane film is much tougher and harder to puncture than either the 20-mil or 30-mil vinyl bags and will stand up to the heaviest commercial use.

A couple of manufacturers supply a thin 2-mil, modified nylon-resin film designed for one-time use. It is usually used as a single top film and taped to an impervious surface. Taping around the edges takes a while, and it is difficult to get a good seal. For this reason, these manufacturers offer continuous running pumps.

Hose connections to the bags varied in location and convenience. Depending on the manufacturer, the hose might connect at the top, side or bottom of the bag. I found the quick-disconnect coupling on Vacuum Pressing Systems' bags to be the most convenient. To attach a hose to the nylon film, both Gougeon Brothers and Vacuum Tool Co. sell a bag tap fitting. I preferred the one from Vacuum Tool Co. because it has two parts that screw together from each side of the film.

Closure systems

I used the interval between pump cycles as a measure of bag and closure integrity. Because all the bags were new with no leaks, the recycle interval primarily revealed the effectiveness of the closures.

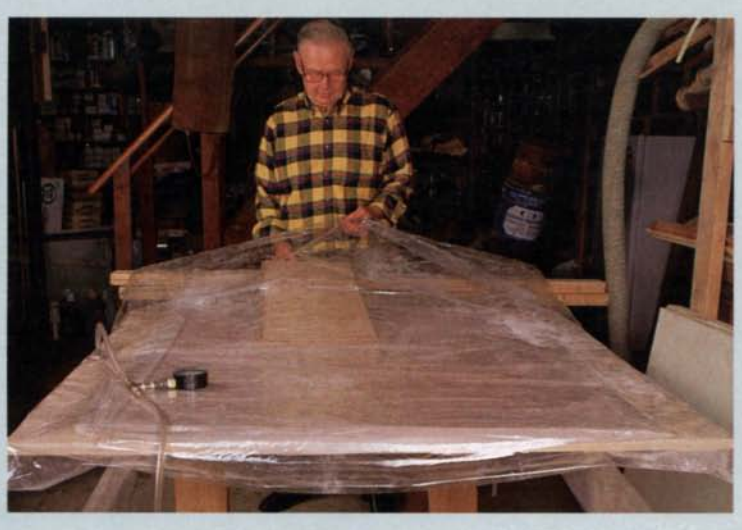
Each manufacturer uses a different closure system. Woodworker's Supply uses a light-weight zipper that is fast and easy, but it didn't seal the bag very well, even with the recommended sealing tape at the ends of the zipper. Its recycle interval averaged about 30 minutes.

Mercury Vacuum Presses also uses a zipper, but it's heavy-duty and requires pushing your finger along its length to get the best seal. Although recycle times varied, this system could hold a vacuum for up to two hours. Mercury also offers bags with zippers at both ends or custom bags to meet special needs, such as a zipper along three sides for easy loading and a narrow bag with a 30-ft.-long zipper for pressing spiral staircase parts.

Vacuum Pressing Systems' bags have neat little hook-and-loop fastner tabs to hold the bag temporarily around a ¾-in.-dia. plastic rod, making it easy to snap an extruded plastic C-channel around the rod and bag. This closure is simple to apply and provides the most effective seal, holding a vacuum for well over six hours before the pump recycled. Closures at both ends of Vacuum Pressing Systems' large bags allow easy loading of multiple pieces. The seams on Vacuum Pressing Systems' bags are small and smoothly welded to-

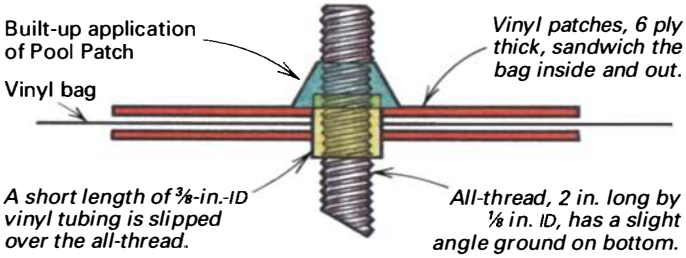
Shopmade vacuum press for under $100

by Larry Schiffer



Vacuum line to bag connection

Substantially reinforcing the hose to bag connection will eliminate the major source of leaks in this shopmade vacuum bag.



I was faced with the prospect of veneering a kitchen full of cabinets for my son's new log home and had decided a vacuum press was the way to go. My problem was finding a source for the vinyl in less than 5,000-sq.-ft. rolls. I was stymied until one day while shopping at K-Mart, I saw a roll of 5-mil.-thick vinyl for storm windows that only costs $10. I decided to experiment.

Making the bag: I folded the vinyl in half to make a 54-in. by 72-in. bag and welded the edges with some PVC solvent from my local home-building center. I installed a pump-connection fitting, as shown in the sketch, using ⅛-in.-ID all-thread pipe. I further reinforced this critical juncture with a generous application of pool patch, available from most pool-supply outlets. Pool patch is a highly viscous vinyl cementing material, which allows a greater buildup of material and a stronger joint. To help protect the thin vinyl, I rounded all edges of the MDF platen. Some ⅜-in.-ID vinyl tubing connects the bag to the pump (see the photo at left).

Connecting the pump: For a pump, I used a single-cylinder air compressor. I removed the air filter and, using a compression fitting, attached a piece of ⅜-in. copper tubing to the suction side of the air compressor. The vinyl hose from the bag slips over the copper tubing. The air from the pressure side outlet of the compressor discharges into the room. To protect the compressor's motor, I loosened the belt tension so that when I hear the compressor start to lug, the belt slips. Although using an air compressor in this manner invites the discharge of small amounts of oil from the crankcase, I haven't had to add any oil in two years of operation. As an alternative to the air compressor, you can get a surplus or used vacuum pump from the Surplus Center (1015 West O St., Lincoln, Neb. 68501; 800-488-3407). □

Larry Schiffer is a woodworker in Hopewell Junction, N.Y.

gether to create a tight-sealing bag.

Quality VAKuum Products gives instructions to make a rod closure that is not as convenient as Vacuum Pressing Systems' but is equally effective—holding a vacuum for more than six hours.

Conclusions

The best pump and bag combination will depend on your use and the equipment you currently own. Manual venturi pumps are the least expensive, provided you already own an air compressor. With this setup, you're faced with the option of letting the compressor run continuously or with the inconvenience of monitoring the system. By adding a vacuum-storage tank, you can increase the volume of the system and extend the recycle time. Quality VAKuum Products sells components, so you can start with a manual venturi and add an automatic control kit later. One drawback of the manual venturi pumps, except Vacuum Pressing Systems' pump, is that they generate more than 85 decibels of noise, a level I wouldn't want to listen to for long.

If I had a compressor and intended to do only a modest amount of vacuum pumping, I would probably get an automatic venturi system. The higher volume automatic venturis performed almost as well as the better rotary-vane pumps. And a venturi pump is the better choice for hold-down applications.

Because I do a lot of veneer work, I prefer the top-end automatic, rotary-vane systems. In a production situation, these pumps are cheaper to operate than the compressor-powered venturis. And their ability to quickly draw a vacuum can be critical when working with complicated glue-ups that take longer to assemble and get in the bag.

The right bag material will depend on how frequently you will use the bag, as previously discussed. Because the zipper closure is flexible and will wrap around the workpiece, you can press larger forms with this type of bag. But I prefer the tight seal and convenience of Vacuum Pressing Systems' rod closure. The 2-mil, modified resin film might be a good choice for unusual applications because it's cheap, it can be taped together to make a bag of any size and it will conform to any shape.

Manufacturer's instructions vary from none (Vacuum Tool Co.) to a complete book, *Advanced Vacuum Bagging Techniques*, from Gougeon Brothers, which deals primarily in epoxy techniques. In between are Woodworker's Supply (two pages) and Quality VAKuum Products (four pages), which cover the basics. Both Vacuum Pressing Systems and Mercury Vacuum Presses provide manuals that go well beyond the basics and include information on techniques and adhesives.

Vacuum pressing is an emerging technology that is making the process of pressing and laminating veneers available to almost any woodworker. Improvements and refinements in pumps, bags and closure systems were under development by several manufacturers while this article was being prepared. These new systems weren't ready in time for review, so check for current developments before you buy any system. □

Monroe Robinson is a woodworker in Little River, Calif.

Vacuum Press Systems

	Pumps				Bags		
Manufacturer	Type	Vacuum flow in CFM	Time to evacuate bag (min:sec) ◗	List ● price	Bag or film material	Closure system	List ● price
Gougeon Brothers, Inc. PO Box 908 Bay City, MI 48707 (517) 684-7286	Manual venturi	1.0	15:0 ✷	$65	2-mil film (60 in. wide)	Tape	$30
Mercury Vacuum Presses PO Box 2232 Fort Bragg, CA 95437 (800) 995-4506	Auto. rotary vane Auto. venturi Manual venturi	5 4 4	4:40 6:15 6:20	$640 $438 $189	20-mil vinyl 30-mil vinyl	Heavy zipper	$129 $165
Quality VAKuum Products Inc. 32 Longmeadow Road Lincoln, MA 01773 (800) 547-5484	Auto. venturi Manual venturi	3.2 1.6	6:05 10:0	$320 $99	20-mil vinyl	None	$155
Vacuum Pressing Systems, Inc. 553 River Road Brunswick, ME 04011 (207) 725-0935	Auto. rotary vane Auto. venturi Manual venturi	5 3.2 2	4:10 6:45 8:35	$605 $430 $139	20-mil vinyl 30-mil vinyl 20-mil urethane	Rod and C-channel	$135 $178 $420
Vacuum Tool Co. 310 Watertown Road Morris, CT 06763 (203) 567-3499	Manual rotary vane	5	11:20	$425	2-mil film (72 in. x 30 yds.)	Tape	$74
Woodworker's Supply, Inc. 1108 N. Glenn Road Casper, WY 82601 (800) 645-9292	Auto. rotary vane	5	9:40	$449	20-mil vinyl	Light zipper	$109 ▲

✷ Pump requires 15 min. to draw a maximum of 18 in. Hg.
◗ The time required to draw 23 in. Hg. in a 4x8 bag containing a 7-cu.-ft. hollow form.
● To determine system prices, add the selected bag price to the selected pump price.
▲ Woodworker's Supply offers a complete-system price of $529.

Tambour Cabinet Doors

Canvas and glue make flexible, flowing doors

by Richard Wedler

The first time I used tambour doors in a furniture project, my client had commissioned a dining buffet to fit into an extremely small dining room. Hinged doors stuck out too far when opened, and regular sliding doors limited access to the inside of the cabinet. Tambours provided an elegant solution.

Tambour doors are made by gluing a gang of individual wooden slats to a canvas backing. The slat ends have tongues that ride in a track groove routed into the cabinet carcase. The canvas backing gives a tambour plenty of flexibility to follow gentle curves in a track, so the doors can run back into the cabinet and disappear. Their flexibility makes tambours an attractive solution for doors in a wide variety of cabinet and furniture pieces. Although tambours can be made to operate vertically, the most accessible projects involve one or two horizontally sliding doors, such as the ones in the buffet I built shown below.

In this article, I'll tell you how I make a typical tambour door, from milling the slats to gluing on the canvas, to routing the track, to adding handles and installing the finished doors. Because smooth-running doors depend on careful planning as much as precise construction, I suggest you read the story on tambour design on p. 78 before you proceed. Once you've determined track layout and slat size, you can make a full-scale plan-view drawing of the cabinet and use it to generate templates for the track and various cabinet parts.

Milling the slats

Door construction begins with milling the slats. I perform this task in several separate stages, allowing the blanks to season in between. Though this may seem time-consuming, it ensures that all wood distortion and dimensional changes take place *before* the slats are glued to their canvas backing. The straightness and precision of each slat is crucial to a smooth-running tambour.

I begin by estimating how many slats the door will require. Experience has taught me to be conservative and to make 25% to 30% more than the total number needed; even more if the wood is fussy and seems prone to warping. In the first milling stage, I joint, then thickness plane or ripsaw the slats until they're at least one-and-a-half times thicker and wider than the finished size and slightly longer. Once the first pass is done, I stack the slats into a neat pile, placing stickers between the courses to allow air circu-

***Canvas-backed tambour doors are elegant and smooth-operating alternatives** to standard hinged or sliding doors. They excel in providing a large amount of access to a cabinet interior, such as this pair of doors does in the dining room credenza built by the author.*

Photo: Phillip Nilsson

lation. The length of time it takes the wood to season will vary depending on the species, the climate in your shop and how wet or dry the wood was to begin with. Most distortion probably will occur within a few days. But don't worry; you've left enough stock on each slat to allow corrections in subsequent milling.

The next milling stage removes another 15% or so from each slat. To keep things orderly, I've developed my own procedure: First I joint one edge of each slat, and place those edges face down on the worktable. Next I thickness plane the unjointed edges (to keep them parallel). I rotate each slat 90°, so it's face up, before setting it on the worktable. Then I repeat the same jointing/thicknessing process. This minimizes confusion about what's been done and what hasn't. After all the milling is completed, the slats go back to the stickers for another day or two of seasoning.

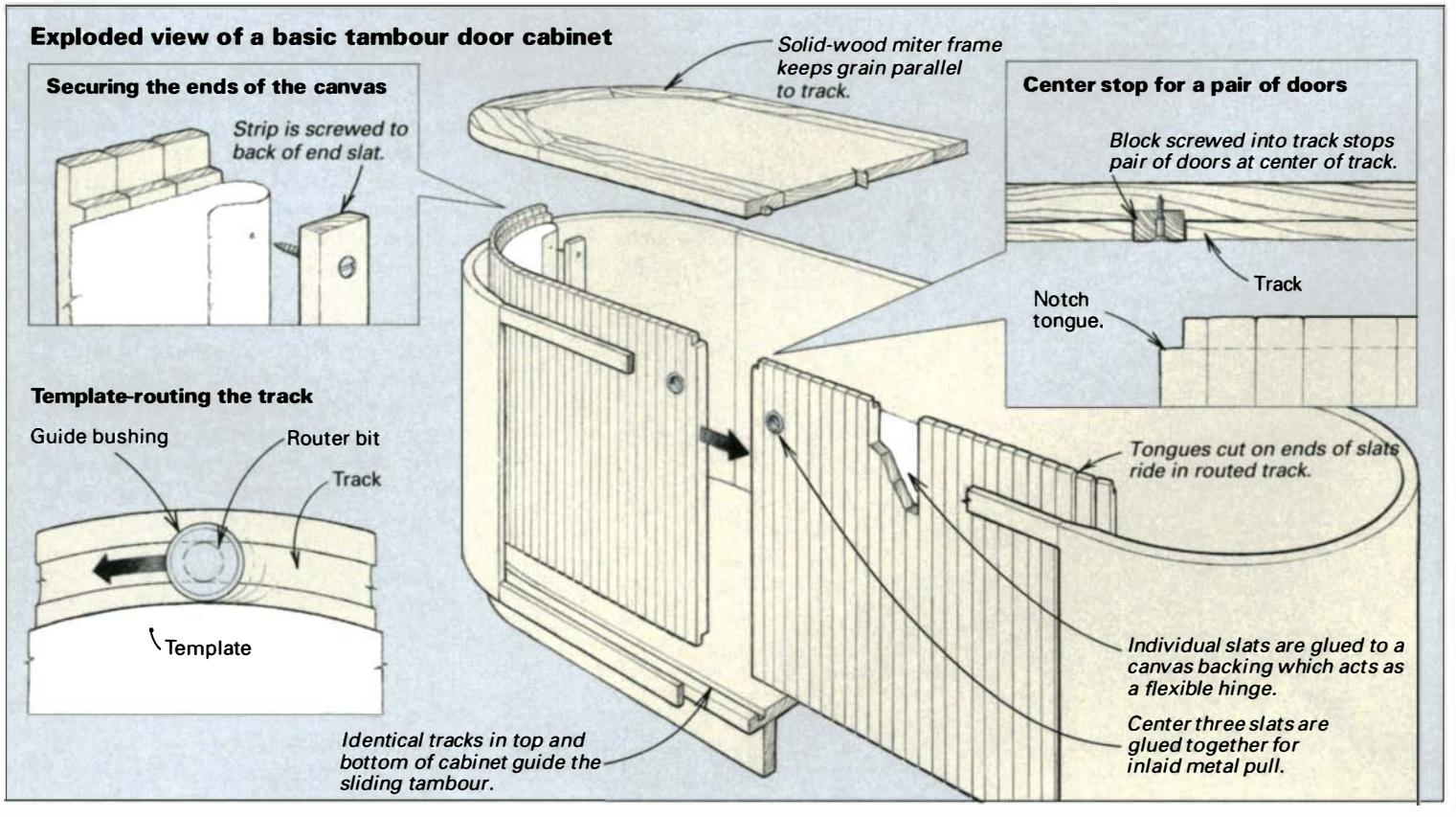
The final milling step takes the slats to within a final sanding of their finished dimensions. A final pass is taken with jointer and planer set to remove a scant 1/32 in. It's advisable to do any edge-shaping on the slats prior to this last milling, especially if shaping removes considerable stock because this may induce additional warping. My shop is equipped with a small drum sander, so I sand all the slats with it. Now sticker the slats again, and leave them until you're ready to glue up the doors.

Wedler template-routs the track that guides the tambour around the curved end of a kitchen peninsula cabinet. The particleboard template steers the guide bushing of a router fitted with a straight bit.

Routing the track

I template-routed the track into the case work before assembling the cabinet. Though I've seen tracks that were routed into particleboard and plywood carcases, the smoothest-running tambour track is routed into a solid-wood frame mitered together so that the grain runs parallel to the track. This can be a lot of work, so you might want to incorporate a solid frame only on the cabinet bottom because the lower track carries the weight of the tambour and the majority of the resistance during door travel.

I rout the track using a straight bit. The router has a base fitted with a guide bushing to follow a composition board template, as shown in the photo above. The width of the bit will equal the width of the track. As far as the type of bit to use, I've had particularly good luck with carbide slotting bits, though standard carbide (one or two flute) and even newly sharpened HSS bits could prove adequate. Before marking and cutting out the template, I must compensate for the guide-bushing offset. I subtract the outside diameter of the bushing from the diameter of the bit and divide that number in half. The resulting number equals the offset. Now, working on the full-scale layout drawing, I draw a parallel line offset from the inside edge of the track by the calculated amount. This new line represents the profile of the template to cut out. I make my templates from either ¼-in. medium-density fiberboard (MDF) or Masonite. Both are inexpensive, although I've found tempered Masonite to be more durable for repetitive jobs.



Photos except where noted: Sandor Nagyszalanczy

Designing slats and track for a smooth-running door

If you decide to use tambour doors in any piece of furniture or cabinetry, don't expect to just pop them in like you would hang a hinged door on a completed face frame. While they're not particularly complicated to make, tambour doors must be integrated at the same time the case work is designed.

Laying out the track

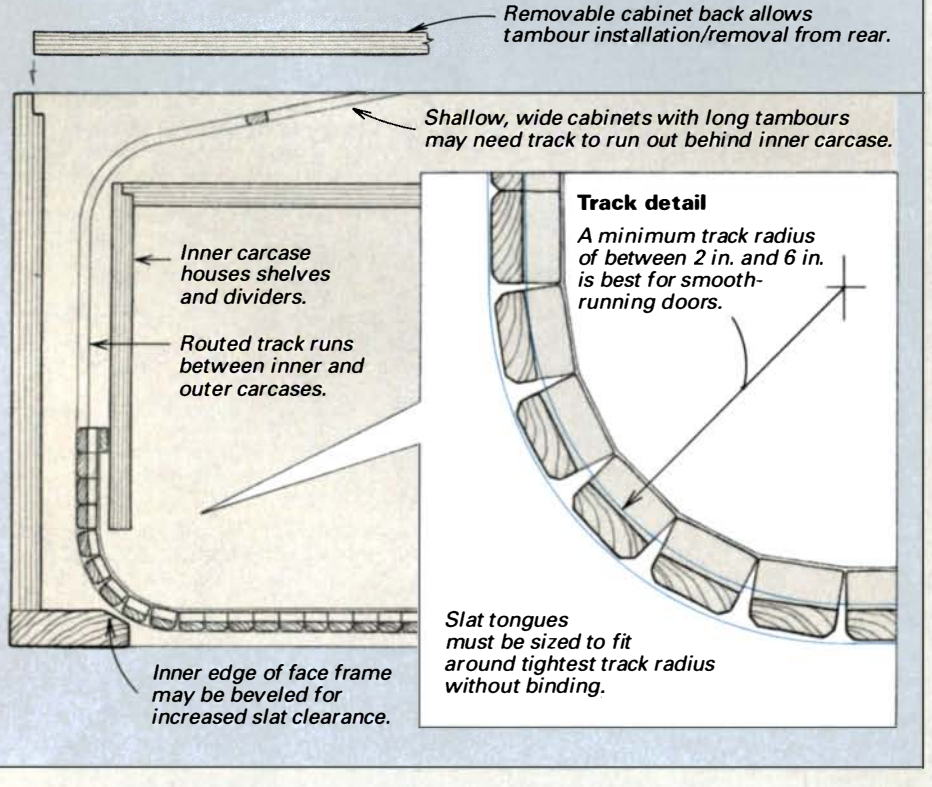
Carcases for tambour doors usually have an outer case and an inner case open to the front. The tambour track passes between inner and outer cases on the sides and at the rear (see the drawing below). The inner case provides a means of adding shelves and dividers to the cabinet; otherwise, these could not be attached to the sides of the outer case without interfering with tambour travel. The inner case also hides the canvas backing when the doors are open and prevents items stored in the cabinet from hanging up the doors.

After determining the basic design and dimensions of your carcase, plan the path of the track on a full-sized drawing. The track must maintain adequate clearance from both the inner and outer case works. Tambours with wide slats will require more clearance on the outside of curves than tambours with narrow slats. For easiest tambour installation and removal, the cabinet should have a removable back with the track running directly out the back. Otherwise, you will have to devise some sort of access panel (this panel is important for adjustments when the cabinet is new, for future repairs and for refinishing).

Most cabinets will require each door to negotiate only one curve as it traverses from front to side. However, wide, shallow cabinets may not have adequate side depth to accommodate a long tambour door that's fully opened. In this case, curve the track around behind the inner case, as shown in the drawing.

While I have seen a tambour travel around a curve with as little as a 1 in. radius, gentler curves with radii of 2 in. to 6 in. usually make smoother-operating doors. Larger-radius turns also handle wider slats, which give you more design latitude. An additional refinement, taught to me by a friend, is to run the track close to the inner edges of the face-frame stiles, as shown in the drawing, to minimize the gap between the closed tambour and the frame. This lends a more sophisticated look to your piece. If there isn't room for the slats to pass, you can bevel the inner edge of the stile for more clearance (see the drawing detail below).

Drawings help to plan track layout and slat sizing



Sizing the slats

Once you've laid out the track, you will need to size the slats and their tongues. As you can see in the drawing detail below, the ratio of the width of the slat and thickness of the tongue must be adjusted to fit the size and the radius of the track groove. I initially calculate tongue size from a drawing; the size should allow adequate clearance—maybe 3/64 in. or so—to prevent binding in the curve. I rout a test track in a wood scrap and then try running a test tongue around the curve. For most tambours I build, I make a 1/4-in.- or 5/16-in.-wide groove for a track that curves no tighter than a 2 in. radius. This track smoothly handles slats that are 5/8 in. to 3/4 in. wide, with tongues about 9/32 in. thick. For bigger cabinets, I've used track grooves as wide as 3/8 in. to handle the larger, heavier doors.

Tongues should be slightly longer than the depth of the track so that the overhanging portion of the slat (which serves to conceal the track) doesn't scrape the carcase. I usually make my track about 1/4 in. deep and the tongues about 5/16 in. to 3/8 in. long. The added tongue length also creates a pleasing reveal (an even gap) where the slats meet the carcase at top and bottom.

Shaped edges on the slats significantly affect the look and the character of any tambour door. The simplest edge treatments include rounding over, small coves and full or stopped chamfers. For a more dramatic effect, you may wish to shape slat faces and/or edges using a bead cutter, Roman ogee, or other profile-router bit. If you leave the slat edges unshaped, your tambour will look more like a solid panel, especially if the wood lacks strong grain contrast.

To further enhance the solid-panel effect, saw slats sequentially from wide boards to preserve the grain patterns in the finished tambour. Marking slats and maintaining their order may require a librarian's patience, but the results are extremely rewarding, particularly when using beautifully figured woods.

The design of the handles or pulls should be incorporated into the design of the slats. If the curve of the track permits, glue together two or three slats at the leading edge of the door, and screw on a handle or rout a recess for a ring pull into the slats. Alternatively, you could add a wider, thicker slat at the end of the tambour that has a finger pull routed into it, or screw a shaped handle strip to the edge of the last slat. *—R.W.*

A shopmade fixture secures the slats for gluing on the canvas backing. *Pipe clamps and a wide batten board cinch the slats tightly together; a few blows from a mallet ensure that all slats are flat.*

A laminate roller works bubbles *or wrinkles from canvas that's been glued to the back of slats. This canvas forms a fabric hinge that allows the tambour to run flexibly.*

Rabbet the ends of the tambour *with a dado blade on the tablesaw to form tongues on the ends of the slats. These tongues, which run in the track to guide the tambour door, are cut from the canvas side of the door.*

After sawing and smoothly sanding the template, I mark a set of reference lines to aid in precisely repositioning the template when routing top and bottom tracks. A centerline marked on both template and carcase parts may be all that's needed. Also, I mark the top surface of the template and orient this side up when routing the bottom track and down for the top track. This ensures identical tracks that run exactly parallel in the top and bottom of the case works, even if the template isn't perfectly symmetrical.

With the bit and guide bushing set up in my router, I take a test pass in a scrap of track material to ensure the cut will be clean and chatter-free. Now I clamp or tack the template to the panel, and I'm ready to rout. I make the top track slightly deeper than the bottom one to allow the top slat tongues plenty of clearance, so they'll run with minimum resistance. Once the routing is done, I thoroughly sand the tracks until they're smooth and consistent.

Gluing the canvas to the back of the slats

The simplest way to successfully join many individual slats into a tambour door is to build an assembly fixture that positions and secures the slats while the canvas backing is glued on. This fixture consists of a plywood or MDF baseboard with strips tacked on in a U-shape, surrounding the slats on three sides. Each of these strips should be thinner than the slats, allowing them to protrude a sixteenth or so above the strips. This keeps the canvas from accidentally adhering to the assembly fixture during glue-up.

A good choice of backing materials traditionally used for tambours is a good-quality, lightweight #12 (or 12 oz.) cotton canvas. However, I've recently been experimenting with contact-cementing acrylic canvas to tambours. Sunbrella acrylic canvas (available from The Canvas Shop, 7410 Valjean Ave., Van Nuys, Calif. 91406; 818-989-4356) doesn't seem to stretch or unravel as much as cotton, and it doesn't get as easily saturated with contact cement.

Which adhesive is best for canvas-tambour construction? In my experience, yellow glue (aliphatic resin) or a good-quality solvent-based contact cement (I use Touch Down, made by W.F. Taylor Co., or Weldwood) is the best choice. It's easy to control canvas saturation when applying contact cement with a roller. It is simple to spread evenly on both slats and canvas, and it's very flexible. But contact cement is flammable, so work in a room with good ventilation. Critics of this approach have said the canvas may come unglued because of solvents in the finish applied to the face of the slats, but I've never experienced this difficulty myself.

When I'm all ready for glue-up, I go through my stack of slats and select the straightest, most perfect ones and trim them to final length, touch sanding the ends as necessary. I load the slats into the assembly fixture face down and edge to edge. I then clamp them tightly together using a wide board the same length as the slats as a caul. To ensure the slats are all perfectly flat, I tap them down using a Dead-Blow mallet (see the photo at left above).

I size the canvas about 1½ in. (total) narrower than the length of the slats and several inches longer. I use a razor knife guided by a metal straightedge to do the cutting and handle the canvas carefully to keep the edges from unraveling (don't worry if a row or two of thread comes off). Next I draw pencil lines around the perimeter of both the assembled slats and canvas, staying about ¾ in. shy of the edges, which keeps me from spreading glue too closely to the edges. I also mark the extra inches at each end of the canvas to be left adhesive-free. This lets me hold the canvas flat while I'm applying the glue, and it gives me a clean edge to grab when laying down the canvas. The excess is trimmed and secured later.

I spread glue on both canvas and slat backs, keeping the adhesive layer thin and evenly distributed. A little practice on a piece of

Hidden tambour doors

When Maine woodworker William Turner set about making tambour doors for his walnut chest for storing audio equipment, shown in the photo below, he didn't like the gap between the outer edge of each door and the frame of the cabinet. After some head scratching, Turner came up with a plan: He sawed the tongues off the two outermost slats on each door, so they weren't trapped by the track groove. He then screwed a short length of bandsaw blade (with the teeth ground off) to the back of each door near the end, as shown in the drawing below. When the doors are in the closed position, these blade strips act like springs to keep the outer slats flush with the door front. When the door is pulled open, there's a slight resistance as the spring-loaded slats bend slightly to follow the tongued slats around while the door smoothly recedes into the cabinet.

Hidden tambour doors

Spring-loaded slats hide gap where closed tambour meets cabinet stile.

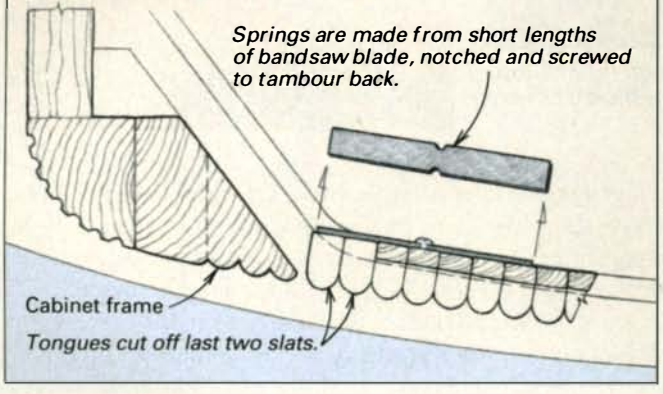


Photo: William Thuss

scrap canvas will help to determine the best technique to achieve a perfectly even spread. The objective is to bond fibers in the fabric to fibers in the wood without allowing the glue to soak through the canvas. If you're using contact cement, allow both surfaces to dry for the length of time specified on the can before sticking the canvas down. If it's your first attempt, you might want to ask for help positioning the canvas and laying it down flat.

I use a laminate roller (available from a building supply store) to work out wrinkles and bumps in the canvas, as shown in the top right photo on p. 79. A straight stick with a rounded edge also works. Firm, even pressure gives an adequate bond if you're using contact cement. If you've applied yellow glue, clamp a flat batten board on top of the canvas. Covering the batten with clear plastic wrap or waxed paper will prevent the board from sticking to the back of the canvas. After the glue sets for a few hours, I remove the tambour from the jig and check each joint to make sure it bends freely. If it doesn't, I snap the edges apart to free the slat because the little bit of glue that seeped in hasn't set yet. (If you use yellow glue, don't wait overnight to try this.)

Fitting the doors

With the canvas glued and dried on each tambour door, it's time to shape a tongue at the top and bottom of each door to fit the track in the carcase. Size the tongues to allow the tambour to smoothly negotiate curves in the track (see the box on p. 78). I cut the tongues by rabbeting the tambour on the tablesaw fitted with a sharp dado set. First I clamp a plywood auxiliary face to the saw's regular rip fence. Next I assemble my dado set to make the width of cut at least ⅛ in. more than the width of the desired rabbet.

Next I lock the rip fence with the dado set's right edge slightly over the auxiliary fence and raise the running blade until it's just shy of the estimated rabbet depth (tongue thickness). I run one edge of the tambour through the saw, as shown in the bottom right photo on p. 79, and check the tongue's fit in the carcase. If it's too tight, I raise the blade a minuscule amount and take another very light pass. When the tambour glides freely in the track, I ease the edges of the tongues and sand them with fine sandpaper. The tambour should slide with just the pressure of a pinky finger. The loose canvas at each end of the door is now trimmed and secured. I cut the canvas back until there's just about ¾ in. left. Then I fold the end under and screw a backing strip over the fold, into the end tambour (see the drawing on p. 77).

When clear finishing my cabinets, I try to avoid getting finish into the track itself. This is easier if I'm wiping or brushing on the finish; if I'm spraying, I mask off the track. It's best to finish the tambour before installing it. Bend the surface back slightly to ensure that both edges of each slat receive finish.

After the finish is dry, I slip the tambour doors into place. Before installing the cabinet back, I screw a small block of wood as a stop at the back end of each track. This prevents the doors from accidentally opening too far and slipping inside their case, out of grasp. If the cabinet has a pair of doors, I install a concealed stop in the upper track to ensure the tambours and handles are centered when closed. The block engages a notch in the top tongue of the first slat in each door (see the drawing on p. 77). Finally, I lubricate the tracks by rubbing in a tiny bit of paraffin wax—not too much or the wax will cake and collect dust. If sections of the track are inaccessible, you might want to lubricate them before carcase assembly. In this case, take care not to contaminate surrounding areas of the carcase that will be finished later. □

Richard Wedler is a professional woodworker, musician and filmmaker in North Hollywood, Calif.

A wax-polished surface has a soft sheen unrivaled by any other finish. *You can see the reflection of the buffing rag in the crotch-mahogany veneered surface of this drop-front desktop.*

Rejuvenating with Wax

Good cleaning and two-step approach give best results

by Tom Wisshack

A coat of paste wax is probably the simplest and safest way of rejuvenating the surface on a piece of old furniture. In the 18th and 19th centuries, varnished, French-polished and oil-finished pieces were all generally wax polished afterward, usually with a mixture of beeswax dissolved in turpentine, sometimes with various resins added for durability and hardness. This wax polish gradually hardened, the wood tone shifted as it aged and a patina developed. Subsequent polishings maintained the finish, which mellowed as it acquired minute scratches, dents and a bit of grime.

A wax polish is compatible with nearly all old finishes, but how well a piece of furniture responds to it will vary depending on how—and how well—a piece was finished originally and on the care (or lack of it) received by the piece since then. Pieces that originally were finished with care but not maintained well will respond to a polishing after being cleaned. Pieces that have either been restored in an insensitive manner (drenched in cheap varnish, for example) or finished poorly to begin with will probably need refinishing before they can benefit from a wax polish. I'll discuss below how I clean a piece of furniture, from the gentlest method to the most aggressive that I can recommend, and how I apply a wax polish, generally beginning with a color coat and then applying a harder clear wax over that. Properly done, a wax polish is the most beautiful surface treatment in the woodworker's repertoire (see the photo above).

Cleaning

Few pieces of old furniture are in perfect condition. If the dirt and grime obscure the grain, the piece needs a judicious cleaning before you polish with wax. I use a naphtha-soaked soft cloth to re-

move dirt, grime and built-up wax, right down to the old finish. (Naphtha is a petroleum-based solvent that's slightly more aggressive than mineral spirits; if you can't find it, mineral spirits will work fine.) I always start in an out-of-the-way place, preferring caution to speed. Finishes on old furniture are always completely cured, so there's very little chance of the naphtha dissolving them. I wipe the surface of the piece until the cloth comes off clean.

I've also removed old wax and dirt with Liberon's wood cleaner and wax remover (see the sources of supply box). As long as it's not left on too long, this solvent won't harm the finish layer either. As with the naphtha, it's best to begin in an inconspicuous area to see how the finish responds to it.

If you find that you need to get more aggressive yet, substituting 0000 steel wool for the cloth will usually do the trick. Sprinkling the surface with rottenstone will increase the cutting action even more and will leave a very fine surface. Whenever I use abrasives, I check the surface frequently (by wiping away the rottenstone and naphtha) to make sure I don't cut through the finish. I've never had a problem, though, probably because the finish layer on most antiques has had a hundred years or more to cure.

If a piece has areas of carving or intricate detail, I make a paste of rottenstone and naphtha and work it in with a soft toothbrush. Afterward, I remove all residue with pure naphtha on a soft, clean cloth. The naphtha sometimes leaves a slight film on the surface, but it will buff right off, and any traces will disappear when I apply wax.

Applying a color coat

After I have cleaned a piece and have given it at least 24 hours to dry, I apply what I call a "color coat" of wax (see the photo below). This color coat is only a preliminary step in preparation for a final coat of clear, harder wax. This first coat of tinted wax will hide minor dents and scratches, enhance the natural wood color and even out excessive differences in tone resulting from repairs or exposure to direct sunlight. A tinted wax will also fill any unfilled pores with darker particles than a clear or white wax will, resulting in a more natural-looking surface. When using a tinted wax, I select a shade darker than the wood tone I'm polishing because most of the wax is removed during the buffing.

I use two brands of colored waxes. One of them, Antiquax's Antique paste wax polish, produces a long-lasting film and doesn't fingerprint. I use the Brown wax most often because it works well over a broad range of wood tones, from light oak to dark mahogany. The other tinted wax I use is Liberon's Black Bison paste wax polish. This wax comes in ten colors (derived from natural earth pigment matter) as well as natural and clear (the natural is slightly amber while the clear is actually bleached—and quite clear). Georgian Mahogany covers quite a range of shades and is particularly useful on old English mahogany furniture, which I see a good deal of.

I apply the colored wax to one surface at a time, using an old cotton T-shirt and working in a circular motion, making sure that everything is covered. The colored waxes are relatively soft, so I apply them quite liberally, really working the wax into the surface. Antiquax recommends leaving its product on for two or three minutes only. Liberon suggests applying its product with steel wool and leaving it on for at least 20 minutes, giving the solvents time to evaporate before buffing. Optimally, leaving the wax on for four to eight hours allows thorough evaporation and will give you the highest sheen when buffed. I've left the color coat on overnight without a problem. It was considerably more difficult to rub out than if I'd followed the directions, but the resulting finish was harder.

I buff out the color coat with an old terry-cloth towel, rubbing vigorously and removing all but the finest layer of the colored wax. The harder I buff now, the deeper the luster of the finish. If a coat of wax does dry out before you get around to buffing it, no serious harm has been done. Applying a fresh coat will dissolve the hardened coat, and you can buff normally. With experience, you'll determine how long to wait before buffing.

I save all my wax-impregnated rags in old cookie tins. A well-maintained antique—or one that you've brought back to life—often will need nothing more than a good rub with one of these cloths to bring back its luster.

For the color coat on the carved areas, I apply the wax with a soft toothbrush, and then I buff it off with a pure-bristle shoe-polishing brush or with one of Liberon's wax-buffing brushes.

***Naphtha, steel wool and rottenstone** all have their place in removing dirt and old wax from antiques without harming the finish. Experiment in an inconspicuous place on the piece, and approach the cleaning with a least-invasive attitude, beginning with naphtha (or other solvent) on a cloth. Proceed to using steel wool and/or rottenstone only if the solvent isn't working by itself.*

***Tinted wax followed by a clear wax** can make a wood surface absolutely radiant. The author applies a color coat first, and then, after it's thoroughly dried, he applies a clear coat of harder wax. He buffs both the color coat and the clear coat with clean rags—preferably old linen napkins or tablecloth scraps—and buffs carvings and other relatively inaccessible areas with a shoebrush or one of Liberon's buffing brushes.*

A color coat may not be advisable on some pieces. Light woods—fruitwoods or maples, for example—look just fine as they are. On furniture made of these and other light woods, I use Antiquax Clear paste wax polish, which has a slight amber tone, but will not discolor these woods because buffing leaves such a thin layer of wax on the surface. Liberon's Neutral and Clear waxes are also good choices, as is Renaissance wax. Renaissance wax has a stiffer consistency than the other waxes I've discussed and can be difficult to apply evenly, but I circumvent this problem by applying it only to very small areas at a time and then buffing almost immediately. The polish it leaves is beautiful, although not as resistant to water or alcohol as other waxes.

Applying a clear coat

It's essential that you use a clear coat of harder wax over the color coat because even if you've buffed the color coat thoroughly, there's a possibility of color transfer from the furniture to your clothing, especially on chair, table or desk edges. Just as important, though, is the protection the harder wax provides your furniture. I like to wait several weeks after applying the color coat before I apply the clear wax. It doesn't always work out that way, but that's the ideal. For this topcoat, I've been happy with Antiquax's Clear paste wax polish, Renaissance wax and Liberon's Clear Professional wax, which is higher in carnauba content (therefore harder) than the waxes in their Black Bison line.

I apply the clear coat to small sections, using an old cotton T-shirt, working in a circular motion and then buffing a little before the wax has completely set—no more than ten minutes (see the top photo). Old linen napkins or tablecloth scraps seem to work better than anything else for buffing out the clear coat. They produce a superior shine, and the wax-impregnated rags just get better with time.

Problem cases

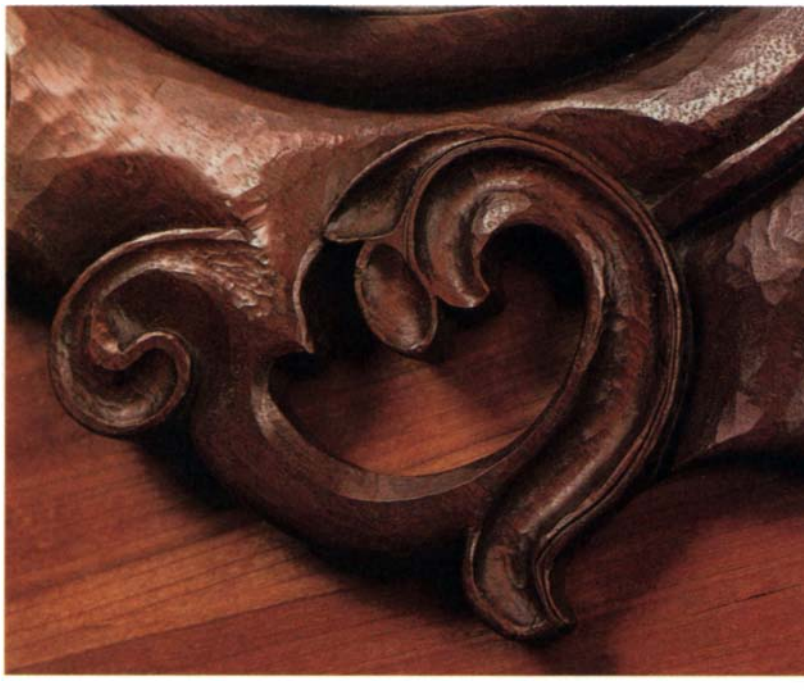
Occasionally I encounter a piece that does not respond well to a wax polishing, even after a thorough cleaning. Often such pieces will show dull or worn areas when polished with wax, or the wax may seem to sink in without effect. If the finish seems sound, I clean the piece again, removing the wax I've applied and any remaining dirt. Then I melt the wax I'm using (usually tinted) in a double boiler or glue pot, and I add about a tablespoonful of rottenstone (not pumice, which is much coarser) for each 8-oz. container of wax. *After* removing the wax from the heat source, I add about one-quarter cup of mineral spirits to thin the mixture and make it easier to work.

When the mixture has cooled, I apply a liberal amount to one surface at a time, buffing it in with a lambswool pad on an electric drill. I add more of the wax mixture whenever it starts getting thin on the surface. The rottenstone lightly abrades the wood, burnishing the surface and enhancing the effect of the wax. After applying the wax in this manner, I rub it into the surface by hand, using a clean, soft cloth and following the grain. I rub briskly and then buff the wax off when dry, again following the grain of the wood. I let the wax cure in a warm atmosphere for at least two weeks and then apply a clear coat of wax in the usual manner. The result is a surface that will remain beautiful for years. Do *not* use any spray polishes, oils or other maintenance products on the finished surface. The only care or maintenance your furniture needs at this point is a quick rub down with the rag you used for the clear wax polish, and less frequently (it will depend on wear), another coat of the clear wax. □

Tom Wisshack makes and restores fine furniture in Galesburg, Ill.

***With the harder topcoating of clear wax,** work in one small area at a time, and apply the wax polish in a tight circular motion. These polishes contain more wax and less solvent, so their drying times are considerably shorter.*

***Carved, multi-faceted surfaces** are ideal candidates for a wax polish. The character of the wax is such that it accentuates the texture of the carving rather than masks it, as is evident in the author's reproduction shown here.*



Sources of supply

Liberon
Liberon Supplies, PO Box 86, Mendocino, CA 95460; (800) 245-5611

Antiquax
Marshall Imports, PO Box 47, Crestline, OH 44827; (800) 992-1503

Renaissance
Available from Garrett Wade Co., Inc., 161 Avenue of the Americas, New York, NY 10013; (800) 221-2942

This desk for writing letters from Lilliput *was created in the late 1920s by English cabinetmaker and miniaturist Frank Early. The 8-in.-tall carcase and all its extraordinary details match the construction and joinery of a full-sized piece. The burl-walnut veneered carcase has drawers built with half-blind dovetails and working brass hardware.*

Small secrets are well-kept *in 19 hidden compartments. Depressing a latch on the base of the lower center pilaster releases it. Two levers connected to weights unlatch the rest of the lower pilasters, releasing, in turn, the three upper pilasters. The rest of the secret compartments are in the desk section: Six ivory-fronted drawers and an ivory-trimmed cabinet with a thin drawer in the back pull out to reveal thread (scaled-down rope) handles on a train of dovetailed boxes that pull out. Even the door on the pull-out cabinet involves a trick: The keystone in the top frame must first be lifted to open it.*

Miniature Masterworks

The precision of Frank Early's furniture is no small feat

by William. R. Robertson

Miniature furniture pieces have been and still are made by the thousands, and in my business, I've seen a lot of them. But last year, several pieces that really bowled me over came into my shop for cleaning and repair. The miniatures, including the secretaire shown in the photos on the facing page and the tall case clock and highboy shown below, were so incredible I immediately called some cabinetmaker friends over to gasp in amazement.

These miniatures, recently acquired by Toy and Miniature Museum of Kansas City (Mo.), are the work of Frank J. Early, a cabinetmaker from Worthing, England. Early, who specialized in full-sized Queen Anne furniture, built diminutive models as a hobby, and some of his work has made its way into Queen Mary's Dolls' House. He created the 8-in.-high secretaire desk and other 1/12th scale pieces in the Queen Anne style during the late 1920s using the same traditional techniques and workmanship that 18th-century cabinetmakers used in full-sized work. All of Early's miniatures have fully joined English brown oak carcases (veneered in burled walnut), dovetailed drawers and brass hardware. All of the tool marks in evidence are from hand tools—no tablesaws or routers were employed—and the pieces were assembled with hide glue.

Early's work is distinguished by the seemingly impossible precision of the abundant details. These details include *working* brass-and-steel locks on the secretaire's doors, fall front and drawers, half-blind dovetails joining all drawer and carcase parts (these joints are cut in oak, which is about the worst wood for work this fine) and wood inlays made with hair-thin strips bent and set into complicated patterns (see the photos above right). All of the burl-veneered panels are book-matched, and some moldings are even veneered to match. One 3/16-in.-high molding is veneered with six matching pieces glued over a part that's been steam-bent. And just when I thought I'd seen everything, I discovered that the secretaire has 19 hidden compartments, many of which operate by the same kinds of elaborate mechanisms used on full-sized secretaires of that period.

What kind of person does it take to create pieces that even the best miniature furnituremakers would look upon with awe? Early's oldest son, Anthony, remembers his father as a large man with a drooping mustache who was extremely precise in his actions. When endorsing a receipt, Frank Early would pull from his pocket a corded ink bottle, a relief pen-nib, blotting paper and a stamp, all in neat order. He was a man who preferred to keep to himself. Rather than risk an encounter on a city sidewalk, he chose to stroll down the middle of the road. Understandably, Early did not appreciate visitors to his shop. Regarding his new shop in Shoreham, Early wrote a letter to a colleague saying that it was "not at all bad, quiet and free from other workers." He was very critical of other people's work, referring to most of it as "rubbish."

How many hours it took Early to make a single miniature creation can only be guessed; maybe a thousand for the desk. I know it took me eight hours to make *one* little replacement drawer for the secretaire (the sharpness of a knife takes on a whole new meaning when you attempt to cut dovetails in a piece of oak that's about 1/64 in. thick). The next time you get frustrated working with small pieces of wood, think of Frank Early's miniature masterpieces for inspiration. □

William R. Robertson is a miniaturist in Kansas City, Mo. The pieces shown are on display at Toy and Miniature Museum, 5235 Oak St., Kansas City, Mo.; (816) 333-2055.

***A key fit for a mouse** opens the brass locks on all the secretaire's doors, fall front and drawers (top). **A curved, veneered cornice** molding (left) less than 1/4 in. wide surmounts the secretaire. The three sunbursts (the largest is 1/2 in. dia.) adorning the top of the case are made with ebony and holly pieces, many as thin as .005 in. **Half-blind dovetails** as thin as .018 in. join drawer sides to the secretaire's veneered drawer fronts (right).*

***Frank Early's burl-walnut veneered highboy and clock** incorporate the same remarkable detail as his secretaire. The tall clock (which uses a working watch movement set into an engraved brass bezel) has a Bombé base with chamfered corners covered with inlays, including a tiny scalloped holly inlay around a small mirror in the door. The 18th-century English-style highboy features magnificent book-matched burl-veneered sides and carved claw-foot cabriole legs. Pressing just below the top molding releases a secret drawer.*

Photos: courtesy of Toy and Miniature Museum

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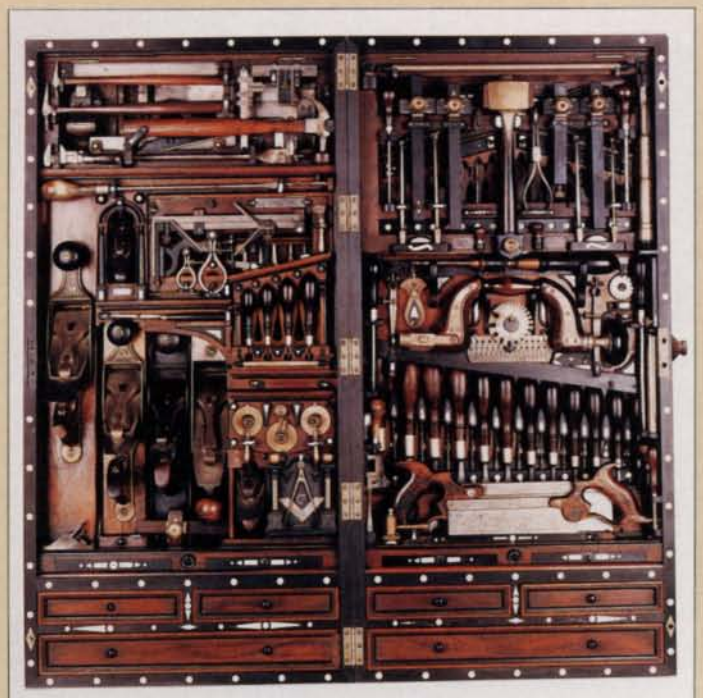

TOOL CHEST LEGACY

If the workmanship in a tool chest is any indication of the maker's talent, then the craftsmanship of master carpenter and storeowner H.O. Studley must have been awe-inspiring. In an oak clamshell box adorned with rosewood, ebony, pearl and ivory, Studley kept both tools he made and a collection of the finest hand tools made prior to 1900, including a complete set of woodworking tools as well as machinist and stonemasonry tools. To pack the 300-plus tools into a case only 19½ in. wide, 59 in. long and 9½ in. deep, Studley devised a jigsaw-puzzle arrangement of flip-up trays, fold-out layers and hidden compartments. Maine native Pete Hardwick now owns the chest, which has been in his family since it was bequeathed to his grandfather by Studley. Hardwick acquired the chest from his brother by trading a 1934 Ford sedan for it. A good trade? It would seem so. Just one tool – the Stanley #1 plane housed in the ebony archway in the upper-left part of the chest – was appraised at $700. Hardwick, a nonwoodworker, plans to sell the chest.

Now available from *Fine Woodworking* magazine

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

We rephotographed the chest and enlarged the photo to fill the 18" x 26" poster shown above. Seen at this size, Studley's ingenuity and workmanship is even more apparent.

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Red Oaks and Black Birches, by Rebecca Rupp, *Storey Communications, Inc., Pownal, Vt. 05261; 1990. $10.95, paperback; 276 pp.*

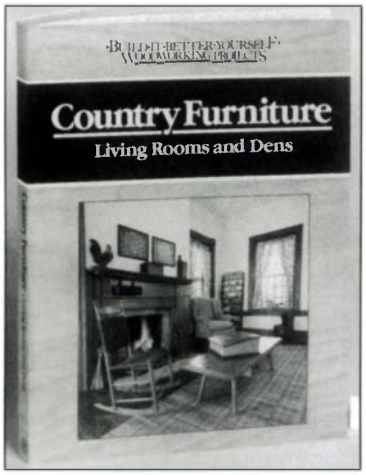
What makes Rebecca Rupp's book so good is her wonderful blend of science, folklore and technology as well as her easy style and lively sense of humor. What other book will explain the chemistry of the sugar production of acer saccharum and also remind you that it is the wood of choice for staking a vampire's heart?

Rupp can make the fungal mortality of the elm and chestnut and the prospects for their recovery a real adventure. The author's knowledge of folklore is enlightening and entertaining. She details the great fad of the cure-all sassafras, which once rivaled tobacco as an export. She also writes about the use of chestnut to repel spiders, the tale of Maria Ana "Granny" Smith and Daniel Boone's choice for his own coffin wood. And wood trivia fans, can you name Eleanor Roosevelt's favorite tree? Did Adam and Eve cover themselves with the jumbo leaves of the sycamore? Rupp tackles those questions, too.

Rupp writes extensively about food, especially nuts and cider. The reader learns to prepare acorn flour, sycamore wine, real birch beer and a bunch of ersatz coffees. *Red Oaks and Black Birches* is worth the trees cut for its publication and won't sit long on a shelf. It is a book destined to be passed among friends.

—John Sillick

Country Furniture: Living Rooms and Dens by Nick Engler. *Rodale Press, 33 E. Minor St., Emmaus, Pa. 18908; 1989. $14.95, paperback; 123 pp.*



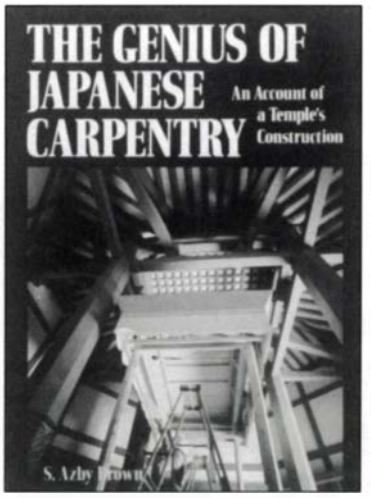
One of the most enjoyable aspects of these project books in Rodale's Build-it-Better-Yourself series is the way each project is introduced with a brief summary outlining how that specific kind of furniture was used in Colonial times and how it has evolved over the centuries to remain useful in our time.

In this particular work, Engler does his best job so far in the series to give the reader a real sense of the historical importance of each item. Also, with a few exceptions, the 16 projects offered show unmistakable signs of having been thoughtfully selected. There seems to be something for all skill levels, and even the simpler projects represent very useful pieces of furniture. Among the least complicated items are a game board, fretwork mirror and a lap desk, any of which should provide just about the right amount of challenge to make for a pleasant weekend in the shop.

Those projects that require a little more effort and perhaps a bit more skill include a small joiner's chair, an occasional table, a mantle clock and a sailmaker's bench. Some other projects, either because of their size or the complexity of the joinery, look more formidable, but they are compensatingly very nice pieces.

Like the other books in this series, Engler includes several sections under the heading "tips and techniques" that address more general woodworking topics and methods. Here he discusses the process for making lock joints, how to turn figured wood and how to deal with the thermal problems encountered when electronics are installed in wooden cabinets. *—Jon Arno*

The Genius of Japanese Carpentry: An Account of a Temple's Construction by S. Azby Brown. *Kodansha International, 114 Fifth Avenue, New York, N.Y. 10011; 1989. $24.95, hardback; 156 pp.*



The almost religious reverence for wood is among the many traditions that have apparently stood the test of time better in Japan than elsewhere. There, a tree is believed to possess a spirit, and a carpenter incurs a moral debt when he cuts down a tree. Each time he fells a tree, Nishioka, the master carpenter who is this book's "hero," prays in part, "I vow to commit no act that will extinguish the life of this tree."

This is neither a history book nor a how-to book, yet it is both of these and even more. The book's ostensible topic is Nishioka's rebuilding of a Japanese Buddhist temple. One senses a contact and continuity with the past in the temple, and even the most "modern" temple must reflect millennia of refinement and evolution.

When the author was offered an apprenticeship with the Japanese master carpenter Nishioka, he protested that he didn't have the seven-year minimum such an apprenticeship might take. But Nishioka somehow helped him get a grant from the Japanese Ministry of Education for study and research in the architecture department of the University of Tokyo. Then Nishioka permitted him to wander the workshops and construction sites, taking photos and asking questions, though questions of "why" or "how" were usually met with subtle hints that he wasn't being observant enough.

The Japanese believe observation is the whole key to learning. To know what should be built, it was first necessary to observe what already existed. Only one person has all the information about the project; others must concentrate on their jobs at hand, following instructions. Observation is vital, but constantly inquiring about "why" and "when" is considered not only bad form but a waste of time as well. Apprentice carpenters learn respect and humility from the heart outward.

For readers more interested in matters technical than attitudinal, well over half of *The Genius of Japanese Carpentry* deals with aspects of design, timber selection, and fabrication and assembly of the temple's components. Even in these discussions, questions of attitude come frequently into play: Craftsmen speak of wood as alive and breathing. Straight lines must be perfectly straight, and joints must be snug enough to last the ages. There is quite a gulf between "good" and "good enough." Even the discussion of tools is as much attitudinal as technical. After the building has been erected, the builders celebrate the sheer joy of working.

If you want technique without idea, you'll require a far more sterile book. While the 160 illustrations will give you insights into the technical aspects of building in the Japanese style, the book merits your attention far more for its beauty—both physical and intellectual. The work it will do on your attitude makes it truly a book to buy and to treasure. *—Floyd M. Dean*

John Sillick makes and repairs furniture in Lyndonville, N.Y. Jon Arno is a wood technologist and consultant in Troy, Mich. Floyd M. Dean (Hugh Foster) is a craftsman in Zephyrhills, Fla. His work brought him to Japan frequently in the 1970s.

Well-balanced, precisely machined and hand fit, Brian Boggs' concave-soled spokeshave is a fine finishing tool.

A fine shave

Anyone who loves working with hand tools is likely to idealize the process from time to time. When I began my career, I doted on fancy tool catalogs, read Krenov's rapturous odes to handplanes and conjured up visions of dances with wood that I couldn't yet do.

Years later, it's clear to me that a floor full of fine shavings is only a downy nuisance and that handplaning is more a Nordic than an Alpine sport—crisp fun, but not the big swoop I had once imagined. However, my notion of bench dancing hasn't ever fully faded, and it needn't ever—as long as there are spokeshaves.

From the start, I found using a spokeshave to be that elusive liberating experience—enough so that I filled a drawer with classic old Stanleys, which I brought back to life. I thought these old castaways were the standard until I tried a shave now being produced by Kentucky chairmaker Brian Boggs (see the photo at left).

But to compare my old Stanleys with Boggs' new spokeshave is unfair because Boggs' tool clearly went straight from a woodworker's soul to the foundry, without stopping for a corporate design meeting or for a consultation with a team of ergonomics nerds. The shave is nearly perfect in form, feel and function.

The spokeshave's cast-bronze body and cap fit perfectly. The thick iron is nicely matched to the sole arc and is honed, ready to use. The lip around the bed (which is relieved about 1/32 in.) is handfiled, so the iron seats perfectly. I could adjust the blade with a feather touch, and the blade didn't shift in the least when I tightened the cap.

Boggs, who is primarily a split-and-shave, post-and-rung chairmaker, designed this tool for his finish work, to be capable of the finest continuous, chatter-free shavings—even in wicked, figured grain. It lives up to that task. It's also very comfortable to use, with one hand or two, and with its ample mass and fine balance, it's likely to remain so for long hours at the shaving horse.

Do I have any reservations? Only three. The first is that it's not possible to take more than a delicate finishing cut with this tool unless you alter the throat. Even modest-sized shavings jam up in the narrow opening. Second, the shave looks and feels more precious than practical—to the point that I'm afraid serious hand-tool users will dismiss the tool as so much fluff, leaving collectors to hoard them for mantle-top display. That would be too bad; although it's a pricey tool ($110), for what you get, it's a bargain.

My final reservation is with the pattern. Most tool drawers aren't full of concave-soled spokeshaves. Except for spindle and rough leg work, a straight-soled shave is much more versatile.

For repeated post-and-rung or similar work, I'd definitely want this tool because the concave sole seats and tracks the tool on the workpiece. You don't get the lateral movement you do with a straight-soled model as you toboggan along the grain. And conveniently, the arc on Boggs' shave matches that of a common plumber's collet (a 2¾-in.-OD fitting), making truing the sole and blade to the same diameter a simple matter.

Boggs plans to offer a straight-soled model later this year. Based on the performance of his concave model, I'd have to say the line for the straight-soled version will form behind this thoroughly impressed reviewer. For further information or to purchase one of Boggs' spokeshaves, contact him at 114 Elm St., Berea, Ky. 40403; (606) 986-9188.

—William Tandy Young

Steel-toed work shoes

What does a one-inch butt chisel have in common with a 1975 Chevy pickup truck? Give up? They have both tried to visit great pain upon my right foot. Fortunately, in both instances, I was wearing steel-toed work boots.

Not that I wanted to. The boat shop I worked in required them, and I remember grumbling a lot with my coworkers about how heavy and hot they were. Not to mention the snickers about "clodhoppers" we got from the girls up at the cafe. As if that weren't enough, there were always those ugly rumors about how a steel-toed boot could actually do you more harm than good in certain situations, slicing off your toes like a guillotine.

Even so, to this day I wear steel-toed shoes whenever I'm working in my shop. There have been some changes in safety footwear in the past few years; these days you can protect your feet in comfort *and* style. Lightweight safety shoes in decidedly non-clodhopper styling are available today from companies such as Iron Age Corp., 2406 Woodmere Drive, Pittsburgh, Pa. 15205; (800) 223-8912 (see the photo below). Who would ever suspect that these hightops or casual shoes contain an immensely strong steel toe? Certainly not Mary Lou at the Bilgewater Cafe. And yet these shoes will deflect a 50-pound weight dropped from 18 inches harmlessly off your foot. Up to 2,500 pounds can rest on your tootsies, and you won't even know it!

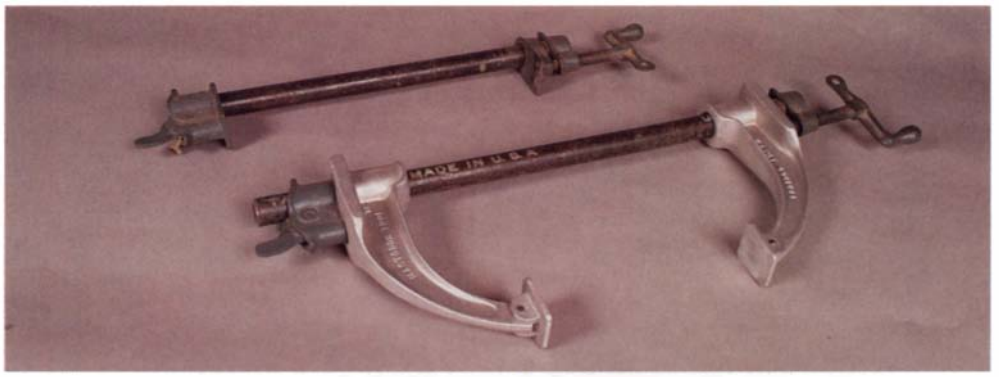
But what about that ugly guillotine rumor? Well, be assured that if something falls on your foot with enough force to crush the steel cap past the buffer zone, your toes would be far beyond reconstructive surgery anyway. In either case, you would have been better off moving your foot.

—Jim Tolpin

Photo: Jim Tolpin

***Steel-toed shoes** often look just like normal shoes these days. Here, a couple of woodworkers from Maizefield Mantels of Port Townsend, Wash., model two of Iron Age Corp.'s more than 230 styles. Dress, casual and sport shoes are all available with steel toes.*

Photos except where noted: Vincent Laurence



***Mastodon Jaw Extenders** extend the reach of a pipe clamp from about 1½ in. to 8 in.*

Jaw extenders increase pipe clamp's reach

It's always nice to find a way to increase the utility of equipment I already have in my shop. Mastodon Jaw Extenders do just that. The extenders, cast of a high-strength aluminum alloy, are easily installed on a common three-quarter-inch pipe clamp, and extend its throat depth from about one and a half inches to eight inches (see the photo above). A swivel piece at the end of the tusk-shaped jaws accepts standard protective jaw pads.

The extenders' design allows clamping of irregularly shaped pieces, reaching over other clamps and replacing two clamps with one in some instances. I've used mine as a hold-down on the drill press, as a clamp for bowl blanks and for clamping together some bookshelves.

Mastodon Jaw Extenders retail for $27.95. The company is currently working on a version to fit I-beam clamps. For the name of the tool dealer nearest you who stocks the Mastodon Jaw Extenders, contact Mastodon Tool (P.O. Box 17506, Portland, Ore. 97217; 503-283-6838).

—Jim Puterbaugh

Follow-up

Saw Trax Professional and Panel Model: In *FWW* #95 ("Cutting Sheet Goods Down to Size") we reviewed three rigs for cutting large panels. Shortly after publication, we learned of another such system called Saw Trax, manufactured by Tinkerdell Inc.

Two of the units we reviewed claim to replace the tablesaw, and the Saw Trax claims likewise: "Makes power miter saws, radial-arm saws and router tables obsolete!" The Saw Trax is designed for crosscutting (at 90° and at other angles), and it comes in four sizes with rip capacities of 21 in., 35 in., 53 in. and 65 in. There are also two carriage sizes available (depending on the size of your saw), and a rip carriage is planned. If you work with a lot of sheet goods, you should check out the literature on the Saw Trax (Tinkerdell, Inc., P.O. Box 1170, Kennesaw, Ga. 30144; 404-424-3046).

—Vincent Laurence

William Tandy Young is a professional cabinetmaker and conservator in Stow, Mass. Jim Tolpin is a furnituremaker and writer living in Port Townsend, Wash. Jim Puterbaugh is a hobbyist woodworker in Portland, Ore. Vincent Laurence is an assistant editor at Fine Woodworking.

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FEATURED IN
FINE WOODWORKING,
OCTOBER 1990, PAGE 68

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With this ONE ALL PURPOSE blade 40 teeth you can SMOOTH RIP & CROSSCUT 1" - 2" ROCKHARDS and SOFTWOODS with **smooth-as-sanded surface.** PLY-VENEERS oak/birch crosscut with NO BOTTOM SPLINTER.

- Mostly 1/8 kerf 15°, ATB and 20° face hook (easyfeed).
- DOUBLE HARDER and 40% STRONGER CARBIDE.
- Ends **blade changing** (ends rip, combo and crosscut).
- Ends **scratchy saw cuts** (for the rest of your life).
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- Ends **cutting 1/16" oversize** to allow for RESURFACE.
- Buy and **sharpen ONE** blade instead of 3, 24T rip, 50T Combination, 80T Crosscut.
- *Strongly* recommend our *.001 flat* **large stiffener-dampener** against outside of blade for smoothest, quietest cuts by this and any other blade.
- Use 30T if ripping mostly 2" - 3" hardwoods.
- Side wobble held *.001* - others .004/.010 is common! RAISE for THICK woods, LOWER for THIN woods and *perfect cut everything!* All 5/8" holes, unless otherwise noted.

	List	SALE
14" x 40T x 1"	$215	**$139**
14" x 30T x 1"	195	**129**
12" x 40T x 1"	183	**119**
12" x 30T x 1"	162	**109**
10" x 40T 1/8 & 3/32	156	**109**
30T 1/8 & 3/32	135	**89**
9" x 40T	$146	**$99**
30T	125	**89**
*8-1/4" x 40T 3/32	136	**89**
8" x 40T 3/32	136	**89**
8" x 30T 3/32	115	**79**
7-1/4" x 30T 3/32	112	**49**

5/8" holes std. Boring up to 1-1/4" $7.50 extra - Shipping $4.00

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WOODWORKER I - Best on RADIAL SAW

(tablesaw too) This ALL PURPOSE blade gives scratch free POLISHED cuts on all materials RIP or CROSSCUT up to 2".

- All 60T and 3/32" *THIN* kerf 20°-ATB and 5° face hook.
- DOUBLE HARDER and 40% STRONGER carbide.
- THIN KERF:
  Saves 1/3 wood loss on each cut, radial or table. Feeds easy when used for moderate rip and crosscut on table saw.
  Reduces "JUMP IN" greatly for better "PULL CONTROL".
  Practically **eliminates bottom splinter** on RADIAL-CROSSCUT.
- Totally stops ALL bottom and top splinter on ply veneers in push-cut mode on RADIAL.
- Our STIFFENER STRONGLY RECOMMENDED AGAINST outside of blade only for best cuts.

Made and serviced in USA for your benefit.

	List	SALE
14" x 60T x 1" 1/8"	$224	**$149**
12" x 60T x 1" or 5/8"	198	**129**
10" x 60T x 5/8"	162	**119**
9" x 60T x 5/8"	156	**109**
8" x 60T x 5/8"	150	**99**
New 8-1/4" x 40T x 5/8"	136	**89**

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OUT PERFORMS 29 OTHER DADO SETS *-Wood Magazine,* Oct. 91

"No tearout on all five woods tested." *--Fine Woodworking* July/Aug. 1991

Boring up to 1-1/4" $25 per set **SALE! 10% OFF** **$5.50 Per Set Shipping**

8" - 5/8" Bore List $299/ **SALE $269** • 10" - 5/8" & 1" Bore List $362 / **SALE $325**

For **HOLZ-HER VERTICAL PANEL SAW** 220mm x 30mm Bore
50 Teeth **CONCAVE FACE** #1 or #2 List $162 **SALE $139**
80 Teeth **FLAT FACE** #3 or #4 List $204 **SALE $159**
(for use with or without 2 knife scorer)

For **STREIBIG VERTICAL PANEL SAW** 300mm x 30mm Bore
60 Teeth **CONCAVE FACE** #1 or #2 List $238 **SALE $179**
100 Teeth **FLAT FACE** #3 or #4 List $263 **SALE $179**

DURALINE Hi-AT For TABLE & RADIAL SAW

(very good on chop saw too!) STOP SPLINTERING those SPLINTERY OAKS, HARDWOOD VENEERS and *thin* 2 SIDE LAMINATES ON PARTICLE BOARD.
FOR FASTER FEED RATES AND MORE ABSOLUTE SPLINTER CONTROL

OURALINE Hi-AT

Note: *Fine Woodworking Editorial Nov./Dec. 1988 No. 73, pg. 65, S.N. recommends high alternating top bevel (ATB) thin kerfs and large blade stiffeners for smoothest cuts on RADIAL SAW, etc.*

Jim Forrest, President and designer microscoping cutting edge.

All 5/8" holes. Boring up to 1-1/4" $7.50 extra
Larger holes - time basis. Shipping $4.00

7-1/4" x 60T 3/32	$129	12" x 80T x 1" 1/8	$212
8" x 80T 1/8 & 3/32	202	12" x 100T x 1" 1/8	253
9" x 80T 1/8 & 3/32	207	14" x 80T x 1"	232
10" x 80T 1/8 & 3/32	207	14" x 100T x 1"	266
		16" x 80T x 1"	262
		16" x 100T x 1"	294

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Ryobi-Makita	10" x 80T x 5/8"	207	**119**
Hitachi	12" x 80T x 1"	229	**129**
Ryobi-Makita	14" x 100T x 1"	266	**169**
Hitachi	15" x 100T x 1"	277	**179**

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READER SERVICE NO. 84

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.

NATIONAL & INTERNATIONAL: **Conference**-World Turning Conference, April 21-25. Wilmington, Delaware. Contact Albert LeCoff, Wood Turning Center, PO Box 25706, Philadelphia, PA 19144. (215) 844-2188.
Fair-Ligna Hannover '93 World Fair for Machinery and Equipment for the Wood and Forest Industries, May 19-25. Hannover, Germany. Contact Hannover Fairs USA, Inc., 103 Carnegie Center, Princeton, NJ 08540. (609) 987-1202.
Competition-International Lathe-Turned Objects: Challenge V. Deadline: July 10, 1993. Send a #10 SASE to Albert LeCoff, Wood Turning Center, PO Box 25706, Philadelphia, 19144. (215) 844-2188.

ALASKA: **Workshops**-Alaska Creative Woodworkers Association, thru April. For info, contact the association at PO Box 201796, Anchorage 99520-1796. (907) 345-8135.

ARIZONA: **Show**-Fourth annual Grand Canyon State Woodcarvers Desert Festival Award Show & Sale, March 12-14. Phoenix Civic Plaza, Phoenix. Contact George Hendrix, 10926 E. Regal Drive, Sun Lakes 85248. (602) 895-7036.

ARKANSAS: **Meetings**-Woodworker's Association of Arkansas meets the first Monday evening of each month at 7:00 at Woodworkers Supply Center, 6110 Carnegie, Sherwood 72117. For more information, call (501) 835-7339.

CALIFORNIA: **Workshops**-Woodworking for women. Furnituremaking with hand tools using traditional joinery, weekends. San Francisco. Call for schedule: Debey Zito, (415) 648-6861.
Workshops-Various workshops including Japanese woodworking, joinery and sharpening. For further information, contact Hida Tool Co., 1333 San Pablo, Berkeley, 94702. (415) 524-3700.
Convention-Woodwork Institute of California 42nd Annual Convention, April 18-20. Yosemite National Park. For more information call (209) 233-9035.
Show-So. California Woodworking Show, April 16-18. L.A. County Fairplex, Building 6, White & McKinley Aves., Pomona, 91768. For more info, call (800) 826-8257.
Show-No. California Woodworking Show, April 23-25. San Jose Civic Auditorium, Exhibit Halls A & B, Park Ave., * S. Market St., San Jose. (800) 826-8257.

COLORADO: **Classes**-Woodworking and related classes, year-round. Red Rocks Community College, 13300 W. 6th Ave., Lakewood, 80401. (303) 988-6160.
Seminars-Woodworking seminars, Sept. thru April. For more information, contact Schlosser Tool and Manufacturing Co., 301 Bryant St., Denver, 80219. (303) 922-8244.
Show-Scott Hausman Furniture, April 19-May 15. Anderson Ranch Arts Center, PO Box 5598, Snowmass Village, 81615. For more information call (303) 923-3181.

CONNECTICUT: **Workshops**-Making Bandsawn Boxes with Bill Gundling, March 20-21. For info, contact Brookfield Craft Center, PO Box 122, Brookfield. (203) 775-4526.
Exhibition-Guilford Handcrafts, July 15-17. Deadline: March 8. Guilford Town Green. Contact Guilford Handcrafts Expo, PO Box 589, Guilford 06437. (203) 453-5947.

DISTRICT OF COLUMBIA: **Show**-11th annual Washington Craft Show, April 15-18. Smithsonian Institution, Arts & Industries Bldg. For information, contact Hortense Green, American Craft Council, 72 Spring St., New York, NY 10012.
Show-Washington Woodworkers Guild '93, Mar. 14-Apr.10. Art Barn Gallery in Rock Creek Park, 2401 Tilden St., N.W.. For more information, contact the Art Barn (202) 244-2482.

FLORIDA: **Meetings**-Central Florida Woodworkers Guild, second Thursday of every month, Winter Park. For information, contact Ed Harte (407) 862-3338.
Meetings-Sarasota Woodworking Club. Second Thursday of every month. For info, contact Tom Clark, 3544 Oak Grove Drive, Sarasota, 34243. (813) 351-9059.
Show-Florida State Fair Fine Handcrafted Furniture show and exhibit. For info, contact Barry S. Caskey, 5637 Peach Ave., Seffner 33584. (813) 684-6564.
Show-Woodworking World Orlando Show. March 26-28. Orlando Centroplex Civic Center, Livingston St., Orlando. For more information, call (800) 521-7623.
Show-North Florida Woodworking Show, March 5-7. Civic Auditorium, Exhibition Hall, 300 W. Water St., Jacksonville. (800) 826-8257.

GEORGIA: **Courses**-Various woodworking courses, thru May. For info, contact Chris Bagby, Highland Hardware, 1045 N. Highland Ave., N.E., Atlanta, 30306. (404) 872-4466.
Workshops-Japanese woodworking by Toshihiro Sahara. One Saturday each month, year-round. For info, contact Sahara Japanese Architectural Woodworks, 1716 Defoor Place N.W., Atlanta, 30018. (404) 355-1976.
Classes-Woodworking classes, throughout the year. Woodworkers Guild of Georgia, PO Box 8006, Atlanta. For info, contact John Gorrell (404) 460-1224.
Show-Atlanta Woodworking show, March 12-14. Gwinnett Civic Center, Duluth. For more info call (800) 826-8257.

ILLINOIS: **Show**-Chicagoland Woodworking show, March 26-28. Odeum, 1033 N. Villa Ave., Villa Park, 60181.
Exhibits-Chicago Woodturners, March 13-27. Westview Hill Middle School. Contact Tom's Woodshop, (708) 920-1635.

INDIANA: **Classes**-Various woodworking classes and workshops. Woodworking Unlimited, 6038 E. 82nd St., Indianapolis, 46250. (317) 849-0193.
Show-Second annual Woodworking World, March 19-21. Allen County Memorial Colliseum, 4000 Parnell Ave., For Wayne 46805. For more information, call (800) 521-7623.

KENTUCKY: **Workshops**-Woodturning and joinery instruction. For info, contact Jim Hall, Adventure in Woods, 415 Center St., Berea, 40403. (606) 986-8083.
Meetings-Kyana Woodcrafters Inc., first Thursday of each month. Bethel United Church of Christ, 4004 Shelbyville Road, Louisville, 40207. (502) 426-2991.
Workshops-Traditional Windsor chairmaking instruction. One-week courses. Contact David Wright, 503 Prospect, Berea, 40403. (606) 986-7962.

MAINE: **Courses**-1993 season opens June 6. Write Haystack Mountain School of Crafts. PO Box 518, Deer Isle, 04627.
Show-Portland Craft Show, Nov. 19-21. Deadline: April 10. Write: Portland Craft Show, Main Crafts Association, PO Box 228, Deer Isle, 04627. (207) 348-943.

MARYLAND: **Show**-Second annual Woodworking World Baltimore show, April 2-4. Pikesville Armory, Pikesville. For more information, call (800) 521-7623.
Exhibitions-Pull Up a Chair II: Celebrating the Art of Seating, March 4-April 30. Meredith Gallery, 805 N. Charles St., Baltimore. (401) 837-3575.

MASSACHUSETTS: **Classes**-Woodworking classes, thruout most of the year. Boston Center for Adult Education, 5 Commonwealth Ave., Boston, 02116. (617) 267-4430.
Show-Northeast Wood Products Expo '93, March 11-13. Contact Pat Lee, Exposition Manager, Drysdale Lee & Associates, 6 Abbott Road, Wellesley Hills, 02181. (617) 237-0587.
Show-Danforth Museum Craft show, June 19-21. Justin McCarthy Campus Ctr., Framingham St. College. (508) 620-0050.
Shows-The Domestic Object, April 3-June 13. Berkshire Museum; July 10-Aug. 21, Worcester Center for Crafts, 25 Sagamore Road, Worcester 01605. (508) 753-8183.
Show-10th annual Woodworking World Boston show, April 16-18. Host Inn/Sheraton, Boxboro. For more info, contact: (800) 521-7623.
Instruction-Full-time program in fine furniture construction. Complete facilities. Wm. B. Sayre, Inc., One Cottage St., Easthampton, 01027. (413) 527-0202.

MICHIGAN: **Courses**-Stiles Education Center, March thru April, 3965 44th St. SE, Grand Rapids, 49512. Contact: L. Duane Griffiths (616) 698-7500.

MINNESOTA: **Classes**-Woodcarving classes year-round. For info, contact the Wood Carving School, 3056 Excelsior Blvd., Minneapolis, 55416. (612) 927-7491.

MISSISSIPPI: **Classes**-Various classes. Allison Wells School of Arts & Crafts, Inc., PO Box 950, Canton. (800) 489-2787 or (601) 859-5826.

MISSOURI: **Show**-Kansas City Woodworking Show, April 2-4. American Royal Center, Governor's Building, 1701 American Royal Ct., Kansas City. (800) 826-8257.
Exhibition-Kansas City Woodworker's Guild 8th annual exhibition, March 13-28. Crown Center Exhibition Hall, 2450 Grand Ave., Kansas City. For information, call (816) 274-8444.

NEW HAMPSHIRE: **Classes**-Fine arts and studio arts. Manchester Institute of Arts and Sciences, 114 Concord St., Manchester, 03104.
Classes-Various woodworking classes, year-round. Contact: The Hand & I, PO Box 264, Route 25, Moultonboro, 03254. (603) 476-5121.
Auctions-Antique and craftsman's tool auctions, year-round. Contact: Richard A. Crane, Your Country Auctioneer, 63 Poor Farm Road, Hillsboro, 03244. (603) 478-5723.

NEW JERSEY: **Juried festival**-Waterloo Arts & Crafts Festival, May 1-2. Waterloo Concert Field, Waterloo Road, Stanhope. For application, call (201) 384-0010.
Show-Ninth annual Woodworking World Cherry Hill show, April 23-25. National Guard Armory, Grove St. & Park Blvd., Cherry Hill. For more information, call (800) 521-7623.
Assistantships-Summer woodworking assistantships, June thru Aug. Deadline: April 1. Contact Peters Valley Craft Center, 19 Kuhn Road, Layton, 07851. (201) 948-5200.
Tool auction-Collectors of Rare and Familiar Tools annual auction April 3. Holiday Inn, Clinton. Send SASE to CRAFTS of NJ, Joe Hauck, 85 Brunswick Ave., Lebanon, 08833

NEW MEXICO: **Classes**-Woodworking classes. N. New Mexico Community College, El Rito, 87520. (505) 581-4501.
Classes-Fine woodworking classes, Santa Fe Community College, Santa Fe 87502. (505) 438-1361.
Juried festival-21st annual Southwest Arts and Crafts, Nov. 11-14. All media. Deadline: April 16. Southwest Arts and Crafts Festival, 525 San Pedro, NE, Suite 107, Albuquerque, 87108.

NEW YORK: **Classes**-Various beginning and advanced woodworking classes. Constantine's, 2050 Eastchester Road, Bronx, 10461. (718) 792-1600.
Meetings and classes-New York Woodturners Assoc., first Tuesday of each month. Craft Student League, YWCA, 610 Lexington Ave. (53rd. St.) New York City. (212) 735-9732.
Juried show-Woodstock-New Paltz Arts & Crafts Fair, May 29-31. Ulster County Fairgrounds, New Paltz. Contact Scott or Neil Rubinstein, Quail Hollow Events. (914) 679-8087.
Juried fair-13th annual Millbrook Crafts Fair, Nov. 26-27. Deadline June 1. Contact: Artisans Group (914) 985-7409.

NORTH CAROLINA: **Meetings**-North Carolina Woodturners, 2nd Saturday of each month. Contact: Eric Hughes, Route 3, PO Box 300, Conover, 28613. (704) 464-5611.
Tutorials-Windsor chairmaking, March 8-12 ; Advanced Windsor chairmaking, March 22-27; Swedish Woodenware, April 5-9. Contact Drew Langsner, 90 Mill Creek Road, Marshall 28753. (704) 656-2280.

OHIO: **Meetings**-Cincinnati Woodworking Club, second Saturday of January, March and May. Reading High School. Contact the club at PO Box 428525, Cincinnati, 45242 .

OREGON: **Meetings**-Guild of Oregon Woodworkers, third Friday of every month. Contact the guild at PO Box 1866, Portland, 97207. (503) 293-5711.
Meetings-Cascade Woodturner's Association, third Thursday of each month. For info, contact Cascade Woodturners, PO Box 91486, Portland 97291.
Show-Nehalem Woodworking show, Aug. 1-30. Deadline: June 1. Contact Artisans Gallery, PO Box 367, Nehalem, 97131.
Call for entries-Table, Lamp & Chair 1993, Aug. 5-Sept. 5.Entry deadline June 26. Send SASE to Table, Lamp & Chair, PO Box 5906, Portland, 97228-5906; or call (503) 226-3556.

PENNSYLVANIA: **Classes**-Windsor chairmaking, weekly and weekends. Contact: Jim Rendi, Philadelphia Windsor Chair Shop, PO Box 67, Earlville, 19519. (215) 689-4717.
Competition-17th annual mid-Atlantic woodcarving, April 3-4. Pennsylvania Delaware Valley Wood Carvers Assoc. Penn State Abington campus gym, Woodland Road, Abington. Contact: Al Ritter, publicity chairman, (215) 757-2152.
Classes-Woodturning with David Ellsworth, March thru May. Three-day weekend workshops in private studio. Contact: David Ellsworth, Fox Creek, 1378 Cobbler Road, Quakertown, 18951. (215) 536-5298.
Show-Harrisburg Woodworking Show, March 19-21. Farm Show Complex, Cameron & Maclay Sts., Harrisburg.
Exhibition-Penn. School of Art and Design, March 5-April 5. 204 N. Prince St., Lancaster. (717) 396-7833.
Festival-Woodcarving Show and All Wood Festival, July 10-11. Cooksburg. Contact: Cook Forest Sawmill Center for the Arts (814) 744-9670; after May (814) 927-6655.
Exhibitions-Furniture by Frank Gehry, thru March 15. One Mellon Bank Center Gallery. Furniture by Tadao Akimoto, thru April 18. The Store at 2100 Smallman St. Contact: Becky Burdick, Society for Contemporary Crafts, (412) 261-7003.
Juried exhibition-10th annual invitational of Contemporary Crafts, Sept. 24-Oct. 3. Deadline April 30. Contact: Chester Springs Studio, PO Box 329, Chester Springs, 19425.

RHODE ISLAND: **Call for entries**-Woodworking exhibition at the Museum of Art at RISD (Providence). Deadline: April 1. Send SASE to Seth Stem, Box 4-14, Rhode Island School of Design, 2 College St., Providence 02903-2784.

TENNESSEE: **Juried show**-Pattern: New Form, New Function, thru May 15. For info, contact Arrowmont School, PO Box 567, Gatlingburg, 37738. (615) 436-5860.
Workshops-Lumberyard Timberline Forest Products, March thru April. Knoxville. Contact Patricia Kirk (615) 637-3332.
Workshops-Appalachian crafts weekend. Green wood turning with John Jordan. Tenn. Tech. Univ., Appalachian Center for Crafts, Box 430, Route 3, Smithville. (615) 597-6801.
Classes-Arrowmont School of Arts and Crafts. Contact: Cynthia Huff, Communications Coordinator, (615) 436-5860.

TEXAS: **Show**-Seventh annual Woodworking World Houston show, March 12-14. Adams Mark Hotel, 2900 Briarpark at Westheimer, Houston. (800) 521-7623.
Exhibition-18th annual Texas craft exhibition, April 2-4. Contact Gloria Jaster, Univ. of Texas at Austin, PO Box 11, Round Top, 78954-0111. (409) 378-3530.

VERMONT: **Courses**-Yestermorrow Design and Building School, RR 1 Box 97-5, Warren 05674. (802) 496-5545.

VIRGINIA: **Call for proposals**-The Hand Workshop, Virginia Center for the Craft Arts. Deadline: April 15. Contact: The Hand Workshop (804) 353-0094.

CANADA: **Workshops**-On going, 5-day intensive hands-on ultra-lite sawmilling in a rainforest on a small N.W. Pacific island with Malloff. Contact The North Island College, Box 320, Sointula, B.C. V0N 3E0.
Show-Chatham International, April 23-25, Kinsmen Auditorium and Memorial Arena, Ottawa. For more information, contact Cryderman Productions Inc. (519) 351-8344.

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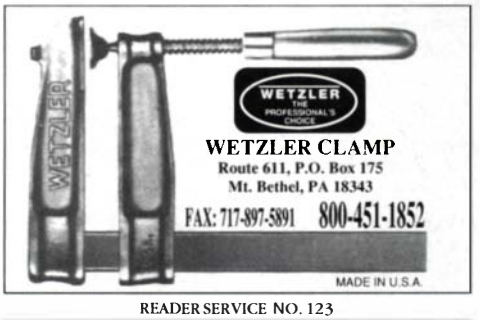

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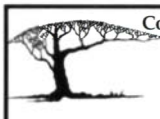

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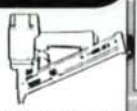

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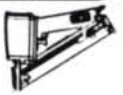

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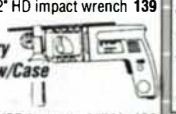

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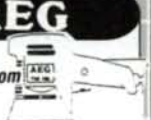

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Traveling exhibit of 18th-century furniture

Portsmouth, N.H., was America's third largest port city in the 1700s, and the mercantile wealth of its residents attracted some of the best craftsmen. The furniture they created remains among the finest examples of the Colonial and Federal eras. However, Portsmouth has been largely overlooked since the 19th-century economic decline that drove most of the skilled craftsmen to other areas.

To help revive interest in Portsmouth furniture, the Currier Gallery of Art, Manchester, N.H., in collaboration with the Society for the Preservation of New England Antiquities (SPNEA), Boston, Mass., premiered an exhibition last fall titled "Portsmouth Furniture: Masterworks from the New Hampshire Seacoast," featuring more than 100 pieces of handcrafted furniture built between 1725 and 1825. A smaller version of the exhibition is slated to appear at the Wadsworth Atheneum (Hartford, Conn.), through April 4, and at the Portland Museum of Art (Portland, Maine), May 1 through July 11.

The unique aspect of the exhibition is its presentation of the furniture. Boston's North Bennet Street School carpentry students reproduced two paneled walls of an early 18th-century parlor to show the use

Anatomy of a masterpiece: *Reproduction furnituremaker Allan Breed, of York, Maine, made four reproductions that reveal the construction processes of Early American woodworkers. The top photo shows various stages of assembly of the serpentine-front chest. This display shows the intricate joinery that has held the chest together for more than 100 years.*

Photos: Vincent Laurence

and arrangement of furniture in the Colonial home. In another section of the exhibition, partially assembled reproductions are displayed next to the original pieces to illustrate their construction techniques, as shown in the photos on p. 106. But the major theme of the exhibition is a historical study that divides the furniture into three stylistic groups (Baroque, Rococo and Neoclassical) and examines the effect of outside influences on Portsmouth craftsmen (see the photo below).

For more information on future appearances, contact the public relations department, The Currier Gallery of Art, 192 Orange St., Manchester, N.H. 03104; (603) 626-4153. *—Charley Robinson*

Photo: Vincent Laurence

Portsmouth high chest, circa 1733, is from the Baroque period (later called Queen Anne). The style featured graceful reverse curves, found most frequently in cabriole legs and scrolled pediments.

The journeyman

In the last four years, the man in the double-breasted vest and corduroy suit shown in the photo at right has framed a farm house above the Arctic Circle in Norway, constructed a staircase in Rome, fashioned a suite of furniture in Budapest and erected a timber-frame home in the Pacific Northwest. (And I haven't even mentioned the other globe-trotting woodworking adventures of his that could fill a book, which, as I discovered, they have).

Swiss citizen Hans Stutz is one of a loosely knit group of about 300 European *wandergeselle* who still adhere to the centuries-old traditions of medieval craft guilds. In those days, youths who completed their years of servitude as apprentices were expected to take their newly learned skills on the road. They were now the journeymen of their trade. For a period of three years, they would move constantly from town to town and in some cases, from country to country. They would offer their services to both masters and laypeople for room and board or for pay.

A number of rules applied to the journeymen's conduct and status during their travels, rules that Stutz and his colleagues still attempt to follow: No commitment to marriage, no outside income or debts, no self-owned or operated transportation and no more tools than one can carry (Stutz doesn't even carry a saw, only a selection of bowsaw blades for which he fashions a handle once he's on the job). In addition, these contemporary journeymen still wear the traditional garb and lovingly keep a leather-bound "wander book" in which to record their adventures.

In medieval Europe, the traveling tradesmen needed no advertising, portfolios or letters of recommendation to find work. The distinctive clothing of the *wandergeselle* announced who they were and what was to be expected of them. If work was not to be had, a meal for the road was often offered in respect to the guild. Stutz found that still is true in some measure throughout most of the Germanic and Scandinavian countries he visited.

Here in the United States, however, Stutz finds most people think he is a runaway from an ethnic wedding party. Yet, he has had little trouble finding work. One glance at this journeyman's wander book reveals why. On nearly every page, heart-felt words of appreciation and encouragement appear next to hand-drawn sketches and photographs of strikingly beautiful timber frames and furniture. Photos of Stutz surrounded by the smiling faces of employers, working buddies and adopted families are tucked carefully into the binding. Hans Stutz is on a world-class adventure, an adventure he shares with anyone who is lucky enough to join him under the spell of this ancient tradition.

—Jim Tolpin, Port Townsend, Wash.

Photo: Jim Tolpin

A journeyman, according to medieval guild traditions, had to travel for three years after completing his apprenticeship. His corduroy suit is still recognized in western Europe as a sign of his trade, and his backpacks contain his worldly possessions, including clothes and all his tools.

Announcements

Investing in yourself

A newsletter written by woodworkers and financial experts is now available to give monthly advice on various investment possibilities. *Financial Strategies and Investments: An Independent Guide for Woodworkers and Artisans* offers tips on planning for retirement, mortgages, insurance needs and college expenses. The newsletter provides an economic overview and analyzes the effects of financial trends on business. It also offers advice about specific stocks, bonds and mutual funds tailored to both high- and low-income woodworkers. Basic information, explained clearly in layman's terms, guides the novice through the complicated procedures of buying and selling investments.

A five-month trial subscription is available for $19. For more information, contact the editor, Richard Geist, Financial Strategies and Investments, 1905 Beacon Street, Waban, Mass. 02168.

Woodworkers honored for lifetime achievements

Walker Weed and husband-and-wife team, Joyce and Edgar Anderson were elected to join the prestigious American Craft Council College of Fellows last spring, at the American Craft Museum in New York City. The American Craft Council (ACC) has been recognizing outstanding

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achievements in the crafts since 1970.

Although the Andersons are the fourth married couple to be honored as fellows, Joyce is the first woman designer in wood to receive this award. The Andersons have been self-employed woodworkers since 1950, making custom furniture for homes, churches and offices and crafting sculptures in wood and metal. Their work has been exhibited in museums and galleries throughout the country. The Andersons believe their partnership, with their increased range of skills, enables them to do things that would be difficult or impossible for an individual.

Walker Weed had his own woodshop at age 12 where he produced plank-top coffee tables with turned legs that he sold to friends and relatives. While his craftsmanship has advanced considerably, his furniture remains primarily functional and conservative. Influenced by both the Shakers and the Scandinavians, Weed's work was further shaped by the year (1960-1961) he spent in Norway, Denmark and Sweden. He has supported the crafts throughout his career, including a stint as trustee for the American Craftsmen's Education Council (now the ACC). Weed's advice to today's woodworkers is to build furniture you would like to live with, and imagine how your pieces might look in 10 or 20 years.

Rules of thumb

Murphy, that eternal optimist, was perhaps the most famous maker of rules. Most of us have adopted some of our own rules as guidelines to help us cope with situations we encounter in our shops. Some of these principles are based in fact, like the axiom to allow one year for each inch of thickness when air drying lumber. Some are exaggerations with a tiny grain of truth at their core that makes them universally funny. One of my favorite examples is a rule submitted by John Wilson of Matthews, N.C., which appeared in a "Notes and Comment" piece in *Fine Woodworking* #95, pp. 104-106. Wilson's rule of time management was "Estimate the number of weeks the task will take, convert the weeks to months and multiply by three."

I'm compiling a list of reader-supplied guidelines for making life in the shop easy, productive, safe and fun. If you know a rule or two that's woodworking related, please send it to me at *Fine Woodworking*, P.O. Box 5506, Newtown, Conn. 06470-5506. Keep them short, about 25 words or so, and include your name and address. We'll publish a liberal sampling of what we get from you. —*Charley Robinson*

Photo: Charley Robinson

***Nearly a million square feet of veneer,** from every continent but Antarctica, was on sale for a song at WARP's vintage veneer sale last fall. Proceeds will go toward establishing an information phone line and a shop-testing program for lesser-known species.*

WARP vintage veneer sale

For those who made it to the Woodworker's Alliance for Rainforest Protection's (WARP) veneer sale, in Chicopee, Mass., last fall, it was like being a kid in a toy store. Nearly a million square feet of veneer—some of it up to 25 years old—was on display (see the photo above) and on sale at prices that would make any mail-order supplier of veneer blanch. The sale, organized by WARP, with the help of Andrew Poynter of A&M Wood Specialty, featured more than 50 species of veneers from afromorsia to zebrawood, including Swiss pear, French walnut, Brazilian rosewood and a bunch of obscure exotics.

Attendance, however, wasn't nearly as spectacular as the offerings. Fewer than a dozen major buyers showed up for the full-flitch sale on the first day of the event, and the overall turnout was around 60. As a result, total sales were only about one-third of what WARP had expected. By the time this goes to press, the group will have had a second sale on the same site in hopes of raising some additional revenue to cover costs and to put toward development of WARP's information phone line and shop-testing program for lesser-known species.

Veneers remaining after the second sale will continue to be available. For more information, call Andrew Poynter, A&M Wood Specialty at (519) 653-9322.

—*Vincent Laurence*

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, ***PO Box 5506, Newtown, Conn. 06470-5506.***

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Floral Visions

Turning is only the beginning for a vessel created by Tulsa, Okla., woodworker Ron Fleming. He adorns each piece with his trademark: carved leaves or petal arrangements. For a detailed description of his methods, see Bob Hawks' article on page 54.

Photo: Bob Hawks