6 FUN-TO-DO SCROLL SAW TECHNIQUES
All shop-tested

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We show you how!

SAW BLADES AND ABRASIVES
What's available, plus buymanship pointers

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Toy bulldozer
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Money clip & key ring

CRAFT THIS GREAT-LOOKING MANTEL CLOCK
Complete plans, page 54
These Delta tools will improve anyone's workshop.

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With a deal this good, it's a tough choice to make. Because from now until December 31, 1987, Delta is offering a special low price on our 14" Wood Cutting Band Saw and our Light Duty Wood Shaper. They're built to the same high quality standards that have made Delta tools favorites of woodworkers for the past 50 years. And you can use them to trim a lot more than your tree this year.

Choose our 14" Wood Cutting Band Saw, for instance. With its precision-balanced aluminum wheels, double-sealed, lubricated-for-life ball bearings, and heavy-duty construction, it's a bargain at any price. And it comes complete with a ½ HP motor, lamp attachment, and steel stand. So it's just what you need for contour cutting, straight cutting, or resawing.

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Call toll-free for the name of your Delta dealer, Delta International Machinery Corp., 800/438-2486 (in PA, 800/438-2487).

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The Leader in Carbide Blade Technology

FREUD LASER CUT BLADE BODIES

The extreme accuracy and consistency of Laser Technology makes it ideal for re-attaching the retina in your eye or producing nearly perfect blade bodies at Freud. Expansion slots are necessary in a saw blade to allow for the stretching that occurs when the blade is running. Old style saw blades have large slots cut into the blades. With these slots, a 'whistling' or ringing noise can be created when the blade is running. Some blade makers fill the holes with lead or copper. This can alter the tensioning of the blade and there is the danger that the plug will come out while the blade is running.

The laser technology used by Freud eliminates the need to fill the holes, and makes the expansion slot only .003 inch wide (about the thickness of a human hair). This assures the tensioning strength, a quieter running blade and no danger of the plugs coming out while in use.

The expansion slots are positioned in relationship to the arbor and gullets to minimize blade body distortion. The combination and location is determined by the blade size and application. Most manufacturers use the same number of old style expansion slots for all blade sizes and uses.

With Freud's laser technology, all shoulders and gullets are identical in strength and shape. Arbor holes are perfectly rounded, centered, and ground.

FREUD'S SPECIAL CARBIDE MIX

Freud produces carbide in their own factory. This assures the high quality level that cannot be obtained by saw blade manufacturers who buy carbide from outside sources.

All of Freud carbide is made from titanium, and carbon using cobalt as a binder. This special mixture creates a chemical matrix that is exceptionally resistant to the chemical attack of the glues and resins found in man-made wood building materials. Specific grades of carbide are produced to fit the cutting function of each blade. This means a sharper, longer lasting blade for you. Many other manufacturers use the same purchased carbide on all blades.

The carbide is induction brazed onto Freud's laser cut blade shoulders. This process is controlled by a computer system that assures uniformity of brazing. The hand brazing used by other manufacturers can result in weakened shoulders (due to over heating) and inconsistent bonding.

The blade is finally sharpened with a 400 grit diamond wheel for a razor edge and a mirror finish. Because of the cost of such a fine grinding wheel, many other blade producers use a coarser grade of diamond wheel. This can result in shorter blade life for you.

By comparing the Freud advantages, you will find the value and quality you want in your tools.
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Hand rubbed beauty.

Formby’s Poly Finish penetrates deep into the wood to reveal the beauty of the grain. This unique formula gives maximum protection without making your wood look plastic coated.

Try new Formby’s hand rubbed polyurethane. Homer Formby won’t let anything come between you and your furniture.

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WOOD MAGAZINE DECEMBER 1987 5
DECEMBER 1987

WOOD PROFILE
BALD CYPRESS — THE ENDURING BEAUTY OF THE BAYOU
This resident of the swamp resists decay, acts like hardwood, and works well for both indoor and outdoor projects.

SHOP-TESTED TECHNIQUES
6 FUN-TO-DO SCROLL SAW TECHNIQUES
The scroll-sawn gifts you’ll turn out with these techniques will have your friends and relatives saying “HO HO”, not “ho hum.”

CRAFTSMAN CLOSE-UP
TEENSY-WEENSY FURNITURE:
A WOODWORKER’S ADVENTURE IN LILLIPUT
You’ll be amazed at the detail Seattle craftsman Noral Olson builds into miniature furniture.

HARVESTING YOUR OWN BOWL BLANKS
Invest a few hours searching fields or forests, and come home with enough turning blanks to feed your lathe all winter.

TOOL BUYMANSHP
KNOW YOUR WOODWORKING ABRASIVES
What’s the difference between flint, garnet, and aluminum oxide? Our guide will steer you to the best abrasives for all of your sanding jobs.

ONE GREAT-LOOKING MANTEL CLOCK
Whether you hang it on the wall or display it on a shelf, this two-way cherry timepiece fits right in.

WOODWORKING BOOKS YOU’LL WANT TO GIVE
Make points by giving your woodworking friends a book selected from our list of special favorites.
CARBIDE-TIPPED CIRCULAR SAW BLADES  60
Our tool experts discuss the fine points of buying these increasingly popular circular saw blades.

SANTA'S GALLERY OF GIFTS

SHOWCASE WINE RACK  64
Display your favorite vintages on this compact walnut rack.

CHIMNEY-TOPPED CANDLE HOLDER  67
A perfect mood-setter for winter evenings.

WALNUT MONEY CLIP & KEY CHAIN  68
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DOLL STROLLER  71
Give this stroller to that "special" little one and watch her eyes light up.

FLORAL WALL PLAQUES  74
You can make one set or a dozen of these unique plaques with a simple scroll saw technique.

QUILT-LOOK HAND MIRROR  76
We show you an easy way to make the quilt pattern inlay of cherry and padauk.

FAT CAT BULLDOZER  78
Every little sandbox construction foreman needs a dozer that can build roads, dig lakes, or move mountains.

BUCKLE 'EM UP  80
Materials for these beauties are as near as your scrap wood bin.

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CARBIDE TIPPED ROUTER BITS
PROFESSIONAL PRODUCTION QUALITY

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<td>#14 3/8&quot; KEY HOLE CUTS 3/8&quot; KEY HOLE FOR (This bit only) FLUSH MOUNTING FRAME, ЕТС.</td>
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THE EDITOR'S ANGLE

SOME FOLKS NEVER OUTGROW THEIR NEED FOR WOODWORKING

When a friend told me about WOOD subscriber Bill Boian, I knew I had to meet him. After all, it's not every day that I get to talk to a 95-year-old woodworker with over 80 years of shop experience under his belt. What an encounter it was! Though our visit was brief, I found out some very interesting things about the person who could very well be WOOD's oldest subscriber.

In case you're wondering whether Bill still generates much sawdust, you'd better believe it. When he retired from a local metal fabricating company in 1957, Bill decided to "get serious" about his favorite hobby. The result: a houseful of beautiful wooden items, from dining tables to turned bowls and vases to reproductions of classic furniture pieces. "I do mostly small projects now because I'm almost out of space," Bill said.

What keeps Bill working away in his workshop after all these years? "I just love wood, I guess. I've got so much wood around this place, I'm not sure if I'll ever get it used up," Bill commented, as he pointed out a 46-year-old piece of 2" thick x 20"-wide walnut.

As he walked down the steps to his basement workshop, I heard him comment, "I should get this place cleaned up if I could just find the time. We moved here in '41, and I just keep accumulating tools."

What's Bill's secret to staying healthy and active well into his 9th decade? "I think walking as much as I did during my earlier years helped a lot. I always walked to and from work, no matter how bad the weather. I figured it up one time, and I've walked over 40,000 miles."

I also suspect that Bill's quest for knowledge has something to do with his sprightly manner. He told me he likes to learn something new every day — "not necessarily about woodworking, just anything."

Thanks for taking time out to chat, Bill. I enjoyed every minute of it.Larry Clayton

Bill Boian and his favorite 3-legged walnut chair.

WOOD MAGAZINE DECEMBER 1987
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768
The Delta Unisaw® has been the woodworkers' favorite for half a century.

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Just go on down to your Delta distributor and buy a 50th Anniversary Edition Unisaw* for the special price of only $1399. You'll get a great deal on a great saw. With a 1½ HP motor and triple V-belt drive for dependability. Rugged sealed-for-life bearings and a massive cast-iron table for rock-solid cutting stability. Plus our Jet-Lock Micro-Set® rip fence and Auto-Set® miter gage for the accuracy you demand. And you'll see why the Delta Unisaw has been the woodworkers' favorite for the last 50 years.

It's our anniversary. And we want to give you a present.

What we've already told you makes a good case for buying a Delta Unisaw. But here's another. In honor of the Unisaw's 50th Anniversary, Delta will send you a free gift—a special, personalized wooden Commemorative Case containing two 10" carbide-tipped saw blades, a 6" carbide-tipped dado set, and a table insert. It's a $350 value. So you'll get $1982 worth of precision Delta equipment for only $1399 when you buy a Unisaw from now until December 31, 1987.

So don't miss out on the chance to add a Delta Unisaw—and our free Anniversary Gift—to your home shop. And if this one's not exactly what you're looking for, ask about the great values on the seven other models in the Unisaw line. Because no matter what the case, a deal this good only comes along every 50 years or so. Call toll-free for the name of your Delta distributor. Delta International Machinery Corp., 800/438-2486 (in PA, 800/438-2487).

*Model 34-761F

Offer good only on purchases from participating dealers in the continental U.S., Alaska, and Hawaii, from July 1 to December 31, 1987.

DELTA
Building On Tradition
We welcome comments, criticisms, suggestions...even an occasional compliment. The volume of mail we receive makes it impossible to answer every letter, but we promise to do our level best. Send your correspondence to: Letters Editor, Better Homes and Gardens® WOOD® Magazine, Locust at 17th, Des Moines, IA 50335.

WANTED: CARMEN SCHIFANO CLONES

I have just received the August issue and want to express my thanks for the fascinating article on Carmen Schifano. The young adults being taught by such a man are lucky indeed, whatever their economic backgrounds. Oh, how I wish I would have had an instructor like him to impart to me the satisfaction, the happiness, and the justifiable pride that comes from doing a thing well, and doing a thing right.

More power to the Carmen Schifanos of the world. May their teachings be an inspiration to all. I only wish we could clone him and send one to every woodworking class in America.

—Steven V. Smith, Fairhaven, Mass.

Carmen Schifano

Steve, we couldn't agree with you more. Effective, dedicated teachers like Carmen, are invaluable in so many ways. Our thanks, too, to the students who originally invited us to share their story with you.

CRADLE SUPPLIES CORRECTIONS

The Buying Guide for the pendulum cradle featured in the October 1987 issue (page 62) lists Sears as the source for the 17" x 31" cradle pad. We've just learned that Sears no longer stocks a pad this size and offers a larger cradle pad using the same catalog number (29113041) that we listed in the Buying Guide. Unfortunately, this pad will not fit properly in the cradle basket. Sears told us they will issue refunds to any customers who ordered and received the wrong size pad.

We now have a new supplier for the 17" x 31" vinyl-covered foam pad. It sells for $16.95 ppd., and can be ordered direct from Sleepland, 4412 N.E. 14th, Des Moines, IA 50313.

Also, if you received 3½" outside diameter ball bearings instead of the ¾" we listed in the same Buying Guide, return them to Standard Bearings, P.O. Box 823, Des Moines, IA 50304. They will send you the ¾" bearings instead of the ¾" we listed in the same Buying Guide. Or, if you've received the 3½" bearings but haven't drilled the holes for the bearings, just drill ½" holes ¼" deep.

We apologize for any inconvenience these changes may have caused you.

continued on page 12
A DUST COLLECTOR SUCCESS STORY
I read your recent articles on dust collectors with great interest. I've purchased a new Total Shop #TS-110 and would like to tell you about my success in installing it in my shop.

Actually, I installed the collector just outside the shop and ran a 4" thin-wall PVC feed pipe through the wall, then connected it to the vacuum with a short length of flexible hose. Inside the shop I used T-fittings for runs to the saw, Shopsmith, drill press, and the floor. By boring a hole in the center of a PVC cap, I was able to adapt my regular shop vacuum hose to the end of the PVC pipe.

When using a tool, the collecting lines to the other tools need to be shut off. At first I just put a piece of Masonite over the unused ends. This worked, but I've purchased some PVC end caps for most of the tools. My total cost for pipe, fittings, and flexible hose was less than $47. And, I'm happy to say, my setup does an excellent job of keeping the dust controlled.


LOOKING FOR BACK ISSUES OF WOOD
I need your help in finding issues 1, 2, 3, and 5 of WOOD magazine. I have all the others and would like to have these too. I contacted your Shopping Service but with no luck. Ever think about a second printing?

— Joseph Weckermeyer, Imperial, Mo.

We're sorry Joe, but the recent back-issue sale completely cleaned out our limited inventory of early issues. We wish we could help you, but unfortunately there are no more copies of issues 1, 2, 3, 4, 5, 6, 7, 8, and 9 available. Maybe you can find a reader willing to part with the issues you lack. Check with local libraries, too. They'll sometimes sell duplicate copies.

SHAME ON YOU LEFTIES
I am a 54 year-old left-hander who seldom thinks about it until I hear another one complaining (Talking Back, August 1987). Thanks to the right-handed world, I have been trained all my life to be almost ambidextrous. I consider any circular saw with the blade on the right side as being built for a left-handed person because I can see the blade and pencil line clearly and actually split the mark easier than a right-handed person.

When a right-handed person injures his right hand he is usually out of commission. But when a lefty hurts his left hand, he can usually keep on working with his right hand because he's been trained to use it throughout his life.

I'm a "lefty" and would not change, even if I could.

— Richard L. Stanley, Los Lunas, New Mexico
MACHINERY - POWER TOOLS - ACCESSORIES

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SB-15—15” SCROLL SAW w/motor a very popular item complete with blade $1299.
SF-015, 1HP, BAG DUST COLLECTOR, 2 bags, portable w/motor $255.
MEAT CUTTING SAW—For all hunters, SB table, floor model with 11” motor $250.

CABINET SHOP MACHINES
SHG 1300, 13” x 8” PLANER, segmented feed roll & chippers, w/3HP motor $1695.
BW16PV, 16” x 7” PLANER, segmented feed roll & chippers, variable speed feed, belt height adjust—w/3HP American motor $1995.
BW20SPV, 20” x 8” PLANER W/4HP American Motor, 220V, Single phase $2995.
BW550PV, 20” x 8” PLANER w/2 HP motor 3 phase, All American motors, 1PH $1495.
BW16PV, 16” x 8” PLANER w/2 HP motor 3 phase, All American motors, 1PH $2595.

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D1400 TA Trim $51.95
D1400 TD Trim $51.95
D1400 PL Planer $36.95

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HEAVY DUTY REINFORCED PVC TUBE NOSE

BLUE D4 3-4” 3” 5/8” DIA.

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FS-35 PLANER/JOINTER $2189.
MORTISER FOR FS-35 $109.
T3 SHAPER $1510.
T5 SHAPER $1510.
SLIDING TABLE $545.
3” MIST COOLER $552.
L5S STROKE SANDER $2987.
T100 LATHE $874.
CT100 COUPLER $874.
L100 COUPLER $874.
SCMI/MMI UNO 37” WIDE BELT SANDER 18HP 2-speed, 3 phase 220V $8995.

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CREATE THE SYSTEM TO MEET YOUR NEEDS!!

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R-5 9.50
R-6 19.50
R-7 24.00
R-8 34.00
R-9 57.00
R-10 74.00

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D1400 CT Cut Off $42.95
D1400 TA Trim $51.95
D1400 TD Trim $51.95
D1400 PL Planer $36.95

VISE CLAMPS Here's a great idea ... vise clamps for your drill press! Now you can clamp the work down to the table and freely drill thru with no fear of shifting or throwing the work. Every drill press needs one!

6” VISE CLAMP $9.95
9” VISE CLAMP $15.95
11” VISE CLAMP $19.95

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MADE IN U.S.A. Illustrations show 1” Adapter mounted never buy sleeves again! These drums are designed to use sandpaper cut from standard size sheets. Stocked in the following sizes: (less adapter):

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MALABAR® MOTOR SALE

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D1400 CT Cut Off $42.95
D1400 TA Trim $51.95
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FITTING DOWEL CENTERS TO THOSE “ODD” REPAIRS
When repairing old furniture, you often run across odd-size dowels and dowel holes, such as 7/16", for example. What do you do if your dowel center set has none for that size?
TIP: Using the next smaller size dowel center, wrap electrical tape around it until it fits snugly in the hole, as shown in the drawing below. Wrap the tape carefully and evenly, so the point remains centered.
— Dan Miller, Elgin, Ill.

DEBUGGING YOUR CABINETS
The space beneath baseboard-type cabinets becomes a popular hiding place for all kinds of household bugs. How can you get the little critters?
TIP: You have two choices.
1 Drill a 3/4" hole in the baseboard of each cabinet to allow application of your favorite bug killer. Then plug the holes with furniture dowel buttons. Don't glue them in place, so you can pop them out for future raids on the hideouts. Stain the plugs to match the cabinet.
2 Drill a 3/4" hole through the floor of each cabinet, apply the pesticide, then insert a dowel plug flush with the cabinet floor (dowel must fit snug in hole).
— James D. Craig, Birmingham, Ala.

AEROSOL TOUCH-UP TRICK
Touching up small areas with aerosol paints can be touchy. If you aim the spray at one spot, the paint globs on the surface.
TIP: Through the center of a folded newspaper, cut a hole the size of the spot to be sprayed, then center the hole over the spot. Peak the fold slightly above the surface, and make several quick spraying passes across the hole. The moving spray will prevent paint from globbing in one spot, and the raised paper allows some of the residual spray to creep beneath and feather the edges.
— From the WOOD shop.

Do you have any good tips you'd like to share with our readers? We'll pay you $25 for each submission we publish. No shop tips can be returned. Mail your tips to:
Shop Tips
Better Homes and Gardens®
WOOD Magazine
Locust at 17th
Des Moines, IA 50336

ALIGNING A ROUGH BREAK
When gluing split or broken pieces back together, how do you keep the break perfectly aligned during the clamping process?
TIP: First remove any loose splinters that will interfere with the fit. With a flat stick, spatula, or feeler-gauge blade, work the glue into the break. Then use a hand screw, or a combination of blocks and clamps, to align the adjacent faces, as shown in the drawing below. Finally, position another clamp at right angles to the break to pull it together.
— Don Butler, Waterford, Pa.

Continued on page 16
**Savings in Sets**

**3 SAWBLADE SET**
With the purchase of these 3 blades, you will not need to buy any other blades! You have a blade that gives you a glue line rip finish in the LM72M010. Another blade, the LU85M011, cuts with a "glass like" finish when cross-cutting or mitering. The third blade, LU65M011, is your combination blade that is used when an extreme cross cut finish or production rate ripping is not needed.

<table>
<thead>
<tr>
<th>Set of 3 Blades</th>
<th>List</th>
<th>Sale</th>
</tr>
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<tbody>
<tr>
<td>LM72M010 10 x 24 Flat</td>
<td>$116.40</td>
<td>$72.77</td>
</tr>
<tr>
<td>LU85M011 10 x 53 Comb</td>
<td>$49.75</td>
<td>$81.22</td>
</tr>
<tr>
<td>LU65M011 10 x 18 ATB</td>
<td>$120.80</td>
<td>$81.50</td>
</tr>
</tbody>
</table>

**DADO**
Fored Carbide Tipped Dado Heads produce a smooth and accurate groove when used running with the grain or across the grain. The standard dado cuts a maximum width of 3/8" inch. All blades and chippers are carbide tipped and sharpened to give you a long cutting life. The set contains 2 outside blades of 3/8" kerf, one 3/4" chiper, two 3/4" chippers and one 3/4" chiper.

<table>
<thead>
<tr>
<th>DS306 8 x 10 Dado Set</th>
<th>List</th>
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<tr>
<td></td>
<td>$125.00</td>
<td>$100.12</td>
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<tr>
<td>DS308 8 x 10 Dado Set</td>
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</tr>
<tr>
<td></td>
<td>$125.00</td>
<td>$125.00</td>
</tr>
</tbody>
</table>

**94-100**
Produce your own cabinet doors with this 5-piece router bit set at a fraction of the cost of shaper heads! These bits are individually balanced and designed to be used with a table mounted router. The bit profiles are: rail and stile, raised panel, door top, and glue joint. All bits are precision sharpened for a long cutting life.

<table>
<thead>
<tr>
<th>94-100 5 Piece Router Door System</th>
<th>List</th>
<th>Sale</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$199.00</td>
<td>$59.00</td>
</tr>
</tbody>
</table>

**90-100**
This 15 piece router bit set offers you a great variety of useful bits from "V" grooving and flush trimming to chamfering and dovetailing. All bits are solid carbide or carbide tipped and are ground to a razor sharp edge. Profile bits have a sharp face for an extremely smooth finish. All bits have a 1/4" shank.

<table>
<thead>
<tr>
<th>90-100 15 pc Router Bit Set</th>
<th>List</th>
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<tbody>
<tr>
<td></td>
<td>$199.00</td>
<td>$100.00</td>
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</tbody>
</table>

**EC-900**
Produce professional quality cabinet doors with this set of 5 piece cutter heads designed for your 1/2" spindle shaper. These heads are sharpened with a 600 grit diamond wheel for an extremely sharp edge. One half inch bushings standard. The shaper head profiles are: Rail & Stile raised panel, door lip, and glue joint.

<table>
<thead>
<tr>
<th>EC-900 5 piece Shaper Set</th>
<th>List</th>
<th>Sale</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$380.00</td>
<td>$199.40</td>
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</tbody>
</table>

**FB-100**
These Forstner bits will produce a flat bottom hole and bore any arc of a circle at any angle thus allowing you to make pocket holes. A special heat treated steel is used in their production to assure long lasting edges. The 16 piece set includes bits from 9/16" to 2-1/2" inclusive in 1/4" increments.

<table>
<thead>
<tr>
<th>FB-100 16 pc. Forstner Bit Set</th>
<th>List</th>
<th>Sale</th>
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<tbody>
<tr>
<td></td>
<td>$199.00</td>
<td>$90.00</td>
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</tbody>
</table>

**DB-050**
This 50 piece set consists of: A) 25 high speed steel bits (1/16" - 1/2" in 1/32" increments) B) 4 high speed steel bits for sheet metal (1/16" - 1/2", 1/32") C) 6 chrome vanadium steel bored pilot bits for use in wood (1/16", 1/32", 1/16", 1/16", 1/16", 1/16") D) 6 carbide tipped masonry bits with hex shanks (3/8", 1/4", 1/4", 1/4", 1/4") E) 1 center punch, 1 Allen key and 6 depth stops. These bits fit any stationary or portable drill using 3/8" or larger chuck.

<table>
<thead>
<tr>
<th>DB-050 50 Piece Drill Bit Set</th>
<th>List</th>
<th>Sale</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>$99.00</td>
<td>$99.00</td>
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</table>

**HAND SAWS**
These hand saws are made in Sheffield, England out of the finest steel to give you high performance and durability. These high quality blades are flexible but will always return to true. The collection of 5 saws (rip, panel, tenon, dovetail, gent's) will meet almost all of your hand saw needs. They are precision balanced, thus letting the saw work with you. The lacquered English red beech handles are designed to make your precision sawing comfortable.

<table>
<thead>
<tr>
<th>Set of 5 Hand Saws</th>
<th>List</th>
<th>Sale</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS324 24&quot; x 7 points</td>
<td>$75.00</td>
<td>$32.51</td>
</tr>
<tr>
<td>NS322 22&quot; x 10 points</td>
<td>$16.50</td>
<td>$16.50</td>
</tr>
<tr>
<td>TS912 12&quot; x 15 points</td>
<td>$12.25</td>
<td>$12.25</td>
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<tr>
<td>TS908 8&quot; x 20 points</td>
<td>$19.25</td>
<td>$19.25</td>
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<tr>
<td>TS906 6&quot; x 15 points</td>
<td>$8.25</td>
<td>$8.25</td>
</tr>
</tbody>
</table>

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TIPS FROM YOUR SHOP (AND OURS)

Continued from page 14

TWO GOOD USES FOR HOBBY MAGNETS

Many new stationary power tools have removable locking switches or keys. Unfortunately, most of them won't attach to your key ring. So, where to put them?

TIP: Epoxy a round hobby magnet to the switch or key and attach it to an inconspicuous metal part of the tool, such as under the table or metal stand. Now, you're less likely to lose the key.

When using clamps, it's a good idea to sandwich wood spacers between the jaws and project to keep from marring it. But how do you keep the spars in position while tightening the clamp?

TIP: Recess small, round hobby magnets into 2" squares of 3/8" plywood. Drill the recess holes just deep enough so that the magnet projects slightly above the face of the block, then epoxy the magnet in place. The magnets hold the blocks on the clamp jaws while you're clamping.


Continued on page 18

16 WOOD MAGAZINE DECEMBER 1987
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**TIPS FROM YOUR SHOP (AND OURS)**

**KEEPING RUST AT BAY**
Rust can take its toll on tools, especially if you store them in an unheated shop or garage where humidity varies widely.

**TIP:** Place small packets of desiccant (silica gel) in toolboxes and carving cases to absorb rust-causing moisture as it forms. Collect these packets from cans of coffee, packaged camera equipment, and other store-bought items sensitive to moisture damage. You can give the desiccant packets new life by drying them in your oven.

—John C. Monagban, Goleta, Calif.

**STICK-FREE TAPING**
When you’re using tape for securing various items, the adhesive backing often sticks to the items being taped.

**TIP:** Fold back a section of tape, with the adhesive sides facing each other. Make this section slightly longer than needed to loop around the items you’re securing. Leave several inches of the adhesive exposed to secure the loop.

—Chester Beintema, W. Covina, Calif.

**PUTTING A TIGHT LID ON FINISHES**
When you apply paint or varnish directly from the can, the material often collects in the channel of the can rim, preventing a tight seal or spattering the finish when you replace the lid.

**TIP:** Use a nail to punch small holes in the channel. This allows the finish to drip back into the can while you’re using it, so you get a tight seal with no spatter.

From the WOOD shop.

---

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#159

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**KwiKut Equipment Inc.**

**CABINET DOOR SETS**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>70290A</td>
<td>Corner Lock, Lock Mitre Bit</td>
<td>$51.60</td>
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</table>

**STILE RAIL CUTTER SETS**

<table>
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<th>Model</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>70284A</td>
<td>Classic, Also Available: Round Over Convex Roman Ogee</td>
<td>$119.95</td>
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</table>

**CABINET SETS**

<table>
<thead>
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<th>Price</th>
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<td>3 1/2&quot; O.D., Panel Raiser</td>
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<tr>
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Here at WOOD, we're always looking for products that make life in the woodshop a bit easier, or make a project a bit nicer. When you find a product that really works for you, you tell your friends, right? That's the purpose of this column. We don't always feature the newest products on the market, but ones we think you, as a woodworker, will be interested in. And we test all of them to make sure they meet our standards of performance: we hope they'll meet your requirements, too.

NEW USE FOR A FAMILIAR PRODUCT
If you're tired of cleaning gummed-up circular saw blades by the traditional method—soaking them overnight in kerosene or a similar noxious solvent—there's a quicker, easier way. Give the blade a few squirts of Formula 409 All Purpose Cleaner, brush lightly with a bristle brush, and wipe clean with a soft cloth. You'll be surprised how quickly the pitch and gum dissolves off the blade. Really gummy blades may require a second application. If you already have a spray bottle of Formula 409 in with the household cleaning supplies, preserve family harmony—buy another bottle for the shop!

Formula 409 All Purpose Cleaner, distributed by The Clorox Company. We paid about $2.50 for the 22-ounce size spray bottle at a local supermarket.

TWO KNIVES YOU CAN PASS DOWN TO YOUR GRANDKIDS
These classic three-blade whittler pattern knives refute the old expression, "They don't make 'em like they used to." You'll find that the Camillus (top) and the Boker Tree Brand Classic (bottom) are two knives with an heirloom quality you can see and feel.

The German-made Boker has a 2½" sabre clip master blade, 1½" pen blade, and 1¼" coping blade, solidly constructed from chrome-molybdenum alloy steel. It also features a comfortable 3½" wood-inlaid serpentine handle with nickel-silver pins and bolsters, and machined-brass linings.

The American-made Camillus has high carbon steel blades—a ¾" sabre clip master blade, 1½" pen blade, and 1¼" coping blade. The 3¾" swelled-center handle fits comfortably in the hand. It also features nickel-silver bolsters and pins, and brass linings.

After trying these knives, our woodcarving consultant Harley Refsal commented, "Both knives are entirely usable for general carving or whittling. The blades take and maintain a keen edge, and contain plenty of steel in case you want to grind one or two of the blades into specialty shapes for a specific type of carving."

But you don't have to be a carver or whittler to appreciate these fine pocket knives.

Boker Tree Brand Classic knife (cat. no. 17C51) $29.95 ppd; Camillus knife (cat. no. 17C41) $14.95 ppd from Woodcraft Supply Corp., 41 Atlantic Ave., Box 4000, Woburn, MA 01888.

Continued on page 25
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A / Woodworking Machine Special Wax
Ideal for tables and fences of woodworking machines. Quickly cleans wood residue off the metal surface, leaving a thin coat of non-silicone wax.

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<thead>
<tr>
<th>Code</th>
<th>Size</th>
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<td>4510.2</td>
<td>24 oz.</td>
<td>Waxlit</td>
<td>$28.00</td>
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B / Our 202GF Gap Filling Glue Has Remarkable Properties
It has a high solids content so that small gaps on your joinery are actually filled - with strength. And the "squeeze-out," where it is not pressed into the wood, is right up and chips off when dry. No soaking in to ruin finishes. Dries to a light tan. Water clean-up.

<table>
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<tr>
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<td>62J01.03</td>
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<td>$10.95</td>
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C / Turn Your Router Into A Small Scale Shaper
A robust, well designed system that fits any Router, with the size, flexibility and control features found on full-sized Shapers. Tough laminated top is 1½" x 24" x 32". The Standard Set comes with Top, a clear, removable Inset; solid Hardwood Legs; and a fused Switch. Deluxe Set adds a 3" x 3" x 33" Aluminum/Hardwood Fence and Starting Block (both with Bir Guards). For function and quality, a system that is in a class by itself.

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<tr>
<td>8210</td>
<td>Deluxe Set</td>
<td>$325.80</td>
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D / Handy Glue Syringes
Set of three, with most glue syringes.

E / Special Cabinetmaker's Skew Ground Chisels Provide A Slicing Finishing Cut Available in Right and Left Hand pairs. Nothing surpasses these when cleaning up the corners of difficult joints or trimming next to adjacent surfaces.

<table>
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<tr>
<td>37501.03</td>
<td>1&quot; Skew</td>
<td>$19.95</td>
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F / Folding Dozuki Protects The Saw Blade Ideal for any toolbox. The deep blade is flexible for flush cuts and the 18 tpi pattern fine enough for trimming out. 9" Blade folds nearly to fully protect the blade.

G / Special Bandsaw "Cool Blocks" Prolong Blade Life And Increase Accuracy
Made of special, composite phenolic resin impregnated with graphite. Set closer to your blades than with conventional soft steel guides. They run much cooler and are more "slippery." Set of 4 Blocks: (A) fits the Delta 14" and Taiwanese copies; (B) Sears 12"; (C) Inca 101/2; and (D) Shopsmith.

H / Combination Pocket Knife And Precision Rule
Very slim Knife with 2 Stainless Steel Blades, plus a folding 6" Precision Rule graduated in 64ths. Together in a polished Stainless Steel Case. Overall size 5" x ¾" closed.

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<td>1988 Catalog (free with order)</td>
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STAYING IN THE SLOT
It's frustrating when a screwdriver keeps jumping out of the screw slot when you're trying to drive flathead wood screws. At worst, the screwdriver chews up the slot, or slips, marring the wood. If you're using the correct-size screwdriver with a good, square tip, and you're still having problems, try this trick:
TIP: Before installing, place the screws in a vise, being careful not to damage the threads. Then use a hacksaw to increase the depth of the screw slot. This will give the screwdriver more bite. Note: The width of the hacksaw blade and the existing screw slot should match closely. This trick won't work well with all screws, especially some larger ones.

SCRATCH-FREE GLASS CUTTING
A steel framing square would make an excellent straightedge for cutting glass, except that it tends to slide around while you’re cutting.
TIP: Attach a single layer of masking tape or duct tape to the side of the square that will contact the glass. Choose a width slightly less than the width of the square legs. The tape prevents both slippage and scratching. Note: Place the glass on a smooth, flat, solid wood surface before cutting.
— Ruben Pauly, Alliance, Nebr.
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Flat Head Square Drive Screw Prices

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<td>6 x 5/8</td>
<td>1.45</td>
<td>13.45</td>
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TOOL COLLECTOR VALUE GUIDE

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What Are Your Old Tools Really Worth?

Old woodworking tools are one of today's hottest new areas of collecting. Long neglected by all but a few sophisticated insiders, this field is growing rapidly. Several Stanley-Bailey patterns pieces are already selling in the $500-$500 range, and an early pair of tools sold for $8,000 at a recent tool auction. A fine old tool can cost a lot more than you think. A top-notch reference tool for the old tool buff. Contents: 1000 illustrations, 685 pages. Full-Colour. 11 x 17 • $39.95.

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At 7 tpi (teeth per inch), the Nakaya rips and crosscuts through wood like a hot knife through butter. The manufacturer claims it will cut 3/4 faster than a conventional 8-tpi panel saw.

The teeth have three ground faces instead of two. Each tooth is cut at a slightly different angle, which gradually increases from 10° at the heel to 16° at the toe. This causes the teeth to bite more aggressively as you increase the stroke length. (Unlike traditional Japanese saws, this one cuts on the push stroke.)

The unusual set of the teeth require hand-sharpening with a special file and fence that you order with the saw.

Nakaya Panel Saw no. 49120.01, $33.90 postpaid from Garrett Wade Co., 161 Avenue of the Americas, New York, NY 10013. Special file and fence no. 49120.02, $5.25 with saw order.

Continued from page 21

CUSHIONY SOFT SANDING

We've seen several inflatable contour sanders in the past few years, but the Cushion Contour Sander incorporates a nice improvement. It's the first one we've tested with spindles to attach both ends of the 8" inflatable sanding drum to a lathe or drill press. The spindles solidly support both ends of the 8" long sanding drum. Attached to a variable-speed lathe or drill press the sander has even greater sanding flexibility. You can quickly remove a lot of stock at higher speeds with coarse sanding sleeves, then slow down the drum to prevent burn marks when using finer grits.

To use, you inflate the drum with a few bursts from an ordinary bicycle pump (you can order one from the manufacturer).

Cushion Contour Sander, 3"-diameter drum, lathe and drill press attachments, and five sanding sleeves, $69 postpaid. Additional sanding sleeves, $1.40 each, 2", 4", and 6" drums also available. For bicycle pump add $3. Order from Industrial Abrasives Co., 642 N. Eighth St., Reading, PA 19603.

Continued on page 26
GETTING A HANDLE ON COMFORT
If you've ever found a tool uncomfortable — even painful — to hold after using it awhile, you can bet that the manufacturer didn't have a good grasp of ergonomics (otherwise known as human-factor engineering). Bahco, a Swedish tool manufacturer, hired ergonomics specialists to design the Bahco Ergo chisel to reduce wrist and hand strain. We found that the long, tapered handle provides a firm, comfortable, nonslip grip when used with one or both hands. The handle design and overall balance of the tool allow precise control over the blade in a variety of work situations. We especially like the angle of the blade in relation to the handle. The angled blade enables you to apply much more force with greater accuracy when making shallow paring cuts. Overall, this chisel just plain feels good in your hand.

The chisel's impact-resistant polypropylene handle carries a lifetime guarantee. Other Bahco Ergo tools include screwdrivers, pliers, and several sizes of adjustable wrenches.

Seven widths of Ergo chisels (\(1/4\)" to \(1\frac{3}{4}\)"") from $13.67 to $17.54 through woodworking mail-order catalogs and some retail outlets. For a list of distributors in your area, send inquiries to Seraqua Trading Co., 4099 Landisville Rd., P.O. Box 1289, Doylestown, PA 18901. 215/345-6212.

TWO QUICK STEPS TO THE FINISH LINE
Make room on your shelf for another good finishing system. General Finishes has simplified their three-step finish system into the Sealacell 2-Step System.

Step 1 consists of a deep-penetrating stain-sealer (available in clear and in eight wood colors). Step 2 consists of a urethane wood finish for a satin finish, or Arm-A- Seal for a gloss finish. Both finishes wipe on with a rag. It's one of the easiest finishing systems we've tried.

2-Step Sealacell System, Step 1 and Step 2 products $4.25 half-pint, $5.50 pint, $7.95 quart (plus shipping) from General Finishes Corp., P.O. Box 14363, Milwaukee, WI 53214. For additional information call 414/774-1050.

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The well-dressed woodworker

When you go out on the town, you put on a good set of clothes, right? But, if you go jogging instead, would you wear the same clothes? Of course not. Being properly dressed in the shop can prevent an accident.

No loose-fitting clothing.
If you wear a long-sleeved shirt, button the cuffs. If you roll your sleeves up, roll them past your elbow. Better yet, switch to a short-sleeved shirt. Always wear shoes, preferably steel-toed ones, when working in the shop.

Protect your eyes, nose, and lungs.
Wear safety goggles with side shields when using power tools. If you wear glasses, you may find a face shield less of a hassle to wear. We find the face shield especially good when using a tool (such as the lathe) that throws chips back into your face.

Wear a dust mask to protect against nontoxic airborne irritants; a cartridge-type respirator when working with finish containing volatile solvents. Remember: Dust masks provide no protection against fumes from organic-type solvents.

Get into the habit of wearing hearing protectors. Use one you feel most comfortable wearing.

Bodies need protection, too.
A cloth apron should be adequate for all-around use. But for greater protection, consider a leather apron. Finishes and solvents require a moisture-proof apron.

Have several different kinds of leather or cloth gloves if you handle rough lumber. Wear light-duty plastic gloves for chores such as applying an oil finish. But, reach for heavy-duty vinyl gloves whenever refinishing.

Illustration: Jim Stevenson

It can do so much, it's almost unfair to call it a sander.

The new Delta 1" Belt Sander is so handy that no shop should be without one. And at only $69.95, just think what a great Christmas gift it'd make for your favorite woodworker or hobbyist. Or for yourself.

You can use it to sand, grind, deburr, contour, sharpen, buff, or polish just about any material. It uses standard 1" x 30" abrasive belts. And there's a power take-off for mounting an accessory flexible shaft with attachments that can do dozens of extra jobs.

In fact, our new 1" Belt Sander does so many things so well, you may wonder how you ever got along without it. Call toll-free for the name of your Delta Dealer. Delta International Machinery Corp., 800/438-2486 (in PA, 800/438-2487).

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I Keep your carving tools sharp. Sharp tools cut wood with a minimum amount of pressure. A dull blade or edge requires more of your muscle to tear its way through the wood, thereby decreasing your control and increasing the chance of injury.

II Hands belong behind sharp edges. When you are carving, every so often stop and ask yourself, "If my knife or gouge were to slip, where would it go?" Whittlers or figure carvers typically hold the piece with one hand and carve with the other. Always be sure to have your "holding hand" behind the cutting blade. Hold gouges firmly with both hands to minimize any chance for injury. And, keep the blade edge or gouge tip going away from you.

III Control your cut. In hand-held carving, many carvers also use their knees as a vise to help hold the wood, which isn't as dangerous as you think. That's because you control a whittling or bench knife by holding the knife with the power hand while pushing on the back of the blade with the thumb of the other hand. This method eases the blade through the wood. It may seem

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awkward at first, but with practice, pushing the blade proves to be very safe and effective. And, don't try to take off too much wood at a time. Carving too deeply can damage you and your carving.

IV Secure large workpieces. When carving large, three-dimensional pieces or plaques in relief that have a tendency to slide, attach the wood to your bench. Carver's screws, various types of woodcarving vises, or large wooden clamps will hold the wood securely in place. For the pounding that goes with gouge and mallet work, you'll find clamping your work a must.

V Wear protection. A leather apron or a heavy-duty shop apron of denim or duck give you peace of mind and can deflect misdirected cuts. For more protection, wear a carving glove on your holding hand. Made of interwoven strands of a nylon/fiberglass material and stainless steel, a glove proves virtually impossible to slice through with a knife blade. Yet, due to the fairly loose weave, a direct stab can puncture.

VI Keep your work area free of clutter. Knives and gouges lying around your carving bench or work area invite cuts and nicks as you reach for another tool. Keep them within easy reach, but out of the way while working. Lying helter-skelter, tools bump into one another and quickly lose their sharp cutting edges. Always line up gouges or knives so they can be picked up by the handles, not the blades. If you hand a tool to someone else, hold onto the blade end and offer the handle.

VII Don goggles and a mask with power tools. Power carving tools, such as the Foredom or Dremel, produce flying chips, then fine dust. Wear safety goggles, and after the chips stop flying, don a dust mask.

Illustration: Jim Stevenson

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A cousin to the huge redwood and giant sequoia, the bald cypress easily ranks as the largest and longest living tree east of the Mississippi. Thousand-year-old, first-growth trees attain 150' heights and diameters of 12'. In fact, bald cypress of this size have yielded 100,000 board feet of lumber per acre! However, typical stands average no more than 10,000 board feet.

Today, such huge, ancient trees are a rare find. Loggers locate some by probing the bottoms of swamps. These still sound prizes — sunk long ago by clearing or storm — must be dredged from the water, then airlifted to the sawmill.

Resistance to decay makes even the smaller, second growth bald cypress ideal for outdoor construction. Yet, its attractiveness lends itself to indoor projects, too.

Wood identification
The bald cypress (Taxodium distichum), classified as a conifer, acts like a hardwood by turning brown or golden in the fall before dropping its needles. Immature trees form a conical shape, have thin, light brown bark, and look much like any other conifer. As a bald cypress ages, however, it begins to more closely resemble a hardwood.

Its trunk tapers and develops broad supports called buttresses at the base. The bark turns reddish brown, becomes deeply ridged, and peels. At maturity, bald cypress trees have large, uplifting branches forming a broad, irregular canopy.

Bald cypress prefers wet feet, and grows well in damp bottomlands and swamps from Delaware to south Florida, and along the Gulf Coast into Texas. Northward, it hugs river valleys through Oklahoma and Arkansas, and up into Illinois and Indiana.

In swampy areas, bald cypress grows in stands. To help anchor the tree in a fragile bottom, its roots develop above-water shoots or knees for support. On drier ground, bald cypress mixes with hardwood species.

The wood weighs a bit less than walnut at 28 pounds per cubic foot dry. It has a yellow to pale-brown to reddish hue, and sometimes attractive figure. Bald cypress also feels slightly greasy or waxy. Heartwood has a peculiar, unpleasant odor.

Working properties
Bald cypress wood rates as moderately hard, strong, and stable, with straight, close grain. Although fairly light, the wood holds nails and screws well. It also feels resinous, but this does not affect gluing.

Bald cypress works easily with both hand and power tools. And, the wood sands smoothly and grabs on to finishes quite tenaciously.

Uses in woodworking
You can use bald cypress successfully for both indoor and outdoor projects. It works for furniture, paneling, cabinets, doors, windows, siding, decking, and trim. Boatbuilders find bald cypress excellent for planking, and farmers use it for barn boards, water troughs, and fences.

Cost and availability
In the South and southeastern United States, you'll find bald cypress at lumberyards. In other areas availability will be limited due to high shipping cost and the competition from western red cedar. Where you find it, bald cypress will cost about $1.50 per board foot. Faux satin crotch, a scarce veneer made from bald cypress crotch wood, occasionally shows up for commercial use in fine-furniture pieces and wall paneling.
'Tis the season for scroll-sawing wooden tree ornaments, decorations, and holiday gifts. But maybe you're tired of cranking out the same old cookie-pattern cutouts on your scroll saw. We are. So this year we decided to have some real fun with our saw. Also, we wanted to turn out some scroll-sawn gifts that would make our friends and relatives say "HO-HO!", not "ho-hum". In the process, we came up with six neat scroll-saw techniques. We hope they'll spark your imagination — for holiday gifts, and projects the year-round.

Our Gift To You: We'll give you a set of full-size patterns for the projects illustrating these techniques, free for the asking. Just send a self-addressed stamped envelope to: SCROLL SAW PATTERNS WOOD Magazine 1716 Locust St. Des Moines, IA 50336.

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CAUTION: Some of the photos in this article show the saw's bold-down foot elevated so you can better see what's going on. But we recommend you keep the foot in its proper position — down against the stock — while making all cuts. On most scroll saws, the foot not only holds the stock firmly against the table while you're cutting, but also serves as a blade guard to protect your fingers from the blade.

Note: We chose these blade sizes based on their ability to make tight, intricate cuts in the stock thicknesses indicated. Use wider blades for simple patterns and straight-line cutting.
SCROLL-SAWING WOODEN PUZZLES FOR TINY TOTS

Brightly colored, durable wooden puzzles fascinate young, growing minds. If you're making the puzzle for a preschooler, choose a pattern your little gift recipient will easily recognize.

1. With a pen or pencil, divide the pattern into puzzle segments—eight to ten easily identifiable pieces should do for most puzzles.
2. Cut a square or rectangular piece of \( \frac{1}{4} \)" birch plywood large enough to provide a \( \frac{1}{2} \)" to 1" margin around the pattern. (This piece forms the puzzle parts and frame.) Then, from \( \frac{1}{8} \)" birch plywood or hardboard, cut a piece the same size as the frame for the frame backing.
3. Center the pattern on the frame, then attach it with artist's spray-mount adhesive. Drill a hole in the frame just large enough to thread the scroll saw blade through it, insert the blade, and cut out the overall pattern shape, as shown in the photo upper right. Now, detach the blade from the saw arm and remove the frame and cut-out pattern piece.
4. Reattach the blade. Cut the pattern piece into individual puzzle parts, as shown in the photo lower right. Remove the paper pattern from the individual pieces.
5. Glue the backing piece to the backside of the frame. After the glue dries, sand the frame and puzzle pieces with 220-grit sandpaper, rounding over the edges slightly.
6. Use nontoxic paints to paint each puzzle piece a different color, and a clear nontoxic finish for the frame.

HOW TO MAKE SCROLL-SAW PUZZLES FOR KIDS OF ALL AGES

Sure, most people do call them jigsaw puzzles. But we call them scroll-saw puzzles because you can't beat a scroll saw for cranking out a lot of them in a hurry. Here's how to do it:

1. Cut out a suitable print, poster, or magazine photo, and glue it to a backing of \( \frac{3}{8} \)" hardboard. (We found that an all-purpose spray adhesive, such as Touch 'n Stick or 3M Super 77, works well.)
2. With a straightedge and grease pencil (we used a white one), draw light grid lines on the puzzle face to indicate the size and number of puzzle pieces you want.
3. Cut the pieces freehand, using the grid lines as a general guide. Cut each puzzle piece so it interlocks with the adjoining ones, as shown in the sketch upper right. Make all of the lengthwise cuts first. Then, flip the puzzle upside down, and tape the strips together, as shown in the photo upper right. Now, flip the puzzle back over and make all the crosswise cuts.
4. Remove the grease-pencil marks by wiping lightly with a soft cloth dampened with lighter fluid. Don't rub too hard or the fluid may also remove the ink from the picture.

Glue the picture to the puzzle, mark grid lines, and make all lengthwise cuts. Then, flip the puzzle over and tape the cut lines together with masking tape.

The tape holds the puzzle together while you make crosswise cuts to separate the individual pieces.

Continued
SCROLL SAW TECHNIQUES

3 GIVE YOUR NEXT PROJECT A BIT OF RELIEF

Need a gift for your Aunt Martha? She'll surely make room on the wall for a lovely scroll-sawn relief plaque like the dove pictured above.

1 Select the material for your workpiece blank, then cut it to size. (We used 3/4" Honduras mahogany for the oval dove plaque.)
2 Attach your pattern to the workpiece with artist’s spray-mount adhesive. Then, drill a blade-threading hole or holes in an inconspicuous part of the pattern, such as an inside corner. (The dove plaque requires a separate threading hole for each of the six cutouts.)
3 Thread the blade into the workpiece, then cut each pattern piece. Next, cut the background to the desired shape. (We cut the oval plaque slightly oversize, then sanded it to finish size with a disk sander, as shown at right.)
4 Sand a slight round-over on the top edges of the pattern pieces and the inside edge of the background. Then, sand all the parts smooth.
5 Place the background upside down on a piece of waxed paper, and prop it up with 1/4" spacer blocks, as shown in the photo far right. Insert the cut-out parts into the background, then run a bead of woodworker’s glue around each piece.
6 After the glue dries, attach a saw-toothed hanger to the back of the plaque, then apply a clear finish.

Note: On our dove plaque, the dove projects from the background. If you want your pattern recessed into the background, prop up the cut-out parts, instead.

HOW TO MAKE GLOVE-TIGHT INLAYS

Use this bevel-cutting technique to make solid-wood inlays for boxtops, wall plaques, and other projects. To do it, your scroll saw must have a tilting table. (We used 1/8" walnut and maple for the unicorn inlay. We then glued the inlaid piece to the top of an unfinished walnut box purchased at a local craft supply store.)

1 Choose two contrasting woods of the same thickness for the inlay and background pieces. Cut the pieces large enough for your pattern plus at least 3" at one end for making test cuts when you set the tilt angle of the saw table.
2 Start with the saw table set at an angle between 8° and 12° (see note below). Tape the workpieces together with double-faced tape, then cut out a “test plug” in the margin area (see photo at right).

Note: If you’ve tilted your table to the left, as we did in the photo, top right, rotate the stock counterclockwise into the blade to cut out the test plug and pattern. If you’ve tilted your table to the right, rotate the stock clockwise into the blade. If you cut in the wrong direction, you’ll get the reverse—the cut-out portion of the bottom piece will fit neatly into the top piece!

Now, push the plug from the inlay (top) piece into the hole cut out of the background piece. If the plug doesn’t fit snugly into the hole, reset the table angle and try again. (Notice in the photo that the middle plug dropped too far into the background piece. To compensate for this, we increased the table angle a few degrees to get the tight fit shown at right.) You may have to repeat this process several times before you get a tight, flush fit. Once you do, save the last plug you cut to serve as a guide block for drilling your blade-threading hole.

3 Attach your pattern to the workpiece with spray-mount adhesive. Then, use the last plug you cut in Step 2 as a guide block to drill your blade-threading hole at the correct angle, as shown in the photo lower right.
4 Thread the blade through the hole and cut out the pattern.

Note: When cutting out patterns on a tilted table, gravity sometimes works against you. We found that the blade tends to drift toward the uphill side of the line when turning outside corners, as shown in the photo far right. You can compensate by slowing down the feed rate when making outside turns and applying slight pressure against the downhill side of the blade.
5 Apply a thin coat of woodworker’s glue around the edges of the inlay. Press-fit it into the background. Wipe off glue squeeze-out.
6 After the glue has dried, fill any imperfections with colored wood putty or glue mixed with sanding dust. Then, use a sanding block with 220-grit sandpaper to sand the entire surface. Now, incorporate the inlaid piece into your project.
Cut out the oval on the scroll saw, staying slightly outside the line. Then, remove the waste with a disk sander.

Glue the cut-out pieces to the frame from the back side. Use cotton swabs to spread the glue evenly.

Upper left. To determine the exact table angle for making inlays, make test cuts in the waste portion of your workpiece. The plug from the top piece should fit snugly into the piece underneath as it does in the test cut at right.

Lower left. Use the last test plug you made as a guide to drill the blade-threading hole at the correct angle.

Above. When cutting outside curves, the blade may drift outside the line. To compensate, slow the feed rate and apply pressure against the downhill side of the blade.
WOOD SCULPTING MADE EASY

Here's a good way for you non-carvers to make a classy wood "sculpture" with your scroll saw and sanding machine.

1. Select a segmented pattern and cut it into its various components. Then, choose the type and thickness of wood you want for each pattern component and the background. (We made our sailboat sculpture from varying thicknesses of maple, walnut, and Honduras mahogany against a background of \( \frac{1}{8} \)" oak.)

2. Mount the pattern parts on the workpieces with spray-mount adhesive, as shown in the photo at right. If the pattern includes long, narrow pieces, lay them out parallel to the wood grain. Also, keep grain direction in mind while attaching the other pattern pieces for the most attractive looking parts. Cut out the parts on your scroll saw.

3. Sand the face side of each workpiece to the desired shape. (In the photo far right, we're shaping the boat hull on a stationary belt sander.) Sand only the area of each piece that will project above the background surface. Smooth the parts with 220-grit sandpaper.

4. On a piece of waxed paper, glue the parts together with quick-set epoxy. (Use small brads to hold the pieces in position, as shown in the photo on the next page.) Then, touch up the finished assembly with 220-grit sandpaper.

5. Cut the background piece to size, position the assembled sculpture on the face side, and trace the sculpture outline onto it.

6. Drill a blade-threading hole into the background piece, install the blade, and saw the cutout for the sculpture. Now, remove the background piece from the saw and smooth it with 220-grit sandpaper.

7. Insert the sculpture into the face side of the background, using a few pieces of masking tape to hold it in place, if necessary. Now, turn the workpiece face-down and spread quick-set epoxy into the joints between the sculpture and background. Before the epoxy sets, flip the piece back over and lay it, glued side down, on waxed paper.

8. After the glue dries, remove the waxed paper and sand the back smooth (we used a belt sander). Touch up any rough spots on the face side of the sculpture with 220-grit sandpaper. Apply a clear finish of your choice to both sides of the finished sculpture.

STACK 'EM UP, CUT 'EM OUT, MIX 'N' MATCH

Stack cutting enables you to make several cutouts from one pattern. If you use contrasting woods, you can interchange the pieces, and glue them back together so no two cutouts will be alike. Use \( \frac{1}{8} \) stock for small items, \( \frac{1}{4} \) stock for larger ones.

1. From each type of wood you want to use, cut a piece slightly larger than your pattern (We used \( \frac{1}{8} \)" walnut, maple, and Honduras mahogany for the rocking horses shown above.) Stick the pieces together, using double-faced tape.

2. Cut out your pattern and mount it on the stock with spray-mount adhesive. (If you want to reuse the pattern, make several photocopies.)

3. Cut out the pieces as shown in the photo at right.

Note: To keep tiny parts from falling through the blade slot in the saw table, make a zero-clearance table top, as shown in the photo far upper right. Cut a piece of \( \frac{1}{8} \)" plywood the same size as the saw table and clamp it to the table. Then drill a small hole for the blade and thread it through the plywood top.

4. Separate the stacked parts and remove the tape. Then, arrange the parts on a piece of waxed paper and interchange the parts to make figures of interesting, contrasting colors as we did with the three rocking horse examples at left. If you have trouble separating the small pieces, dip them in a pan of lacquer thinner, then gently pry them apart.

5. Edge glue the pieces together with quick-set epoxy, using \( \frac{1}{2} \)" brads to hold them in position, as shown in the photo lower right. (With our horses, we first glued the tiny head pieces together to form a larger piece, then glued this piece onto the rest of the figure.)

6. After the glue dries, sand the decorations with 150- and 220-grit sandpaper to remove excess glue. Apply a clear finish. For tree ornaments, drill a \( \frac{1}{16} \)" hole in each one, then insert a string or wire.
Mount the pattern pieces on stock of different thicknesses and kinds of wood, then cut out the individual parts on your scroll saw.

We found our stationary belt sander an excellent tool for quickly sculpting larger parts. You also can shape the parts on a disk sander or drum sander. Shape smaller parts by hand sanding.

Above. Double-faced tape holds the stacked pieces together while you cut out the ornament parts.

Upper right. Attach an auxiliary top of ¼” plywood to the scroll saw table, and drill a small hole for the blade. This keeps tiny pieces from falling through the blade slot in the table.

Right. Lay the parts on a piece of waxed paper, and glue them together with a quick-set epoxy. Use small brads to help hold the pieces together until the glue dries.
Noral Olson once turned out designs for mass-produced, commercial furniture. It was sleek, slick, and functional. As a result, he designs and builds a custom-made line. It's elegant, ornate, and hardly practical. There's another difference, too. Noral could warehouse a month's production in a file drawer!

Miniature furniture collectors rate Noral's tiny pieces top-notch. His eye for design, perfect detail, and flair for finishing set his scale furniture apart. For example, the 4" high desk he holds, above, has a rolltop that rolls! We marveled at his work, and wanted to see just how he does it. So, in Seattle, we visited Noral and his wife, Inez, and shared a woodworking adventure in a modern-day Lilliput.
TEENSY-WEENSY FURNITURE: A WOODWORKER'S ADVENTURES IN LILLIPUT

Seattle craftsman Noral Olson thrives on detail in 1:12 scale

It was two centuries ago that Jonathan Swift wrote of Gulliver's adventures in Lilliput. Swift created a fictional kingdom where soldiers stood tall at six inches. Gulliver felt uncomfortable there. Noral Olson would feel at home.

From a desktop in a house hugged by Seattle's lush greenery, he designs and builds furniture fit for Lilliputian royalty. In a scale of 1:12 (1" = 1'), Noral crafts classic chairs, chests, clocks, desks, rockers, sofas, and tables.

Don't confuse Noral's work with ordinary dollhouse furniture, however. "The pieces I make are mostly keepsakes," he says, flicking a finger to tidy up a spot on his well-used but immaculate drawing board "workbench." Whatever you call them — keepsakes or collectibles — since 1970 he has crafted over 500 finely detailed pieces of thumbnail furniture, at prices paralleling the tags on full-size furnishings.

DETAILS AND MORE, BY DESIGN

Noral enjoyed the years he worked in the furniture industry as a designer. His eyes really dance, though, when he talks about his second career, as a miniaturist. "My philosophy has always been to design and make what people will buy. People want miniature furniture with lots of details, so I give them what they want."

And, oh, so many details! On Noral's furniture, the drawers, doors, and tops open. You'll find real glass in a breakfront or clock case (with a works that actually keeps time). Hand carving decorates chair and table legs, as well as Louis XV sofas. Tops have chamfered edges. Drawer pulls move, and even knobs are screwed on. Sometimes, he uses gold-plated hardware! If a piece of furniture someone wants duplicated in miniature lacks detail, Noral probably won't do it. "I like lots of doors and drawers. I know other craftsmen don't want to do them."

Noral made his first piece of miniature furniture for fun — a gift for his daughter. Now all his work is custom-order. "Someone will send me a photograph of a piece they want built, or a picture from a magazine. Few very send dimensions, but I can scale it by starting with the full size of the piece as I know it should be. Once I've calculated the dimensions, I draw a set of plans and build it."

The 2½"-high Italian bombé chest, below, was the sort of challenge Noral enjoys. It has 350 solid cherry parts (built-up for the contoured drawer fronts and case sides) and took him 65 hours to complete. The first chest earned him six commissions for duplicates.

"When I make a commissioned piece, the original customer retains the exclusive right to that piece. That means I will only make more pieces of that design for the person who first ordered it. If, for instance, you want a Biedermeier desk, you'll have to place your order for it with the original customer," explains Noral. This practice has worked well for him, and it protects each piece's exclusivity.

WOOD: THE FINER THE GRAIN, THE BETTER

For the most true-to-scale miniature furniture, wood has to be extremely fine- and close-grained. Oak, for instance, won't work for 1:12 scale furniture because its open grain shows up as gaping holes. "I do most of my pieces in basswood because I find it has the best grain."

While Noral prefers basswood, he also uses cherry, maple, and some walnut. Even in those fine-grained woods, not all pieces measure up to his high standards. Most miniature shops from Los Angeles to Seattle have seen his neatly groomed figure at one time or another fastidiously sorting through their pile of scale lumber for the very tightest grained pieces in ¼" to ⅛" thicknesses.

TINY TOOLS FOR TINY TREASURES

Noral spends his shop time dressed in a crisply pressed shirt and slacks. His personal neatness underlines a finely honed sense of order — perhaps a prerequisite for crafting highly detailed miniatures.

Noral's workshop occupies the space of a typewriter atop the desk in his Spartan home office. Opening a desk drawer, he displays his shop tools. "This is my table saw," Noral chuckles as he skillfully draws his X-acto knife the length of a ¼"-thick piece of cherry. His fence is a metal ruler; his ripping blade a No. 11 X-acto tip.

At his fingertips, he lays down a selection of X-actos and other
TEENSY-WEEENSY FURNITURE:

knives of similar type. Noral spreads his tiny hand tools across the desk top: an assortment of dental picks, needle-nosed pliers, jeweler's files, a finger-powered twist drill and minuscule bits (dentist's drills), lathe tools no larger than Popsicle sticks, a fret saw, a pair of calipers, and a homemade miter box he's especially proud of. "X-acto makes one, but I can do finer work with mine," Noral says.

With a skew chisel you might mistake for a toothpick, or one of his jeweler's files, Noral turns out table and chair legs on his Dremel lathe. Its bed measures a wee bit longer than a new lead pencil.

"Turning is the only time I use magnification," he notes, mounting square stock for between centers work. "I use a 'Yankee' chuck. It has a selection of square 'tubes' you pull in or out to mount different size stock. I can go from 1/4" square down to 1/16"."

Noral's drill press stands no higher than a tall drink of water. It doubles as a router table. To make lips and fancy edges on furniture tops, he mounts a Dremel Moto-Tool fitted with a No. 193 cutter bit in the drill press. Then, he maneuvers the workpiece around the bit. Noral tidies up the bits of debris with a hand-held Dust Buster.

JIGS FROM THE MEDICINE CHEST

You won't find jigs for making teeny dovetails in Noral's shop (that's not

For turning a table leg, Noral employs magnification. He uses a jeweler's file to shape the 1/8" basswood stock held by the adjustable "Yankee" chuck.

To hold the Queen Anne chair in the correct position for gluing its curved frame, Noral made a jig from illustration board.

A shoebox holds all the tools you need for building miniature furniture. Jeweler's files double as lathe tools. An X-acto knife becomes your table saw. Other tools Noral has collected from various sources fill the bill for tiny tasks.

In 1:12 scale, this grandfather clock stands only 7" tall, but has full-size detail. The rocker features a worn leather seat.
his forte). You will find an occasional vitamin bottle, though.

"To bend the wood for the Beidermeier rolltop to exactly the right diameter, I searched for a vitamin bottle with the dimension I needed," Noral relates. "Then, I dipped the wood in hot water for about 15 minutes, put paper toweling on both sides, and bent it around the bottle. Rubber bands held it in place until it dried. It came out perfect!"

In full-scale shops, woodworkers utilize lots of plywood for making special-purpose jigs and fixtures. Noral doesn't manhandle heavy 4x8' sheets through his shop. Instead, he builds occasional jigs from standard-size sheets of illustration board. One jig Noral uses holds the contoured shape of a Queen Anne chair frame in place for gluing, see photo, left.


**FINISH FIRST FOR FINE FURNITURE**

In miniature furniture, its the finish that unquestionably separates the so-so from the collectible, and there's no such thing as being too discriminating. Notes Noral: "Too much or too heavy a finish throws a piece out of scale, just like open-grain wood."

He avoids buildup and concealment of detail by finishing as much of a piece as he can _before_ assembly. "That way, I avoid the glue smear problem, too," Noral notes.

First, he sands all the pieces with 220-grit garnet paper, wipes them off, and colors them with oil-base stain, which he intermixes to achieve the look of various different woods. "After the stain has completely dried, I use fine steel wool (No. 000) to reduce the wood fibers on round parts, and 600-grit paper for flat surfaces. It's really a smoothing and polishing technique," he explains.

Next comes the first of usually two, sometimes three, coats of a lacquer-based, semigloss, clear finish. "To avoid runs, I brush it on irregular surfaces and spray it on large, flat surfaces. But, I'm careful not to put any topcoat where I have to apply glue," Noral advises. Sanding between coats with fine steel wool and 600-grit paper also helps minimize buildup and removes any brushstrokes. And, frequent use of a tack cloth to remove dust and sanding particles is a must.

"For a final coat on shaped parts, I use a hard paste wax," says Noral. "On flat surfaces, such as tablespops, I do a last polishing with pumice before I apply the wax."

To assemble, Noral doesn't put down a bead of glue on the pieces to be joined. Instead, he lays down a thin film of white glue on both surfaces to limit squeeze-out.

**ADVICE FOR TRAVELS TO LILLIPUT**

"You don't need a lot of equipment to make miniatures," says the master miniaturist. "I know some people that have basements full of equipment, but I simplify things. You need two wooden drawing boards — one for cutting and sanding, the other for finishing — some knives, small files, and a little drill. You can start out with kits. There are some nicely detailed ones that sell for $7 and up in miniature shops." In fact, Noral built a miniature pump organ for his daughter from a plastic kit. "By the time it was finished, you wouldn't know that it wasn't wood. You can embellish them, change the hardware, and add as much detail as you want to try," he offers.

Beginners quickly find out that making miniature furniture often requires some scrounging to make the scale parts fit. For the grandfather clock, for example, _left_, he hit a stone wall when it came to assembling the movement, hands, and face. The movement eventually came from a battery-operated wristwatch, while Noral found the moon dial face and serpentine hands in a miniature shop. The hardest problem developed in mounting the paper-thin hands to the movement. After considerable searching, Noral found a sympathetic jeweler to accepted the challenge and solve the dilemma.

Unlike the other pieces Noral makes, he's planning to keep the grandfather clock. Some things just take so much time they're too difficult to part with.

Produced by Peter J. Stephano
Photographs: Bob Hawks
You’ll Reap One-Of-A-Kind Treasures When You
HARVEST YOUR OWN BOWL BLANKS

To show just how to go about harvesting your own blanks, we did a lot of reading, interviewed three blank hunters, and then set out with a chain saw and camera to try out what we learned.

WHERE TO LOOK FOR NATURE’S BOUNTY
Before you set out prospecting, bear in mind that trees, even downed trees and stumps—which are what you’re after—belong to someone. You’ll be hunting on someone else’s land, so introduce yourself and explain what you’d like to do.

Many timber owners will appreciate being offered a few dollars for a portion of a fallen tree, and some probably will let you remove it for free. Show specimens of your finished bowls, and an owner might even volunteer to be on the lookout for the odd stump, crotch, or burl that very well may hide some magic inside.

Check farms, wood lots, areas being cleared for new homes. You can find unburied treasure just about anywhere trees grow. Other possibilities include:

- National Forest Service offices issue permits for wood-gathering on federally administered lands. John Lca, one of our woodturner consultants for this article, reports that the Forest Service office charges $10 for a license to collect up to four cords of “dead and down” wood in his favorite hunting ground near Flagstaff, Arizona. Some state, county, and local parks do likewise.

- Many firewood companies will be happy to sell you logs for more than they’d go for as fuel, especially if you’re willing to cut them up and haul them yourself.

Attention, turners:
Thar’s bowls in them thar trees. Yes, an ordinary fallen log or stump can be a “bowl mine” for any turner willing to chain saw it into turning blanks. Invest a few pleasurable hours traipsing through the woods, and you can come home with enough handsomely figured blanks to feed your lathe all winter, almost for free. What’s more, you gain the satisfaction of following a project from nature to the beautifully finished end result.

- Nurseries and tree surgeons might know about prize specimens practically in your own backyard. If they can charge a homeowner to remove a dead tree, sell you select pieces at a premium, and get rid of the rest as firewood, they gain three ways instead of two.

- Contractors clearing trees threatening power lines leave a bounty of downed wood in their path. Again, ask permission; these trees usually remain the property of the landowner.

Maple, elm, walnut, cherry, butternut, apple—just about any species of hardwood can yield a beautiful bowl, but the harder and more exotic, the better. With bowl blanks, figure and grain are the names of the game. So keep an eye out for the parts of trees in which these are most interesting, namely stumps, crotches, and nodes where branches tried to grow and failed.

Once you’ve found a likely candidate, slice off an inch or so in order to get a good look at the wood. Note especially where the pith (center of growth) is located. You want to avoid the unstable pith (which will almost certainly crack) and the area immediately around it when you lay out the cuts for your blanks.

SEALING THE BLANKS—THE KEY TO MOISTURE LOSS
The slabs you’ve just cut out will probably be heavy (and they’ll seem even heavier if you have to lug them very far). Moisture accounts for most of the weight in newly cut wood. You need to retard the rate at which that moisture evaporates. If wood dries out too quickly, it tends to check and split, making it useless for turning.

Blocks can begin to crack within hours, so we seal end-grain cuts by immediately coating them with Sealite (see the Buying Guide on page 49 for ordering information). Other turners use paraffin, shellac, varnish, floor wax, even old latex or oil paint to seal their blanks. We liberally slosh on Sealite with a brush. Seal only the end grain; if you seal the whole blank, the piece will take too long to season.

TURN NO BLANK BEFORE ITS TIME
Store the freshly cut blanks in an area that’s unheated but protected from rain and direct sunlight—in the garage, for example, or under plastic on the north side of a building. As a precaution, if you see any bugs on the wood, spray or dust it with an insecticide. Stand the blocks on their sealed ends, with about an inch of air space around each one. This allows the blanks’ surfaces to dry and minimizes fungus growth.
Check your stockpile every few days. You'll notice the blanks getting lighter and lighter as they lose water and seek moisture equilibrium with the air around them. Some turners use food or baby scales to weigh their blanks to the nearest ounce; others gauge a blank's weight by simply hefting it. Eventually, you'll notice that a block has stopped losing weight. This means that its moisture content has come into harmony with the air around it. Once the blank has remained the same weight for several weeks, you can then move the block inside to dryer, heated air.

Indoors, choose a location that's warm but not extremely dry, well away from the furnace or woodstove. In a few days you'll notice the wood again losing weight as it releases more moisture to its drier environment. The losses are more subtle now, and a scale really comes in handy to check for weight loss. When its weight remains unchanged for about three weeks, consider the blank adequately seasoned and ready for turning.

**ONE GOOD WAY TO HURRY NATURE ALONG**

Thick blocks of wood can take a year or more to dry thoroughly. Don't worry though, you can speed up the process. One method is to turn the unseasoned blanks into bowls with 1"-thick walls. Then, coat them completely with any of the sealants mentioned earlier. Store these bowls first in an unheated space, and monitor their weight loss. After they stop losing weight, bring them inside and continue weighing them once a week until they again stop losing weight.

Text continues on page 47

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**HOW TO LAY OUT AND CUT BLANKS**

To maximize bowl blank size, use a crayon, chalk, or marker, and draw profiles on the log's end for the blanks you'll be cutting.

Try to capture the most intriguing grain patterns (see our step-by-step photos on the next page for details). Once you've laid out the blanks, measure the widest one, add a couple of inches for waste, and cut the log to that length as shown in the drawing below.

Roll the sawn section away from the main log, and examine the grain exposed by your second cut. If new defects show up, you may want to revise your layout. Finally, brace the log so it won't roll, and make a series of lengthwise cuts, holding the saw at a 30-degree angle to the log as shown at right.
BOWL BLANKS

WOOD TAKES TO THE WOODS

One sunny day early last spring, Marlen Kemmet and Lee Gatzke, two of the harder-core bowl turners on our staff, decided to duck out of the office and do some field work for this article. They wanted to follow up on a HOT tip they'd received from a sawyer in north-central Iowa. It seems that they were on the trail of some fantastic-looking spalted maple (see the discussion on spalting, far right). Here's what they found, and how they went about harvesting their newfound treasure.
1 Luck was with us! That maple log was exactly where we'd been told it was. Our source said the remaining section was originally near the top of the tree, probably about 30 feet from the ground. The lower part of the trunk had already been hauled off to a saw mill.

2 Lying in a pasture near the edge of a wooded area, the maple log had been exposed to the elements for over three years.

3 Using a chain saw, we sliced an inch off the end of the log, and here's what we discovered — a handsonely spalted pattern. At that moment we both experienced what early miners probably felt when they struck gold.

4 Note the pith (see the arrow) located to the left of center. Its position will determine how we lay out the bowl profiles.

5 After examining the log, we decided that the end section could yield three good-sized bowl blanks. Drawing the profile of several bowls provides a good indication of the largest size bowl we'll be able to turn from each blank later. Note, when drawing each bowl's profile we avoided the pith, just above Lee's right hand.

6 For the second cut we set the log section on end. Our 16-inch chain saw handled this lengthwise cut in a single pass. Finally, we cut each length in half to obtain two good-sized bowl blanks from each section.

7 Next, we turned our attention to the mushroom-topped stump of that same maple tree. Stump wood often makes the best blanks of all. In this case, the exposed top let in lots of moisture — one of the key ingredients for spalting.

8 With a series of vertical cuts we sliced the stump into several slabs. Again, we took care to cut around the pith and avoided dulling the saw blade in the dirt.

9 The stump made a handy bench for holding the slabs as we marked and trimmed them into bowl blanks. The size and shape of the slabs helped determine the size and quantity of blanks we could get from each slab. We figured we could get one large blank and two smaller ones from the original slab. The bigger the blanks you can cut, the more options you'll have when it comes time to mount them on your lathe.

10 To slow down the drying process, we coated the end grain of each blank in the field with sealer. On hot days, we've experienced bowl blanks beginning to check within hours after cutting if left uncoated. You don't need to coat edge or surface (face) grain or surfaces that are still covered by bark. The moisture leaves these surfaces at a slow enough pace. Coating more than the end grain can cause the blank to dry too slow, and it can be years before the blank is dry enough to turn without cracking.

The time it takes for a rough-turned bowl to dry varies widely — from six weeks to six months or more — depending on its initial moisture content, the temperature, humidity, the bowl's thickness, and the thickness of the sealant.

You can expect weight losses from a few ounces up to more than half the piece's initial weight. After a rough-turned bowl has stopped losing weight for at least three weeks, you can remount it, finish turning, and apply the finish.

Recently, some turners have been experimenting with drying rough-cut bowls in a microwave oven, a process that offers lots of promise for anyone in a rush to transform a piece of wood from one life to another. We'll be delving into microwave wood drying in future issues.

**SPALTING — MOTHER NATURE'S CALLIGRAPHY**

After a tree dies it goes through a long, slow process of decomposition. This often enhances the wood's beauty in much the same way that a few wrinkles or gray hairs bring character to a person's appearance. Part of the decaying process, known as spalting, splices up bland woods and brings a gleam to a bowl turner's eyes.

Spalting works like this: Under the right conditions, as a log begins to decay, fungi enters the log and begins to decompose the wood. Gradually the spreading fungi create black or dark brown markings. Some spalting looks as delicate as Chinese calligraphy. Other patterns appear like broad strokes from an avant-garde painter's brush. Like snowflakes, no two spalted designs are ever the same, even six inches down the same tree.

You'll usually find spalting occurring in downed trees, exposed to plenty of moisture and in areas with rich soil. Woods most likely to spalt include birch, beeche, elm, gum, most fruitwood species, and (especially) maple. Mushrooms growing on a maple stump signal that spalting may be taking place.

**Continued**
BOWL BANKS

JOHN LEA: HUNTING ALLIGATORS IN ARIZONA

When John Lea, a professor at Arizona State University and an avid turner, sets out to prospect for burls, he and Phil Brennan, a wood sculptor friend, prepare for an expedition. Into a four-wheel-drive truck go a couple of chain saws, a two-man handsaw, pry bars, a shovel for when they get stuck, towing cables, gloves, a tape measure, ear protectors, safety glasses, a first-aid kit, plus food, water, and camping gear for a couple of nights out in the open.

Their quarry? John and Phil hunt pine, oak, juniper, aspen, citrus, walnut, manzanita, mesquite, and other exotic species. But they look especially hard for alligator juniper (**Juniperus deppeana**), a soft, lightweight, light red wood typically used for fuel and fenceposts because of its resistance to decay. The common name comes from the thick and rough, gray or blackish bark that looks a lot like the back of an alligator.

Arizona alligators grow at elevations between 4,500 and 8,000 feet. These areas often fall under the jurisdiction of the National Forest Service or the Bureau of Land Management. The Forest Service manages 12 million acres in Arizona, divided into six national forests. Before heading for the boondocks, they check in with a Forest Service office, get a wood-gathering permit, collect maps, and determine where wood gathering operations have taken place. With this information and a general knowledge of the mountains, they can block out an area to search.

“We have our best success driving along old back roads with binoculars at hand,” John says. “These let us check out a likely looking stump without wasting a lot of time climbing up and down hills and washes only to discover that what looked like a perfect burl turns out to be a less than perfect boulder.”

MARY REDIG: SCAVENGING DEADWOOD IN MINNESOTA

Mary Redig enjoys finding wood to turn almost as much as she loves turning it into delicate, thin-walled plates and vases. She sifts through friends’ firewood, checks neighbors’ fresh-cut and dead trees, and hangs out at sawmills. But she often finds some of the best pieces on jaunts through the woods just down the road from her house in Shoreview, Minnesota.

“Even my children get in on the act,” she says. “If we’re out on a bike ride and they notice a piece of wood, they point it out to me. Lots of times I come home balancing a hollowed-out log in my bike’s basket.”

Mary doesn’t cut blanks in the field. Instead she saws off logs twice as long as they are thick, brings them home, and cuts them into slabs on her band saw or uses her chain saw on larger pieces.

Burls stay in the shop because she’s discovered they season fine there. Logs go outside, first to a damp area on the north side of the house, then after a few months to a drier spot. Mary lays the logs on sheets of tin and covers them with plastic to retard the drying. She also seals the end cuts, either by rubbing on wax in the field or by dipping them in melted paraffin later.

PETER SIELING: MINING A WOODLOT IN UPSTATE NEW YORK

For hardwood lumber dealer Peter Sieling, bowl blanks are a profitable part of his woodlot operation.

“Because I sell stock, I’ll cut the entire trunk into blocks, but I pay the most attention to the stump and crotch areas,” Peter says. “These generally have the most interesting figure and will make the prettiest and most valuable bowls. After cutting the blanks to rough size with a chain saw, which leaves a wide and uneven kerf, I finish cutting the individual blocks on a 36” band saw. The result is a stack of rectangular rather than square blocks. The extra length is insurance. In spite of all precautions, the ends of blocks will sometimes crack. With the extra length, I can later saw off the crack without reducing the final bowl diameter,” states Peter.

Like Mary Redig, Peter dips the cut ends of blocks in melted paraffin. “Paraffin will spontaneously ignite if it gets too hot and should be used with extreme caution,” he warns. “You’ll know it’s too hot when a dipped block sizzles like frying bacon.”

Peter often rough turns 1”-thick bowls from green bowl blanks. First, he band-saws the blank round, mounts it to the lathe, and turns it until the wall thickness is approximately 1”. Then, after removing it from the lathe, and unfastening the faceplate, he sealed the entire bowl with paraffin, and air-dries the rough-turned bowl.

“Because wood shrinks unevenly as it dries, the bowl becomes elliptical,” he’s learned. “Later, after the bowl has dried, I remount it on the lathe, turn it round again, and apply the finish. While thick blocks can take several years to dry, I can speed up the process to a few months by rough-turning the bowls and drying them instead of drying the entire blank.”

A sharp chain saw is a must for Peter Sieling when cutting bowl blanks in his woodlot.
“After cutting and before dipping, I use a marker to label the type of wood and the date harvested on the blank or log. Dipping the ends of the blanks seals the softer woods such as sumac and butternut,” Mary notes. “But with hardwoods such as Minnesota’s ironwood and lilac, I haven’t found anything yet that works very well. I just let them crack where they will and salvage what’s left.”

In the field, Mary Redig, president of Minnesota Woodturners Association, checks first for the best cutting angle on a heavily burlled dead tree.

At home, John keeps some wood in his yard, covered with a tarpaulin and arranged to allow air circulation without exposure to the broiling Arizona sun. Drier pieces go into a residential garage with a west-facing metal door.

“On a summer afternoon,” John observes, “this ‘oven’ reaches 130 degrees Fahrenheit and simmers the moisture out of the inventory. Our annual humidity averages 37 percent, but in the summer it may get down to three or four percent. Wood dries quickly here.”

John Lea loves hunting and harvesting Arizona “alligators” in the high country near Flagstaff with his companion, and fellow turner, Phil Brennion.

BUYING GUIDE
- Sealtite. Green wood sealer, catalog no. 01W61, $14.50 per gallon ppd. Woodcraft, 41 Atlantic Ave., P.O. Box 4000, Woburn, MA 01888.

Produced by Marlen Kemmet with James A. Hufnagel
Photographs: Bob Calmer  Illustrations: Jim Stevenson
KNOW YOUR WOODWORKING ABRASIVES

If you think “abrasives” means sandpaper and steel wool, you’ve only scratched the surface.

With the large selection of products now available, you’ll find it easier than ever to smooth your way to a fine finish.

COATED ABRASIVES: SANDPAPER AND A WHOLE LOT MORE

Coated abrasives include products made up of abrasive minerals bonded to a backing material with a glue or resin bonding agent. Yes, they still come in the familiar sheets, disks, belts, and drums. But you’ll also find them on other backings: cords, cloth strips, and sponge-backed blocks for sanding contoured surfaces and getting into tight places. Each form has its uses, as shown in the chart on the facing page. But no matter which form you choose, you also have to pick the right abrasive minerals and grit sizes to get the best results.

FIVE OPTIONS IN ABRASIVE MINERALS

When selecting abrasive coatings, you can choose from two natural minerals (flint and garnet) and three manufactured ones (aluminum oxide, silicon carbide, and zirconia alumina).

Flint: Inexpensive, but no bargain!

Flint, the original sandpaper mineral, has been practically obsoleted. It breaks down easily and dulls more quickly than the other abrasive minerals. If you can find flint, it will be in sheet paper only. Our advice: don’t waste your money.

Garnet: A fast-cutting paper for hand sanding

Garnet remains the woodworker’s favorite for most hand-sanding operations. This mineral fractures easily as you sand, producing extremely sharp edges—great for quickly removing material by hand. However, even the finest grit garnet papers don’t leave quite as smooth a surface as aluminum oxide or silicon carbide papers. For this reason, when hand-sanding hard woods, we generally use garnet papers up to 150-grit, then finish-sand with 220-

grit aluminum oxide or silicon carbide paper.

Also, garnet won't hold up to the pressure exerted by power sanding machines nearly as well as aluminum oxide or zirconia alumina.

**Aluminum Oxide: An all-around performer**

You'll find aluminum oxide available in more forms than any other abrasive mineral—sheets, disks, drums, sanding blocks, cords, and nonwoven finishing pads. The light-to-dark-brown, wedge-shaped particles resist fracturing, but aren't as sharp as garnet. This durability makes aluminum oxide good for power sanding, because machine speed compensates for its slower cutting properties. Use the finer grits (220, 320) for final dry sanding before applying the finish.

**Silicon Carbide: Use it for finish sanding, wet or dry**

Silicon carbide particles have extremely hard, sharp edges that cut faster than aluminum oxide or garnet. We found that fine-grit silicon carbide sheets cut faster and last much longer than aluminum oxide. So, we prefer these for finish-sanding hardwoods by hand and, with a waterproof backing, for wet-sanding bare wood and finishes between coats (see page 53). But silicon carbide costs more than garnet or aluminum oxide, and it doesn't work quite as well as garnet for rough-sanding by hand. It also doesn't hold up as well as aluminum oxide for power sanding.

**Zirconia Alumina: Good news for power sanding**

If you haven't heard of this bright-blue mineral, you're not alone. Developed by Norton Abrasives, under the trade name NorZon, it's the newest, most expensive, and most specialized of the manufactured abrasive minerals.

For the home woodworker, zirconia alumina comes in belts in standard sizes and grits for portable and stationary belt sanders. You'll also find it in 9" adhesive-backed disks for disk sanders, and in smaller sizes for drill sanding attachments. Zirconia alumina products cost between 10% and 20% more than their equivalent in aluminum oxide. But its self-sharpening characteristics and ability to withstand heat and pressure make zirconia alumina the most durable, long-lasting abrasive mineral for power sanding. And, it cuts faster than any abrasive mineral. We recommend 100-grit belts for rough sanding with a portable or stationary belt sander. You won't get these advantages when hand sanding, so you won't find it in sheets. If you can't find a local supplier for NorZon products, contact Norton for dealers in your area. See buyer's guide on page 53.

**GRIT SIZES: OUR RECOMMENDATIONS**

Grit number (or mesh number) refers to the particle size of the mineral used for the abrasive. The numbers range from 36 grit on coarse abrasive belts to 600 grit on very fine silicon carbide papers. However, the sanding products you'll most often use fall within the 60- to 220-grit range.

When sanding bare wood prior to finishing, you don't need to work your way through the full range of available grit sizes, especially if you use a power sander for some of the work. For instance, to smooth a flat surface, we usually start with a portable or stationary belt sander equipped with an 80- or 100-grit aluminum-oxide belt. Then, we switch to a finishing sander, using 150-grit or 180-grit garnet paper, then 220-grit aluminum oxide paper. The chart at left lists the recommended abrasives and grit sizes for various sanding procedures.

Here's what we usually stock in the WOOD shop:

- Sheet paper: garnet, 60, 80, 100, 150 grit; aluminum oxide, 220, 320 grit.
- Belts for portable belt sander: aluminum oxide, 60, 80, 100, 150 grit.
- Belts for stationary belt sander: aluminum oxide, 80 or 100 grit.
- 9" disks for stationary disk sander: 60, 100 grit.

The above abrasives handle most of our sanding chores, so we try to keep a good supply on hand. We buy more specialized abrasive products as we need them.

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**CHOOSING THE RIGHT ABRASIVE FOR THE JOB**

<table>
<thead>
<tr>
<th>Application</th>
<th>Tool/Product</th>
<th>Abrasive</th>
<th>Grit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surfacing rough wood, fast stock removal</td>
<td>Surface sander, belt sander</td>
<td>Aluminum oxide, zirconia alumina</td>
<td>36-80</td>
</tr>
<tr>
<td>Rough-sanding mill marks, saw marks, defects, and grain</td>
<td>Orbital sander, belt sander, disk sander</td>
<td>Aluminum oxide, zirconia alumina, garnet</td>
<td>60-100</td>
</tr>
<tr>
<td>Smooth sanding</td>
<td>Orbital sander, disk sander, sheet sandpaper</td>
<td>Aluminum oxide, garnet, silicon carbide</td>
<td>120-320</td>
</tr>
<tr>
<td>Sanding blocks, non-woven pads</td>
<td>aluminum oxide, silicon carbide</td>
<td>medium-fine</td>
<td></td>
</tr>
<tr>
<td>Sanding contours</td>
<td>Sanding drums, disks, flappers, cords, strips</td>
<td>Aluminum oxide, garnet, silicon carbide</td>
<td>80-320</td>
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<tr>
<td>Sanding blocks, non-woven pads</td>
<td>aluminum oxide, silicon carbide</td>
<td>coarse-fine</td>
<td></td>
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<tr>
<td>Wet sanding, applying stains or oils, sanding between finish coats</td>
<td>Sanding sheets, non-woven pads</td>
<td>silicon carbide aluminum oxide</td>
<td>240-600 fine-extra fine</td>
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<tr>
<td></td>
<td>steel wool</td>
<td>#00-#0000</td>
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Continued
ABRASIVES

OPEN-COAT VS. CLOSED-COAT PAPERS
Here's yet another decision to make. On closed-coat sandpapers, the abrasive mineral covers the entire surface. On open-coat papers, the mineral covers only 50-70% of the paper's surface, so they won't clog or fill up as quickly as closed-coat papers. We generally use open-coat paper on resinous softwoods and other woods that tend to "load up" or clog the paper; also for power sanding. Closed-coat paper cuts faster because it has more abrasive mineral on the surface, which makes it a better choice for most hand-sanding chores.

FLEXIBLE ABRASIVES FOR SANDING CONTOURS
The following specialized sanding products will help you smooth out the curves and get into those hard-to-reach spots. For sources, see our buyer's guide on page 53.

Foam sanding blocks have a backing of flexible sponge material with an aluminum-oxide abrasive coating on one, two, or four sides. The palm-size blocks measure about 3" wide by 4" long by ½" to 2" thick. As shown in the photo at right, the abrasive may be bonded directly to the pad (1), attached with a hook-and-pile fastener (2) or bonded to an intermediate fabric backing (3, 4). When the blocks clog up with sanding residue, just wash them in clean water and reuse.

We found that all of these blocks work well on flat and contoured surfaces, but are too flexible to use for a sharp edge or corner.

Cloth-backed sanding strips, or shop rolls, come in standard grit sizes from 40 to 240 grit. You can buy the 50-yard rolls in 1", 1½" and 2" widths. They're great for hand-sanding contoured shapes, such as turned spindles. Keep a roll handy next to your lathe.

Abrasive cords get you into those tight spots that other sanding products won't reach. Made exclusively by the Mitchell Company, the aluminum oxide-coated cloth cords come in widths from ¼“ to ½“, and standard grits from 120 to 200.

In addition to these products, you'll find two nifty power tool attachments for contour sanding—flap sanders and inflatable sanding drums (see photo at right).

Manufacturers treat some of their silicon carbide and aluminum oxide papers with zinc stearate to keep them from loading up. The treatment also turns the paper off-white, as shown in the photo on page 50. We like to use these papers in the finer grits for finish sanding.

Sand "paper" alternatives include foam sanding blocks (1-4), cloth-backed sanding strips (5), and abrasive cords and tapes (6). Use these products for sanding contoured surfaces and getting into tight spots.

Flapper-type sanders fit portable drills. The one shown here is the Sand-O-Flex from Merit Abrasives.

Inflatable drum sanders fit portable drills, drill presses, and lathes. You inflate them with an air pump.

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SPECIALTY ABRASIVES FOR A FINE FINISH

The sanding process on bare wood usually ends with 220-grit sandpaper. Then you apply the finish of your choice. But in some cases, you may need an even smoother surface prior to applying the finish. In such situations, you can wet-sand with fine-grit wet/dry sandpapers, or use steel wool or nonwoven finishing pads for final smoothing.

You also can use these products to smooth and level sealers and finishes between coats. We have found that the fine-grit finishing pads also work great for applying penetrating finishes, such as Danish oil or tung oil. (See photo below.)

Wet/dry sandpapers come in most of the standard grit sizes, though you’ll usually use 220- to 600-grit papers for wet-sanding wood and finishes. These silicon carbide papers have a waterproof bonding agent and backing.

Steel wool comes in seven grades, ranging from #3 (coarsest) to #0000 (finest). Use the coarser grades for removing chemical paint strippers during refinishing. Use the finer grades (#00-#0000) for smoothing contoured surfaces prior to applying a finish, and between finish coats.

Steel wool has always elicited two major complaints from woodworkers—it rusts, and it sheds tiny strands of steel, which you must then remove with a tack cloth.

To prevent rust, most manufacturers put a light coat of oil on the steel wool pads. This oil may affect the adhesion or penetration of some stains and finishes. We suggest that you soak the pads in acetone or lacquer thinner to remove the oil before using them. High-quality steel woods have longer strands, so they won’t shed quite as much as low-quality ones. Some are also oil-free. See buyer’s guide at right.

Non-woven finishing pads have the best qualities of wet/dry sandpaper and steel wool. The 1/4”-thick nylon fiber pads easily conform to contoured surfaces and won’t shed, and can be cut into various shapes and sizes. Most come impregnated with silicon carbide or aluminum oxide powders in various grits, which are labeled coarse to extra fine.

We have found that these pads outlast steel wool and sandpaper.

Pumice and rottenstone have one purpose only—to rub out the topcoat of hard finishes, such as lacquer, varnish, and shellac. (Don’t use them on oil finishes). You mix these powdered abrasives with an oil lubricant, such as paraffin oil or lemon oil, and apply them with a felt pad. Pumice comes in coarse and fine grades. You start with the coarse grade, then go to the fine grade. If you want an even higher polish, follow up with rottenstone mixed with a lubricant.

WHERE TO BUY ABRASIVES

You can buy these products in hardware stores, home improvement centers, and woodworking supply catalogs. For more information, call or write to these sources:

Zirconia alumina belts and disks
- Norton Company, Abrasives Marketing Group, Worcester, MA 01606-2698, 1-800/524-2110

Abrasive cords and tapes
- E.C. Mitchell Co., P.O. Box 607, Middleton, MA 01949-0907, 617/774-1191

Inflatable sanding drums
- Fine Tool Shops, 170 West Road, P.O. Box 7091, Portsmouth, NH 03801, 1-800/533-5305
- Industrial Abrasives Company, 642 N. Eighth St., Reading, PA 19603, 1-800/428-2222
- Trimex Industrial, Dept W, Route 11, Moores, NY 12958, 518/236-5521

Cloth-backed sanding strips
- Jet Equipment & Tool, 1901 Jefferson Ave., Tacoma, WA 98402, 1-800/426-7941
- Norton Company (see above)

Flapper sanding attachments
- Merit Abrasive Products, 201 Manville, Compton, CA 90224, In Calif.: 213/774-6650, Outside Calif.: 1-800/421-1936

Non-woven finishing pads
- 3M Home Products Division, 3M Center, Bldg. 223-48, St. Paul, MN 55144, Attn: Tom Nelson
- Grit, Inc. 809 Broad St., Wrens, GA 30833-0709, 1-800/431-2976
- Norton Company (see above)

Premium steel wool
- Liberon, P.O. Box 1750 Dept. W, Mendocino, CA 95460, 707/937-0375
- Garrett Wade, 161 Avenue of the Americas, Dept. W, New York, NY 10013, 1-800/221-2942

Produced by Jim Barrett with David Donnelly Photographs: Bob Calmer and Jim Kascoutas
ONE GREAT-LOOKING MANTEL CLOCK
NO MATTER HOW YOU LOOK AT IT

The decision to build comes easy. But, deciding where you'll display it may be a pleasant dilemma. Right at home on a mantel or handsomely hung on a wall, our cherry-cased clock fits well into almost any decor and adds a bit of class to any room.

MAKING THE FRONT AND SIDE FRAMES
Note: You'll need some 1/2" stock for this project. You can resaw or plane thicker stock to the correct thickness or special-order it. See the Buying Guide on page 57 for our source.

1 To make the front and side frame members (A, B), rip four 1"-wide strips of 1/2" cherry 20" long as laid out on the Cutting Diagram on page 56. (It's easier and safer working with the long strips.) Rout a bead along one edge of each strip as shown on the Step 1 Drawing at upper right.

2 Using the Step 2 Drawing as a guide, rout a 1/4" rabbet 3/16" deep in each frame strip where indicated. (You also can cut the rabbet on a table saw with a dado blade.)

3 Using a miter box, cut the eight A's and four B's to length as shown in the photo below. (We used a Japanese saw that cuts on the pull stroke to cut the pieces.)

Cut frame parts to length with a miter box and fine-tooth saw.
4 To assemble the three cherry frames, spread glue on the mitered ends, and “clamp” them together (good face up) on a piece of scrap wood as shown in the photo below. (We found the frames too small and clumsy to clamp by ordinary means.) Wipe off the excess glue at each mitered joint with a damp cloth. Later, remove the frames, and sand each frame smooth.

JOINING THE FRAMES

1 Mount a dado blade to your table saw. Using the miter gauge, cut a $\frac{3}{8}''$ rabbet $\frac{1}{4}''$ deep on the top, bottom, and back edges of both side frames as shown in the drawing below. (Don’t rabbet the front frame.)

2 Switch back to a $\frac{1}{8}''$ blade in your table saw, and tilt the blade to $45^\circ$ from center. Now, bevel-rip the front edge of each side panel and both side edges of the front panel. (Do not narrow the width of the panels when ripping.)

3 To form the U-shaped framework, glue and tape the side frames to the front frame, checking for square. (We used duct tape to hold the frames together until the glue dried. We also used a scrap spacer between the side frames to hold them square to the front frame while the glue dried.) Later, scrape off any squeeze-out, and lightly sand the assembly smooth.

FORMING THE TOP AND BASE

1 Rip and crosscut the base and top parts (C, D, E, F, G, H) to the sizes listed in the Bill of Materials.

Continued
MANTEL CLOCK

TOP SECTION

BOTTOM SECTION

Cutting Diagram

2" Rout a cove on the front and side edges of parts D and G, using the top drawing at right as a guide.

3" Switch bits and, using the drawing second from the top as a guide, rout a bead on the front and side edges of parts E and H.

4" Now switch to a 1/4" round-over bit, and make the routing cuts shown on the two-step drawing below right to form the decorative edges on part E.

5" Sand the routed pieces smooth. With the back edges flush, glue, center, and clamp part D to C, and then later, part F to the C-D assembly. Repeat this process to laminate G to F, and later, H to the G-F assembly. Wipe off any squeeze-out with a damp cloth immediately.

FINAL CUTTING AND ASSEMBLING

1" With the back edges of the base and framework flush, glue them together, centering the framework from side to side. After the glue has dried, remove the clamps and repeat the process to mount the top to the framework.

2" To make the mounting block (I) for the clock movement, cut two pieces of 1/2"-thick cherry to 2 1/4" x 5 1/2". Laminate the two pieces face-to-face with the edges flush. After the glue dries, remove the clamps, and cut or rout a 1/4" rabbet 3/8" deep across the ends where shown on the Mounting Block Drawing at right. Check the fit of the mounting block in both rabbeted grooves in the clock housing (top and bottom); trim if necessary.

3" Drill and countersink a pair of 1/8" holes through the mounting block where dimensioned on the Mounting Block Drawing.

4" Cut the hardboard back (J) to fit into the rear rabbeted opening. Using the drawing at right as a guide, drill and countersink four 3/8" holes through the hardboard back for fastening to the back side of the clock housing later.

Bill of Materials

<table>
<thead>
<tr>
<th>Part</th>
<th>T</th>
<th>W</th>
<th>L</th>
<th>Material</th>
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<tr>
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<td>6&quot;</td>
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</tr>
<tr>
<td>B*</td>
<td>1/2&quot;</td>
<td>1&quot;</td>
<td>3 1/2&quot;</td>
<td>cherry</td>
<td>4</td>
</tr>
<tr>
<td>C</td>
<td>1/2&quot;</td>
<td>4 1/4&quot;</td>
<td>8 1/4&quot;</td>
<td>cherry</td>
<td>1</td>
</tr>
<tr>
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<td>1/2&quot;</td>
<td>4 1/4&quot;</td>
<td>7 1/4&quot;</td>
<td>cherry</td>
<td>1</td>
</tr>
<tr>
<td>E</td>
<td>1/2&quot;</td>
<td>3 1/2&quot;</td>
<td>7&quot;</td>
<td>cherry</td>
<td>1</td>
</tr>
<tr>
<td>F</td>
<td>1/2&quot;</td>
<td>3 1/2&quot;</td>
<td>6 1/2&quot;</td>
<td>cherry</td>
<td>1</td>
</tr>
<tr>
<td>G</td>
<td>1/2&quot;</td>
<td>3 1/2&quot;</td>
<td>6&quot;</td>
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</tr>
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<td>H</td>
<td>1/2&quot;</td>
<td>2 1/4&quot;</td>
<td>5&quot;</td>
<td>cherry</td>
<td>1</td>
</tr>
<tr>
<td>I</td>
<td>1&quot;</td>
<td>2 1/4&quot;</td>
<td>5 1/2&quot;</td>
<td>cherry</td>
<td>1</td>
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<td>1/2&quot;</td>
<td>5 1/2&quot;</td>
<td>6&quot;</td>
<td>hardboard</td>
<td>1</td>
</tr>
</tbody>
</table>

*Parts marked with an * are cut larger initially, and then trimmed to finished size. Please read the instructions before cutting.

Supplies: 1/2" x 5 1/2" mirror, 2 — 1/2" x 1 1/4" x 4 1/2" glass, 1 — 1/2" x 4 1/2" x 4 1/2" glass, 4 — #2 x 1" flathead wood screws, clear silicone sealant, double-faced tape, finish.

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5 Have a mirror cut to size, and fasten it to the hardboard back (we used double-faced tape). Get the three glass panels cut to size for the framework at the same time.

6 Stain and finish the cherry clock pieces as desired. Position the glass panels in the rabbeted frames, and secure the glass panels in place with clear silicone sealant as detailed on the Frame Assembly Drawing on page 55. Now, mount the clock movement to the mounting block. If you choose to place the clock on a mantel or shelf, you simply slide the mounting block (1) into the bottom rabbet. If you prefer to wall-mount the clock, slide the mounting block into the opposite rabbet. You'll hang the clock with the wide end up, as shown in the small opening photo on page 54.

7 Position the hardboard back in the rear-rabbeted opening. Using the previously drilled holes as guides, drill \( \frac{1}{8} \)" pilot holes \( \frac{3}{4} \)" deep into the clock housing. Now, fasten the hardboard back (with the mirror attached) to the back of the clock housing.

8 If you plan to hang the clock on the wall, drill a \( \frac{1}{4} \)" hole \( \frac{1}{2} \)" deep at a slight angle where shown on the Final-Assembly Drawing, above.

**BUYING GUIDE**

- **Quartz skeleton movement.** Complete with brass time ring, catalog no. 10050, $26.95. Requires one N battery, catalog no. 45004, 85 cents each. Movement and battery, $27.80 plus $3.30 shipping from Klockit, P.O. Box 629, Dept. WD12, Lake Geneva, WI 53147.

- **\( \frac{1}{2} \)" cherry.** 2 pieces measuring \( \frac{1}{2} \times 5\frac{1}{2} \times 36" \), catalog no. W4559, $88.89 each, $4 shipping. Craftsman Wood Service, 1735 W. Cortland Ct., Addison, IL 60101 or call 312/629-3100.

Produced by Marlen Kemmet
Project Design: James R. Downing
Photographs: William Hopkins
Illustrations: Kim Downing; Bill Zaub

WOOD MAGAZINE  DECEMBER 1987
WOODWORKING BOOKS
YOU’LL WANT TO GIVE

Woodworkers never seem to have enough books. That's why books make perfect gifts. Here at WOOD, we all have our special favorites we wouldn't hesitate to bestow on woodworking friends (see box, opposite). But what books would other woodworkers choose to give?

We picked half a dozen well-known woodworkers, all with different backgrounds and specialties, and asked them the big question: "What book or books from your field of woodworking would you give to a beginner with similar interests?"

Roger Cliffe, De Kalb, Illinois; professor of industrial arts, Northern Illinois University, author, and custom cabinet shop owner.
  "This isn't a project book, but it shows how things go together. Excellent line drawings actually help you build things or give you hints to design your own projects."
  "This tells you all you need to know, from working the bare wood to obtaining the finest finish luster."
  "This is the neatest book I own. It tells you how wood has been used in different countries over the centuries. Don't read it cover to cover, but keep it within reach next to your armchair."

To assemble this holiday gift list, we asked some well-known craftsmen, and the WOOD staff, for their recommended reading.

Clockwise: Carver Harold Enlow, designer Ian Kirby, craftsman Roy Underhill, wood expert Paul McClure, and others, offer advice.

Harold Enlow, Dogpatch, Arkansas; woodcarver, instructor, and author.
  "It's a good beginner book. Everybody seems to like it, and that's why I do. Most everyone finds it a fun book with appealing designs and patterns."
- My favorite of the books I've written is for novice carvers:
  - How to Carve Faces in Driftwood. (Note: Harold's book is self-published. To order, write: Enlow Woodcarving, P.O. Box 34, Dogpatch, AR 72648. Price is $10.20, including postage.)

Ian J. Kirby, Cumming, Georgia; designer, cabinet and furniture maker, author, and teacher at Kirby Studios, Ltd.
  "Every woodworker in the world ought to read this one. He gets you to think about workmanship. He says that workmanship adjusts to the nature of the times. Pye is a woodworker who writes."
  "I'm concerned that beginning woodworkers have a visual education, too. George Nelson is one of America's great architects. And he gives you a visual experience through photographs."

Paul McClure, Gilbert, Arizona; WOOD magazine's wood technologist, former wholesale hardwood buyer, woodworker, and instructor.
- Know Your Woods, by Albert Constantine, Jr., 1975, Charles Scribner's Sons, New York, hardcover, $12.95.
  "A real good one for a layman. He covers all the woods you can possibly ever get and where they come from. It's easy to read, and entertaining as well."
  "For the beginner, it has all color photographs of different wood. It's kind of like walking through an international lumberyard."
BEST READ BOOKS FROM THE WOOD STAFF

Peter J. Stephano
Features Editor
“Frank writes as entertainingly as a novelist, yet tips and techniques come across.”

Marlen Kemmet
How-to Editor
“Great photography here, plus lots of tips and a few projects. A different, interesting type of book on woodturning.”

Jim Barrett
Buymanship/Techniques Editor
“This was my old college textbook, but I still frequently refer to it because it covers everything.”

James E. Boebling
Project Builder
“A real comprehensive text — from design to manufacture.”

Perry A. McFarlin
Graphic Designer
“Roy makes old ways come to life again — with a bit of humor.”

Produced by Peter Stephano
Have you checked the prices of carbide-tipped blades lately? Not too long ago you would have paid anywhere from $60 to $100 for a 10" blade. Today, you can get one for as little as $20.

Sure, this trend bears good news for us home woodworkers. But it also raises several questions. For instance, with blades ranging from $20 to $120 and up, you're bound to find whopping differences in quality. So, how do you know if you're really getting what you pay for? And with so many different kinds of blades on the market, how do you determine which ones (and how many) best suit your needs?

This guide will help you answer these questions. But, before reading on, familiarize yourself with the terms we use by studying the blade illustrated below:

---

**HOW TO SPOT A QUALITY SAW BLADE**

You can see some of the qualities of a good blade just by looking. But to determine others, such as the materials and workmanship that go into the blade body, you'll need to search the manufacturers' literature for clues. Here's what to look for:

- **Better blades have bigger tips**
  - When looking at blades of the same type, compare the size of the carbide tips. High-quality blades generally have larger tips so they'll take more sharpenings. And, the larger the tips, the more abuse they'll take because they're less likely to chip or break off.

  On the other side of the coin, you can replace inexpensive "throwaway" blades for about the same price it would cost to sharpen them. But we suggest you save up your coins to buy the best blades you can afford; you'll be happier with their overall cutting performance. Besides their short life, the cheap ones just don't cut as well.

- **Look for smooth tips**
  - Inspect the tip surfaces—with 5x or 10x hand lens, if possible. Tips with visible scratches or coarse, uneven grind lines have a dull cutting edge to begin with, and will continue to dull more quickly than those with smooth surfaces.

  Blade manufacturers use diamond abrasive wheels to grind the carbide tips. To make high-quality blades, they use 400- to 600-grit wheels to grind the top and face surfaces of the tips. Cheaper blades are finish-ground with coarser 180- to 220-grit wheels.

- **Check the braze joints—for safety's sake**
  - No matter how good the tips are, you don't want them flying off the blade while you're sawing. On high-quality blades you'll find the tips neatly brazed into deep pockets cut into the saw teeth (see the drawing below). Avoid blades with rough or pitted braze joints.
SAW BLADES

If You Feel Swamped with Choices, Here’s Help!

- The saw body: milling makes a difference
  Blades with a body made of milled, heat-treated steel outlast and outperform those with a stamped-steel body. On premium blades, the manufacturer carefully tensions and grinds the body, then checks it for balance. Tensioning a blade relieves stresses in the metal so the body will stretch evenly during operation.

  Better blades generally have a thicker body than their equivalent in the low-end blades. Most also have expansion slots. They allow the blade to expand and contract without warping. The slots usually end with a hole to help keep the blade from cracking. As detailed in the drawing on the facing page, note that some manufacturers plug the holes with a soft metal, such as copper, to make them run more quietly. All of these factors minimize blade warp (runout) and vibration during operation.

  **Note:** You can improve the cutting performance of almost any blade. Simply use a dampener or stiffener. These circular plates, about 1/4 to 1/2 the blade diameter, add rigidity to the blade body to reduce vibration. Depending on their design, you attach them to one or both sides of the blade when you install it in the saw.

- Harder carbide means longer blade life
  The better blades usually use a harder grade of carbide than the less costly ones. The carbide grades in saw blades range in hardness from C1 (softest) to C4 (hardest).

  Although harder carbide tips hold a cutting edge longer than the softer grades, they’re also more brittle. So, manufacturers of premium blades carefully match carbide hardness to blade application. And, they usually indicate the hardness of the tips in their literature.

CHOOSING THE RIGHT BLADE FOR THE JOB

If you’re used to buying steel blades, you may have noticed that their carbide counterparts don’t fit into the same neat categories. Sure, you can rely on the designations and descriptions found in manufacturers’ catalogs or on the saw blade package. But, in some cases, you’ll find such descriptions sketchy, and they’ll vary from one blade maker to the next.

The shape, or grind, of the carbide tip plays the key role in determining which blades work best for each cutting operation. We found that most carbide blades designed for cutting wood fit into one of four basic tip-grind configurations: Flat top (FT), alternate-top bevel (ATB), alternate-top bevel and raker (ATB&R), and triple chip (TC).

**FLAT TOP (FT)—For ripping only**

You’ll find this tooth grind (shown below) on blades designed for fast, heavy-duty ripping. Deep gullets separate the teeth, which are ground to an aggressive 20° hook angle. Most 10° FT rip blades have 10 to 30 teeth (24 teeth being most common). We recommend you not use FT blades for crosscutting. The flat, chiselike teeth leave a fuzzy endgrain surface and splinter the edges of the cut. They’re also poor performers on plywood, particleboard, and other materials that easily splinter or chip out.

THIN-KERF BLADES: Smooth, stingy cutters

Most carbide blades cut a kerf about 1/8" wide, give or take a few thousandths of an inch. Thin-kerf blades cut one about half that width. Use these specialized blades for chip-free cuts on expensive woods when you want to keep material loss at a minimum.

The drawing at right compares the profile of standard flat-ground blade with two common types of thin-kerf blades: a thin-rim planer blade and a thin-rim plywood blade. Thin-kerf blades also have smaller carbide tips, with less side clearance than standard-width blades, which provide a smoother cut. But the tips won’t take as many sharpenings as a conventional carbide blade, so avoid using them for general cutoff work. You can use only the thin portion of the blade for cutting, so there’s a limit to the depth of cut they can make.

Continued
CARBIDE-TIPPED CIRCULAR SAW BLADES

ALTERNATE-TOP BEVEL (ATB)—For clean crosscuts

Alternately beveled teeth cut with a shearing action, producing a smooth cut across the grain in hardwoods, softwoods, plywood, and wood composition materials.

On ATB blades, both the bevel angle and number of teeth determine the smoothness of cut. For instance, a steep bevel angle (15° to 20°) gives the tip an extremely sharp point, which practically eliminates splintering and tearout on the bottom side of the stock. But tips with steep angles will dull more quickly than those with lower angles, so you'll have to sharpen them more frequently.

Choose a 40-tooth blade for general crosscutting on dimensional stock at a moderately fast feed rate, and for shallow ripping and trim cuts with the grain. A 60-tooth blade gives an even smoother cut, but at a slower feed rate. Make an 80- to 100-tooth blade your choice for glass-smooth cutoffs and miters on thin or fragile materials, such as picture frame moldings and veneered plywoods.

ALTERNATE-TOP BEVEL AND RAKER (ATB&R)—The best all-around blade

You'll commonly find this tooth grind configuration on general-purpose combination blades. ATB&R blades make fairly smooth cuts with and across the grain.

The most common tooth pattern, shown in following illustration, has one flat-top raker tooth followed by four alternately beveled cutting teeth. A deep gullet for fast chip removal separates each set of teeth. Other ATB&R tooth configurations consist of two to eight ATB teeth for each raker, with or without the deep gullet.

Typically, 10° ATB&R blades come with about 50 teeth. They make reasonably smooth rips, crosscuts, and miters in hardwoods, softwoods, plywood, and wood composition materials. If we had to recommend one all-purpose blade, this is the one we'd go with.

TRIPLE CHIP (TC)—For tough materials

This tooth design works best for general cutting chores on woods, solid plastics, plastic laminates, and other hard, abrasive materials. As with other blades, the more teeth, the smoother the cut.

We found that TC blades don't crosscut wood quite as smoothly as ATB or ATB&R blades. But on the positive side, the more-durable teeth cut a wider range of materials without dulling as quickly. For example, most manufacturers offer blades with this tooth grind for smooth, nearly chip-free cuts in single- or double-sided plastic-laminated sheet goods (such as Formica).

HOW MANY BLADES DO YOU NEED?

Despite any manufacturer's claims you may have heard, you'll find that no one blade cuts perfectly in all situations. But, as mentioned earlier, we've found that a 50-tooth ATB&R combination blade comes closest to a do-it-all blade. For this reason, this is the standard blade you'll find on our table saw.

Because we use our radial arm saw primarily for general crosscut work, we usually equip it with a 50- to 60-tooth ATB blade. For fine cutoff work, go with more teeth. Or, you can choose one of the specialized blades discussed below.

Generally, these three blades will handle most cutting situations in the home shop: a 24-tooth FT rip blade, a 50-tooth ATB&R blade, and a 60- to 80-tooth ATB blade. Try these out for starters. Then, if you find you need more specialized blades, buy the best you can afford.

BLADES FOR RADIAL ARM AND MITER SAW

Watch the hook angle!

You can use many of the same blades on a radial arm saw that you can on a table saw, with these exceptions: For ripping operations on radial saws, the hook angle should not exceed 15°. The smaller the angle the less chance the work will lift and kick back. For crosscutting, choose a blade with a hook angle of 10° or less. Blades with larger hook angles tend to overfeed, causing the blade to jam.

Blades suitable for power miter saws and chop saws usually have an ATB tooth design and a hook angle of 7° or less. Depending on the smoothness of cut you want, you can choose a blade with 40 to 100 teeth. Some manufacturers offer cutoff blades designed especially for radial arm saws and miter saws, such as the DML Radi-All and Miter-All blades, Freud's LU85M, the Woodworker II from Forrest, and the Chop Champ from Systi Matic.

Written by Jim Barrett
Technical Consultant: George Gransem
Illustrations: Taylor & Associates; Bill Zauf
An exciting 18-page array of easy-to-build projects guaranteed to bring smiles of appreciation to the faces of those lucky folks on your “Very Important Persons” list
Display your favorite Vintages in Our
SHOWCASE WINE RACK

FORMING THE END FRAMES
1 Cut the top pieces (A), uprights (B), and bases (C) to the sizes listed in the Bill of Materials for the two end frames. Then, using the drawing below for reference, mark the radii for all of the curves on the tops and bases.

TOP AND BASE PARTS VIEW

2 Cut a piece of scrap that’s at least as long as the base pieces (12 1/2"). Now, clamp the scrap to the bottom edge of one of the base pieces as shown in the photo below. Clamp these two pieces to your drill press table, and bore the two 1” holes and four 2” holes where marked to form the radii. Repeat these operations on the other base. (If you don’t have the 1” and 2” drill bits, you can cut the radii to shape on a band saw.)

With room for eight bottles of your finest wine and just as many stemware glasses, this freestanding unit makes exceptionally good use of a small amount of space. And guess what? It’s a snap to build as the joinery can be easily accomplished with a doweling jig and dowel pins. Why not make several and treat a friend or relative to this special gift?

Bore holes in the walnut base pieces with a Forstner bit to form the 1”- and 2”-radii curves.
3 Using your band saw and a fence, cut straight lines between the holes to shape the bases as shown in the photo at left.
4 Repeat the boring and cutting process (steps 2 and 3) to shape both top pieces of the end frames.
5 Dry-clamp the pieces of each end frame together, and mark dowel hole reference lines where dimensioned on the drawing on top of the next page. Remove the clamps after making the marks.

Continued
**WINE RACK**

\(\frac{1}{4}\)" round-over on all but the bottom edges of the feet of both end frames. Finish-sand each end frame.

**SHAPING THE BOTTLE RESTS**

1. Cut the four bottle rests and the two top cross members (D) to 2x19". Mark diagonals on each end of each piece to find the center, and drill a \(\frac{7}{8}\)" pilot hole 1" deep at each of the center points. (Be careful to keep the hole at a right angle to the surface being drilled.) Set aside the two top cross members; you'll use them later.

2. To mark the radii on the four bottle rests, first make the template shown on the drawing below. Mark centerlines on each bottle rest where dimensioned on the Exploded-View Drawing. Align the centerline on the template with those on each bottle rest, and mark four radii on each bottle rest.

3. Rout a \(\frac{1}{4}\)" round-over along the top edges of each support and along all but the ends of the two remaining cross members (D). Sand the parts smooth.

4. Drill five holes in the front cross member and nine holes in the rear, using the dimensions and hole size on the drawing above (we drilled ours with a doweling jig).

5. Cut ten pieces of \(\frac{3}{8}\)" walnut dowel stock to 2\(\frac{1}{4}\)" long and four pieces to 2\(\frac{1}{2}\)" long.

6. Using the 2\(\frac{1}{4}\)"-long dowels, glue and clamp the stemware assembly (D, E, F) together. Check that the supports are level with each other and square the assembly. Sand a round-over on one edge of each of the 2\(\frac{1}{2}\)"-long dowels. Glue the four dowels (rounded ends exposed) in the back cross member. These dowels prevent the glasses from sliding out the back.

**FINAL ASSEMBLY**

1. Spread an even coat of glue on the ends of each cross member, and screw the bottle rests (D) and stemware rack between the end frames. Wipe off any excess glue with a damp cloth. Glue \(\frac{1}{2}\)" wood buttons in the screw holes.

2. Stain and finish as desired. (We applied two coats of polyurethane sanding sealer and three coats of polyurethane, steel-wooling between coats. Next, we used the steel wool to apply a coat of Minwax paste finishing wax. Finally, we buffed the wax with a cloth.)

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Project Design: Marlene Kemmer
Photographs: William Hopkins;
Jim Kascoutas
Illustrations: Kim Downing; Bill Zaun

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66
The perfect mood setter for snowy winter evenings

CHIMNEY-TOPPED CANDLE HOLDER

Print this article

There's something about the flicker of candlelight that's so soothing to watch. Provide that relaxed feeling with our smart cherry base and a glass chimney. You'll have a project that's sure to warm someone's heart this holiday season.

1 Cut seven pieces of 3/4" stock (we used cherry) to 5 x 5 1/2" long. Glue and clamp the pieces together face to face, with the edges and ends flush. Let cure overnight.
2 Set your table saw blade at 45° from center, and bevel-rip 1" off each of the four corners to make the lamination roughly octagonal in shape. This will make the lamination easier to turn round. Trim both ends of the lamination square (we did this on the radial arm saw).
3 Screw the lamination to the faceplate (we used a 3" faceplate with 3/8" brass wood screws). Position the tool rest in front of the lamination. With the lathe running at about 800 rpm, round down the cherry lamination with a gouge until its diameter measures 4 1/2".
4 Move the tool rest to the end of the candle holder, and form the candle and chimney recesses with a parting tool as shown in the drawing below. Check the fit of both the candle and the chimney in their respective recesses for a good fit. (The styles of chimneys vary and are available at most hardware and variety stores, or see the Buying Guide for our source.)
5 Using the full-size half pattern or your own shape, turn the candle holder to shape (we used a 1/4" and 1/2" gouge, a skew, and a parting tool). Allow enough space between the faceplate and the bottom of the holder to avoid hitting the faceplate screws when turning to shape.
6 Using a faster speed (we switched to about 1,500 rpm), finish-sand the candle holder. Slow the lathe to its slowest speed and apply the finish. (We used cherry stain and polyurethane, and placed cardboard behind the lathe to catch the splatter.)
7 Using a parting tool, separate the candle holder from the faceplate as shown in the drawing below.

FULL-SIZE HALF PATTERN

Diam. = 4"

Chimney recess

Candle recess

Diam. = 4 1/2"

BUYING GUIDE

- Glass Chimney. Catalog no. PO101, minimum order 2 chimneys at $4.95 each, plus $3 shipping from Craft Supplies USA, 1287 East 1120 South, Provo, UT 84601, or call 801/373-0917.

Project Design: C.L. Gatzke
Photograph: William Hopkins
Illustrations: Bill Zaun; Jim Stevenson

WOOD MAGAZINE  DECEMBER 1987  67
Unique gifts each, both of these handsome stocking stuffers also have a practical side. Best of all, the makings for these last-minute gifts are as close as your scrap bin.

**MONEY CLIP**

1. Cut two pieces of scrap 1/2" walnut to 1 3/4 x 2 3/4", one for the money clip front, the other for the clip back. Using the full-size pattern below and carbon paper, transfer the shape of the clip fronts' top onto the top edge of one of the walnut blocks. Set the other block aside for now.

2. With double-faced tape, stick the walnut block with the shape traced on it to the end of a piece of scrap (see the photo at right). Using the scrap as a handle, make a relief cut at the channel end; then cut in from the other end to form the face of the clip front.

Use a band saw with a 3/8" blade to cut the clip front to shape. Make a relief cut at the channel end first.
KEY CHAIN

With a drum sander, smooth the clip front to shape following the front-face profile pencil mark.

3 Mount a 1 1/2"-diameter sanding drum to your drill press, and sand to the marked front-face profile line as shown in the photo above. Do not sand the end that fits into the brass channel.

4 Back at the band saw, make the second cut where marked to complete the clip front. Remove the waste material from the scrap holder; then tape the clip front, face side in, to the scrap. Sand the back side of the clip front. Remove the finished piece from the scrap.

5 Tape the other block to your scrap holder as you did the first one, and resaw a 1/4"-thick piece from it. Sand the cut surface until the piece is 1/16" thick. Round the front corners of both parts (see the Exploded-View Drawing). Then, epoxy the clip front to the back piece, making sure the top, bottom, and channel edges align.

6 Using the three-step drawing at right as a guide, rabbet the channel end of the clip to accept a 1/8" brass channel. Test-fit the channel end of the clip into a piece of 1/8" brass channel, cutting again if necessary to get a snug fit.

CUTTING THE RABBETS

STEP 1 Stick money clip to auxiliary wood block with double-faced tape.

STEP 2 Cut a 1/8" rabbet 1/8" deep on outside edge of clip front.

STEP 3 Cut a 1/8" rabbet 1/8" deep on inside edge of clip back.

Continued
WALNUT MONEY CLIP AND KEY CHAIN

7 Cut a piece of \(\frac{1}{4}\)" brass channel (available at most hobby stores) to 1\(\frac{3}{4}\)" long. Epoxy the brass channel to the rabbeted end of the walnut clip. After the epoxy has cured, file or sand the ends of the brass flush with the walnut. (Be careful power sanding. If the brass gets hot and heats up the epoxy, the epoxy may liquefy and the pieces can separate.) To shine the brass, buff it with 0000 steel wool.

8 Finish the money clip as desired. (We filled a can with an oil finish, submerged the clip into the oil, wiped off the excess, and hung the clip on a wire to dry.)

**Supplies:** double-faced tape, epoxy, \(\frac{1}{8}\)" brass channel, 0000 steel wool, oil finish

Project Design: Jim Boelling

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**KEY CHAIN**

1 Plane or resaw a piece of scrap (we used walnut) to 1\(\frac{1}{4}\)" thick, and cut it to 2\(\times\)12" long. (Use a piece this long for safety when cutting and drilling later.)

2 Using a compass, mark a 1\(\frac{1}{2}\)"-diameter circle at one end of the walnut board. Now, drill a 1" hole \(\frac{1}{8}\)" deep into the walnut at the centerpoint of the circle.

3 Back the stock with scrap to prevent chip-out. Switch to a \(\frac{1}{2}\)" bit, center the bit in the 1" hole, and drill through the walnut.

4 Band-saw the 1\(\frac{1}{2}\)"-diameter disk to rough shape.

5 As shown in the photo at right, use two nuts to fasten the walnut disk to a \(\frac{1}{2}\)" bolt. Chuck the bolt into your drill press, start the drill press (we used a speed of about 1,000 rpm), and sand a round-over on the top and bottom edges of the disk. (We used progressively finer grits of sandpaper wrapped around a scrap of wood to sand the disk to shape.) Remove the disk from the bolt.

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6 To plug the hole in the disk, cut a \(\frac{1}{4}\"-diameter plug \(\frac{1}{4}\" thick from walnut. Glue the plug inside the \(\frac{1}{2}\" hole flush with the bottom. Later, sand the plug flush.

7 Glue or epoxy your initials inside the 1" hole (see the Buying Guide for our source of letters).

8 Clamp the disk into a small handscrew, and drill a \(\frac{3}{8}\)" hole \(\frac{1}{16}\" deep into the top.

9 Cut a #7 snap swivel (the kind used for fishing) in two where shown at left. Epoxy the swivel loop into the \(\frac{3}{8}\)" hole in the disk where shown in the Exploded View Drawing.

10 Sand and apply the finish. Attach the ring and chain to the disk. (We used the chain and ring from another key chain.)

**Supplies:** epoxy, #7 snap swivel, 1\(\frac{1}{4}\" key ring with chain, finish

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**BUYING GUIDE**

- **Walnut letters.** Two \(\frac{1}{8}\" \times \frac{1}{2}\" letters of your choice, $1.50. ppd from Academy Trophy, 3002 Forest Ave., Des Moines, IA 50311.

Project Design: James R. Downing
Photographs: Bill Hopkins
Illustrations: Kim Downing, Bill Zau
"Talk of the Neighborhood"

DOlL STROLLER

When the other kids on the block ask your special one what she got for Christmas, we bet she’ll think of this gift first. It’s decidedly stylish, so very practical, and best of all, it’s from you.

FIRST, BUILD THE STROLLER BODY
1 Cut and edge-join enough ½” pine stock to form two panels — each measuring 12½” square — for the stroller sides (A). Scrape off the excess glue, and use a straightedge to check each panel for flatness. Plane, if necessary.
2 Mark diagonals on one panel to find its center. Mark a 12”-diameter circle on the marked panel (we used trammel points to mark ours). With the marked panel on top, stick the two panels together using double-faced tape. Make sure the grain on both panels runs in the same direction.

Continued
DOLL STROLLER

Bill of Materials

<table>
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<tr>
<th>Part</th>
<th>Finished Size</th>
<th>Material</th>
<th>Qty.</th>
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<td>2</td>
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<tr>
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<td>mahogany</td>
<td>1</td>
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<tr>
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<td>2</td>
</tr>
<tr>
<td>E</td>
<td>1/2&quot; x 1/2&quot;</td>
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<tr>
<td>F</td>
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<td>mahogany</td>
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<tr>
<td>G</td>
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<td>mahogany</td>
<td>4</td>
</tr>
</tbody>
</table>

*Parts marked with an * are cut larger initially, and then trimmed to finished size. Please read the instructions before cutting.

Supplies: double-faced tape, paraffin, 1/2" dowel 10 1/2" long for handle, 2 — 1/2" dowels 12 1/2" long for axles, 4 — 1/2" washers, 3/4" brads, 1" brads, 1/2 x 5" machine bolt with two washers and nuts (for sanding arbor), putty, primer, paint (nontoxic)

3 Mark the stroller-opening cut lines on the two panels, following the five steps outlined in the drawing below.

STEP 1
Drill a 1/4" hole at center point.

STEP 2
Mark first cut line here.

STEP 3
Mark second cut line here.

STEP 4
Connect transfer lines to the 1/4" hole on the bottom.

STEP 5
Transfer cut lines down sides.

STEP 6
From 1/4" mahogany plywood, rip and crosscut the plywood surround (B) to 9 x 30". Note that the grain runs crosswise.

4 Using a band saw, cut the taped-together panels to shape, cutting just outside the marked radius and 1" past the 90° cut lines where shown in the drawing below. Cutting past the 90° cut lines creates notches to capture the plywood surround that you'll fasten to the sides later. Now, sand the panels to the marked radius for the finished shape. Pry the two panels apart, and remove the tape.

5 Cut three 8" long spacers (we used 1 x 4s). Align the stroller sides by nailing the first spacer between the corners left square where shown on the following drawing. Now, nail the two remaining spacers between the stroller sides. Let the nail heads protrude; you'll remove the nails later. Clamp the assembly firmly to your workbench as shown in the drawing below.

6 From 1/4" mahogany plywood, rip and crosscut the plywood surround (B) to 9 x 30". Note that the grain runs crosswise.

7 To make wrapping the plywood around the sides easier, sponge the outside face of the plywood with warm water. Starting the plywood in the notches cut earlier with the band saw, wrap the plywood...
around the stroller sides, gluing and nailing as you work as shown in photo A. (We attached a clamp to the free end of the plywood to help hold it down as we nailed it in place.) Let the glue dry. Later, remove the 1 x 4 spacers.

8 Using a fine-tooth handsaw, cut along the 90° cut lines to form the stroller body opening.

9 Cut the two rails (C) to size. Rout a ¼" round-over along one edge on both. Glue and clamp each rail in position between the stroller sides, flush against the plywood. Sand a slight round-over on the outside edges of the stroller basket.

**NOW, FOR THE FRAME**

1 Cut the frame parts (D, E) to size. Refer to the Exploded-View Drawing at left, mark a 5/8" radius and hole locations on the ends of each piece. Then, mark the location of the half-lap joints on each frame part. Mount a dado blade to your table or radial arm saw, and cut a 1½"-wide half lap in each piece where marked. Cut the radiused ends to shape.

2 Drill ½" holes for the axles and ¼" holes for the handle in the frame parts. (We used double-faced tape to stick the pieces together, and then drilled the holes through both at one time.) Sand the frame parts smooth.

3 Glue each frame assembly together, checking for square.

**THE AXLES AND WHEELS COME NEXT**

1 Cut four 6"-square pieces from ¾" pine stock for the wheels. Draw diagonals to find center, and mark a 2¼" radius on each. Cut the wheels to shape.

2 To true up the wheels, start by drilling a ½" hole through each at the marked center point. Fasten the four wheels on a 1½ x 5" machine bolt with flat washers on the top and bottom as shown in photo B. Chuck this assembly to your drill press, and sand smooth. (We used a half-sheet of 60-grit sandpaper applied to particleboard with spray-on adhesive and held at 90° to the table with a try square. We positioned the drill press belt to run it at the slowest speed possible.)

3 Rout a ¼" round-over on both edges of each wheel (we routed ours with a table-mounted router).

4 To make the decorative hubcaps (G) mark four 1¼"-radius circles on ½" plywood. Cut the hubcaps to shape, and sand them smooth. Center and glue one of the hubcaps to each wheel.

5 Cut the push bar and two axles from ½" dowel stock. Use the dimensions given on the Exploded-View Drawing.

**ASSEMBLY AND FINISHING**

1 Glue and nail the side frames to the stroller body using the drawing above as a guide. Glue the push bar in position.

2 Fill any voids with putty and finish-sand the entire stroller. Apply a primer coat, then paint as desired.

3 Apply paraffin to the inside surface of all axle holes. Slide the axles through the holes, slip a washer on each axle end, then glue a wheel to the end of each axle.

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Project Design: James R. Downing  
Photographs: William Hopkins; Bob Calmer; Jim Kascoutas  
Illustrations: Kim Downing; Bill Zann

WOOD MAGAZINE  DECEMBER 1987  73
FLORAL WALL PLAQUES

We think you'll find it fun—and easy—to make these three-dimensional wall hangings. For more details about this nifty scroll saw technique, please turn to page 36.

1. Cut two workpiece blanks to 8¼" square from ¾" stock (we used Honduras mahogany). Cut or rout a ¼" chamfer along all top outside edges on each.

2. Align the centerpoint, and transfer the full-size patterns (large photos) on this page and the next to the blanks, using carbon paper.

3. Drill a ¼" start hole in each blank where shown on the photos. Using a scroll saw, cut the disk from within each blank. Then, cut the flower pattern from each disk. Sand...
a slight round-over on the face of each of the flower pieces and on the inside edge of the outer frame. Now, sand the surfaces smooth.

4 To create the three-dimensional look, first lay the outer frame (good face down) on a flat surface. Lay three \( \frac{3}{4} \)-inch-thick spacers inside the round opening. Position the round disk (good face down) in the circle on the spacers, lining up the grain of the disk with that of the frame. Run a bead of woodworkers' glue around the perimeter of the disk and let dry. (We mixed a small amount of sawdust with the glue to prevent the glue from running between the cracks onto the plaque's face.)

5 Remove the spacers, and place the plaque good face down again.

Now, position each flower piece in the opening from which it was cut. Apply a small bead of glue to the back side of each flower piece and to the disk.

6 Attach a sawtoothed hanger to the back of each plaque. Apply a clear finish of your choice.

Photographs: Bob Calmer

- Nd artist's acrylic paint.
"The Fairest of Them All"

**QUILT-LOOK HAND MIRROR**

Once you grasp this finely crafted hand mirror, you’ll know it’s more than just another vanity accessory. The quilt pattern evokes a country-style. The smooth edges on the walnut frame almost beg to be touched. A builder of this treasured gift will not soon be forgotten.

First, assemble the decorative quilted insert; then trim it to fit into the rabbeted walnut mirror frame. There’s no complicated joinery required.

**READYING THE WALNUT FRAME**

*Note: You’ll need ½" stock for this project. You can either resaw or plane thicker stock to size.*

1. Cut a piece of ½" walnut to 6x12" long for the mirror frame. (We planed down a piece of ¾" stock.) Mark reference lines on the walnut where shown on the drawing below.

2. To make the template for routing the opening in the walnut, start by cutting a piece of ¼" hardboard to 6x8". Using carbon paper, center and transfer the router template outline (inside oval) and reference lines shown on the Full-Size Half Patterns to the hardboard.

3. Carefully cut and sand the hardboard template opening to shape.

4. With double-faced tape, stick the template to the walnut, aligning the centerlines. Tape the walnut to a piece of scrap to avoid cutting into your workbench top when routing the opening.

5. Fit your router with a ½" bushing and a ½" straight bit. (Our bushing was too long, so we cut it with a hacksaw so it protruded a fraction less than ½" below the surface of the router base. (See the Buying Guide for our source of the router base and bushing.) With the bushing riding along the inside edge of the template, rout a ½" groove ⅛" deep in the walnut like that shown in Step 1 of Routing the Opening Drawings. (We made several shallow passes and gradually increased the depth being routed. Trying to rout ⅛" deep in one pass may break the straight bit.)

6. Switch to a ¼" straight bit. Riding the bushing against the inside edge of the template, rout completely through the walnut and into the scrap base as shown in Step 2. Separate the walnut from the scrap stock and template.

7. With carbon paper, trace the full-size patterns onto light cardboard. (Be sure to mark the reference lines so you can position the patterns correctly on the walnut.) Cut
Laying-Up the Quilted Insert

Note: You assemble the quilted insert oversize, and then cut and sand it to shape to ensure a tight fit within the routed opening.

1. Plane or resaw a 24” length of ¾” cherry and a 12” piece of ¾” padauk or another contrasting wood to ¾” thick. Now, rip strips ⅛” wide (the lengths stated are extra long for safety when cutting).

2. Using a miter box, cut 20 cherry squares and 4 padauk squares (¾ x ¾”). With the remaining stock, miter-cut one end, and then crosscut as shown in the photo below to form the 16 triangular pieces for the starlike center.

3. Cut a piece of cardboard to 3⅝ x 5” (we used the backing from a writing tablet). Draw a horizontal and vertical centerline on the cardboard. Select four pieces of padauk, and sand the top of each smooth. Then, sand a slight round-over on all four top edges of each square. Place a small dab of glue on the

Continued on page 81
Every sandbox deserves a bulldozer that can build a road, move a mountain, or dig a valley. And, no matter how lost in the land of make-believe your little construction foreman may be, he'll never forget who built his favorite toy.

**FIRST, MAKE THE CHASSIS AND TRACK ASSEMBLY**

1. Using the full-size patterns and carbon paper, transfer the outline of the chassis (A), two track blocks (B), and hole center points onto 1 1/2" stock. (We used 2 x 6 scrap.)

2. Cut the track blocks to shape with a band saw. Rip and crosscut the chassis to its final dimensions. Then, rout a 1/4" round-over on the chassis where shown on the Exploded-View Drawing. Cut or dado the notches in the chassis, and drill the 7/16" axle holes you marked earlier.

3. Lay out and drill the holes for the exhaust stack (1/4" dowel), gas cap (1/4" wood button), and headlights, using the hole sizes and locations given on the Exploded-View Drawing. You'll drill the holes in the track block later.

4. With a compass, mark four 2"-diameter wheels (C) on 1 1/2" stock. (We used the same scrap stock used for the chassis and track blocks.) Drill a 3/8" hole (we used a brad point bit) at the center point of each marked wheel. Carefully cut and sand the four wheels to shape.

5. Cut the front and rear axles to length from 3/8" dowel stock. Glue one wheel onto each axle (the front axle fits flush with the outside face of the front wheels; the back axle protrudes 1/2" from the outside of each rear wheel).

6. With the chassis on its side (we clamped ours in a woodworker's vise), slide the wheel-axle assemblies into the axle holes. Finally, clamp one track block to the chassis centered between the two wheels, and drill a pair of 3/8" holes through the block and 1/2" into the
chassis. Repeat this process to drill the holes for the other track block. Glue and dowel the track blocks to the dozer. Later, sand the dowels flush with the outside face of each track block.

7. Slide the axle assemblies through the chassis axle holes, and glue a wheel to the other end of each axle. (Be careful not to get the wheels too tight against the chassis. If you get them too tight, the wheels won't turn freely.)

**Bill of Materials**

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<th>Part</th>
<th>Finished Size*</th>
<th>Material</th>
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<tr>
<td>C</td>
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<tr>
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<td>pine</td>
<td>1</td>
</tr>
<tr>
<td>E</td>
<td>½&quot; x 1½&quot; x 4½&quot;</td>
<td>pine</td>
<td>2</td>
</tr>
</tbody>
</table>

*Part marked with an * is cut larger initially, and then trimmed to finished size. Please read the instructions before cutting.

**Supplies:** ½" dowel stock, double-faced tape, ¾" dowel stock, ¼" x 13½" cadmium-plated steel rod (available at most hardware stores), 4 — #6 x 1" flathead wood screws, ¾" wood button, epoxy, polyurethane or a nontoxic oil finish

**HERE'S HOW TO SHAPE AND ATTACH THE DOZER BLADE**

1. Cut a piece of ½" stock to 2½ x 12" long for the blade (D).

2. To form the curved blade front, start by raising the table saw blade ¼" above the surface of the saw table. Next, set your table saw miter gauge at 50° from center. Use this angled setting to position a straightedge (we used a 2 x 4) next to the blade where shown in the photo below. Clamp the straightedge in place. Start the saw and use push sticks to move the ½" board across the blade (pushing forward) to cut the cove. Next, raise the blade ¾" above the saw table surface, and make another pass to deepen the cove. (We cut several pieces of scrap stock first to ensure the straightedge was in the right position to center the cove on the workpiece.) Now, crosscut the blade to finished length.

3. To make the blade arms (E), cut two pieces of ½" stock to 1½ x 4 ¾". Using the full-size Blade Arm pattern above, transfer the shape of the blade arm and the 7½" hole location to one of the ½" pieces. Using double-faced tape, stick the two pieces together, with the marked piece on top. Cut the taped-together pieces to shape, and drill a ¼" hole through both pieces for the rear axle. Mark the location, and drill a ½" hole in the top of each blade arm for the roll bar. Pry the pieces apart, and remove the double-faced tape.

4. Drill and countersink four holes through the dozer blade and into the

**Continued on page 82**
BUCKLE 'EM UP

What better way to show off your woodworking hobby than with our easy-to-make belt buckles? You can make enough of them in one evening to take care of your gift list for months to come. You’ll find the hardware inexpensive and the wood as near as your scrap box.

1 Resaw a piece of scrap stock to $\frac{3}{16}$" thickness (we cut ours on the band saw). Cut blanks to 2 x 3" for the large buckles and 1 x 2.5" for the small buckles.

2 To protect your fingers when sanding, cut a 1"- to 1.5"-thick block to the same size as the buckle. Using double-faced tape, stick the buckle blank to the block.

3 Sanding across the grain, sand the front of the buckle to a curved shape as shown below, being careful to maintain an even $\frac{1}{4}$" thickness along the ends and a $\frac{3}{8}$" thick middle.

4 Now, sanding with the grain as shown below, sand the buckle smooth. Finish-sand the buckle by hand, using progressively finer-grit sandpaper.

5 Sand the back side of the hook hardware for better adhesion when epoxying the hook to the buckle. Epoxy the hook to the back of the buckle. Be careful not to epoxy the ring to the wood (we used quick-set epoxy).

BUCKET ASSEMBLY

Sand and apply epoxy to shaded areas.

Do not get epoxy in this area.

6 Finish as desired (we used spray-on Deft). Attach to your favorite belt.

BUYING GUIDE

- **Hook and rings.** For belts 1" to 1.25" use catalog no. 1601; for belts 1.5" to 1.75" use no. 1602, 79 cents each. Write Tandy Leather, Advertising Dept., P.O. Box 791, Fort Worth, TX 76101 for the retail outlet nearest you.

Photographs: Bob Calmer
Illustrations: Chuck Stearns
back of each, and glue them in position at the center of the cardboard, alternating the grain as shown on the Exploded-View Drawing. (We used Super Glue; hot-melt adhesive also works.) Using the procedure just described, and working from the center out, glue the rest of the pieces in position on the cardboard to form your quilt insert.

4. Center the frame, rabbet side or front face down, over the quilted insert. Trace the rabbet outline onto the insert. Using a band saw, cut outside the marked line. Sand to the line until the insert fits snugly inside the rabbed opening. Sand a slight round-over on the edges just cut.

FINAL ASSEMBLY AND FINISHING

1. Take the frame to a glass shop, and have a mirror cut to size. (See the Buying Guide for our source.) Place the mirror in the opening. Run a bead of glue along the edge of the mirror, and glue the quilted insert in place. To avoid damaging the silverying, be careful not to get glue on the mirror back other than at the outside edge.

2. Mask off the mirror, and apply finish to the walnut frame and quilted insert. (We used lacquer.)

BUYING GUIDE

- Router guide bushing set. Set has a universal router base plate that fits most popular round base routers. Also included are 3/16", 7/32", and 1/8"-diameter bushings. $8.95 ppd. from Woodcraft, 41 Atlantic Ave., P.O. Box 4000, Woburn, MA 01888, or call 617/935-5860.

- Oval mirror. $5.50 ppd. from The Stained Glass Store, 3617 Ingersoll Ave., Des Moines, IA 50312, or call 515/279-4855.

Project Design: Roberta Zabradka
Photographs: Bill Hopkins; Bob Calmer
Illustrations: Kim Downing; Bill Zahn
FAT CAT BULLDOZER
Continued from page 79
blade arm, using the dimensions and hole sizes on the drawing below. (The outside face of the blade arms are flush with the ends of the blade.) Slide the blade arms onto the rear axle dowel. Now, glue and screw the blade to the two blade arms.

FINALLY, FORM THE ROLL BAR AND FINISH THE DOZER
1 Cut a 13 1/2" length of 1/4" steel rod for the roll bar. Mark the locations of the bends with masking tape. Clamp one end of the rod in a vise, and make the bend where shown in the drawing below. Repeat for the other end.

2 Trim the bottom ends of the roll bar even with a hack saw. Epoxy the roll bar into the holes in the blade arms.

3 Cut the exhaust stack to length. Glue the exhaust stack and 3/4" button in place on the chassis. Finally, apply two coats of polyurethane or several coats of an oil finish.

Project Design: James R. Downing
Photographs: William Hopkins; Bob Calmer Illustrations: Kim Downing; Bill Zaun
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Tough Toppings for Concrete Shop Floors

You can’t hurt workshop floors of concrete, but face it, they don’t look hot. You can, however, brighten them up with one of these tough, easy-maintenance finishes that go steps beyond ordinary paint.

Have you always wanted to shape up your concrete workshop floor with a good-looking finish but postponed trying because it might not hold up? Well, get ready now. Here’s some heavy-duty options you may want to check out.

Epoxy paint, the toughest of the tough
Polyamide epoxy gives you the toughest painted surface — as proof, it’s used on loading docks. The standard color happens to be white. It really brightens a workshop floor, but colored pigment can be added at the store.

Epoxy ranks high in cleanliness, durability, resistance to abrasion (such as walking across sawdust), chemicals, and moisture-related problems. But, compared with a latex floor enamel, you’ll find epoxy a pain to apply. You have to mix two parts, then apply the mixture promptly, before it hardens (it sets up in about half an hour).

You’ll need two gallons (about $40) for approximately every 250 square feet of floor. That translates to about 16 cents a square foot. And, pros suggest you sprinkle carborundum dust (available where you buy the epoxy) directly on the wet floor for slip resistance.

Acid-stain for permanence
In this virtually permanent coating method, a pigmented acid etches its way into the concrete. The color won’t wear away until the concrete does, and you can protect it with floor wax. You can even have a fancy floor by scoring the concrete with a pattern.

Acid staining mimics an epoxy in characteristics, but ranks a lot higher in durability. However, it may not be for you if your floor happens to already be sealed. Because of the acid, applying it requires a pro, who will charge you about 75 cents per square foot for the job.

Neither tough, easy-clean epoxy or acid-staining will do anything for your comfort, such as preventing tire wear. For that, your best bet will be to place mats around for cushioning in the areas you stand a lot. Called anti-fatigue mats, they’re made of spongy vinyl about 3/8" thick.
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FORSTNER BITS A CENTURY OLD AND GOING STRONG

Forstner bits and the holes they bore. From left to right: (1) American-made multispur from Forest City Tool, (2) European multispur manufactured in Austria, (3) European Forstner sold by Freud, and (4) American Forstner manufactured by Convalco.

A long about 1981, imported Forstner-type bits began flooding the American market. And with all the promotion, these “new” bits caught the attention of a lot of woodworkers. Many didn’t realize these hardworking bits had been around for a long time. An American gunsmith, Benjamin Forstner, patented the “Flange Bit” more than 100 years ago in Salem, Oregon.

A while back, we heard from Dr. Michael Kasha, a chemical physicist at Florida State University. Dr. Kasha was responding to a June, 1986 article in WOOD (“Power Drill Bits and Boring Tools”), in which we said that the rim of the Forstner bit does the cutting. “Wrong,” says Kasha: “The rim only scores the diameter, the flat surface actually does the cutting. That’s why the original Forstner bit (shown far right), is the only bit of its type that doesn’t have a center spur.”

Have the imports improved on Forstner’s design?
To find out how the Forstner-type bits stack up against the real thing, we tested four of them and here’s what we found.

An American-made multispur bit ($18.50), pictured number 1, produced a concave-bottom hole with a deep center pit and deep perimeter groove.

A European multispur bit ($17.50), number 2, produced a shallow perimeter groove and a noticeable center pit.

The European Forstner ($13.34), number 3, eliminated the perimeter groove but still has a center pit.

The American-made Forstner ($22.06), number 4, produced the smoothest bottom and eliminated the center pit.

Avoid excess heat
No matter which Forstner-type bits you used, you’ll encounter rapid heat buildup when using them with power tools. This causes the bits to become dull and burn the wood. To avoid excessive heat, do not run the bits faster than recommended in the speed chart below. The center spur does nothing to speed the cutting nor does it improve heat dissipation.

<table>
<thead>
<tr>
<th>Softwood (Pine)</th>
<th>Bit Diameter</th>
<th>Maximum RPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8 - 3/4&quot;</td>
<td>2,400</td>
<td></td>
</tr>
<tr>
<td>7/16 - 1&quot;</td>
<td>1,800</td>
<td></td>
</tr>
<tr>
<td>11/32 - 11/16&quot;</td>
<td>1,200</td>
<td></td>
</tr>
<tr>
<td>1/2 - 3&quot;</td>
<td>600</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hardwood (Maple)</th>
<th>Bit Diameter</th>
<th>Maximum RPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8 - 3/4&quot;</td>
<td>1,800</td>
<td></td>
</tr>
<tr>
<td>7/16 - 11/16&quot;</td>
<td>1,400</td>
<td></td>
</tr>
<tr>
<td>11/32 - 11/16&quot;</td>
<td>900</td>
<td></td>
</tr>
<tr>
<td>1/2 - 21/64&quot;</td>
<td>450</td>
<td></td>
</tr>
<tr>
<td>21/32 - 3&quot;</td>
<td>250</td>
<td></td>
</tr>
</tbody>
</table>

Continued on page 96.
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SHOP SENSE

FORSTNER BITS

Continued from page 95

Are Forstner bits worth the price?

Forstner bits command higher prices than spade bits or adjustable bits. They also perform several wood-boring tasks better than any other bit on the market. For example, they allow you to:

1. Bore holes in thin stock without fear of breakthough. Holes in 3/8" stock are possible with the American Forstner bits.
2. Bore partial holes at the edge of a board. It worked just fine in our test, but don't try that with a spade or multispur bit.
3. Bore overlapping holes without sideways motion. Multispur bits also perform this operation, but the holes made by Forstner bits still look cleaner.
4. Create flat-bottomed depressions. Without a spur penetrating the wood, you get flat depressions—great for creating shallow bowls or trays.
5. Bore end grain without fear of the bit wandering with the grain.
6. Bore deep holes by frequently clearing shavings. Although some literature claims Forstner bits can't drill deep holes, the long shafts of American-made Forstner avoid this restriction.
7. Bore holes at any angle to the surface. You're liable to ruin a lot of stock if you try this with a multispur or spade bit.

A century has passed, yet the American-made Forstner bit hasn't deviated from the original design. The Connecticut Valley Manufacturing Company (CONVALCO) continues to machine the bit to the inventor's specifications. You can easily order Forstner-style bits imported from Europe or Taiwan from many mail-order catalogs. But you'll have to search for the American-made Forstners. For the name of a supplier in your area, contact CONVALCO, 102 Washington St., New Britain, CT 06050, or call 203/223-0076. Photograph: Bob Calmer
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Dull cutters reflect light from their leading edge (arrow 1). Deep filing damages chain straps (arrow 2).

GET A GRIP ON SHARPENING

Sharpening requires a round file. Since round files come in an assortment of diameters to match the cutter design and pitch of different chains, have your dealer mate the correct file to your saw chain.

File the cutters at their original angle by holding the saw stationary. That's hard to do with your hands only, so try this logger's trick: Cut a kerf an inch or so deep into a log, then lodge the saw there. (Even a dull chain will cut this much.)

---Continued on page 101---
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Hold the file at a 35° angle to the length of the bar and 90° to the bar's vertical plane, below. Keep about 1/10th of the file visible above the top of the cutter. A filing guide that clamps to your file, available from chain-saw dealers, makes accuracy easier.

Hold the file at 35° and perpendicular to the bar. File toward the tip.

Stroke toward the bar tip, from the inside of the cutter to the sharp edge. Avoid filing too deeply or you'll hit the chain's tie straps and put excessive hook in the cutter. Damaged tie straps lead to chain breakage. Extra hook weakens cutters.

Count the number of file strokes it takes to produce a clean, sharp cutter (less than 10 will usually do). Then, file each cutter the same number of strokes. This keeps cutter wear even and the chain running smoothly. File all the cutters on one side of the chain, then switch hands and file the other side. If you file cutters correctly, you'll see where you started.

Most people find filing one side of the chain easier than the other side because of right-handed dominance. With practice, you'll be able to file with either hand equally well. In the meantime, take care to keep the angles the same.

Rakers Need Attention, Too
After a chain has been filed three or four times, check the height of the rakers with a raker gauge, also available from your dealer. Raker heights must be filed proportionately to cutter height because they govern the cutter's depth of bite.

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WOOD MAGAZINE DECEMBER 1987
TOOTHPICKS PRY AWAY AT IMPORTS

U.S. toothpick manufacturers have dropped from 20 to three since WWII. Flossing is partly to blame, but the decline primarily stems from less costly imports, says the Wall Street Journal.

Diamond Match Company's plant in West Peru, Maine, survives. The streamlined operation stamps out about 40 million flat birch toothpicks daily. A single tree yields 400,000. Another, the Forster Manufacturing Co., in Wilton, Maine, intends to clean up with a new design. It's square in the middle and round on the ends.

CHOPSTICKS PICK UP ON EXPORTING

In Minnesota's Iron Range community of Hibbing — an area hard hit by imported Japanese steel — displaced miners turn the tables. They export a resource as abundant as iron ore: aspen, in chopstick form.

Lakewood Industries' plant manager Scott Karppinen says they turn 65,000 cords of veneer quality aspen per day into 6 million pairs of 8-inch disposable chopsticks for direct shipment to Japan.

YEW GOTTA BE TOUGH

Researchers from Imperial College, England, believe that the yew used in some English medieval longbows demanded Rambo-type archers. Examination of old longbows retrieved from a warship sunk in 1545 shows that the wood was exceptionally close grained. Factoring the close grain with the length of the bow, they estimate longbowmen averaged 6'-9 tall and were strong enough to draw and hold a pull of 100 pounds! By comparison, today's recurved hunting bow requires a mere 60 pounds of pull. No wonder longbowmen could rout the enemy from 200 yards.

YOUNG DESIGNERS CASH IN

Henry Burkemper, a high school sophomore from Elsberry, Missouri, turned his Cabbage Patch folding wood chair into a $500 cash prize in Dremel's Seventh Annual Creative Project Scholarship Contest. Made of oak and walnut, Henry's chair scooped junior division honors for design originality, workmanship, and completeness of project plans.

Junior Jon Henke, of Blue Earth, Minnesota, claimed top honors in the senior division with a polar bear he carved from soapstone.

High school students from across the nation entered more than 350 projects in the competition designed "to encourage students to combine imagination and craftsmanship," according to Robert E. Ludwig, of the Racine, Wisconsin, based company. Judges included Jim Downing, design editor of WOOD, and professional designers Carl Bullimore and Dale Stachel. "The number of quality projects was unbelievable" notes Downing. "But lots of kids lost out because they didn't include plans or submitted only incomplete ones."

In this contest, schools win, too. Dremel donates shop equipment to the schools of the 10 cash prize winners in each of two divisions: junior, for 9th and 10th grade students, and senior, for 11th and 12th grade students.

For entry forms, write: Dremel Creative Contest, 4915 21st St., Racine, WI 53406. The next entry deadline: February 22, 1988.
CLASS ACTION
with PowerStars II

When PowerStars first came on the scene, home and professional hobbyists, start-up users and serious craftsmen finally had the chance to bring real quality into their workshops.

With the introduction of PowerStars II, the evidence continues to mount: Powermatic's standard of rugged dependability, precision machining, and strict quality control. Excellent service and easy-to-get parts. Unique features that provide strength, accuracy and longevity. Machines that make consistently better product and hold their value over time.

If you're only looking at front end costs we don't have a case. But judge us fairly.

If you really take pride in the work you do, investigate PowerStars II. Add real class to your action.

Better By Design

Call your local Powermatic distributor for details. Or call Powermatic for the name of the stocking distributor nearest you.

Powermatic features only America's best: motors, controls, inspection, parts and service — all across the nation. Rugged cast iron construction. Efficient high-torque motors.
You won't find better quality carbide-tipped saw blades than the ones we make. They help your Delta saw — or just about any other saw — perform at peak efficiency. And right now, eight of our most popular carbide-tipped blades are on sale at participating Delta distributors.

Sale prices.
And a no hassle guarantee.

At prices like these, now you can afford to settle for more. Because like our saws, Delta carbide-tipped blades are designed to give you more cutting performance and service life. In fact, we're so sure you'll like them that we're offering this guarantee: if your Delta carbide-tipped saw blade doesn't perform as well as any blade you've ever used, simply return it to your Delta distributor.

We'll replace it or refund your money. No questions asked.

So hurry. The sale ends December 31, 1987. And if you miss the opportunity to get a Delta carbide-tipped saw blade at these prices — you may have to settle for something less.

For the name of your nearest Delta distributor call toll-free: Delta International Machinery Corp., 800/438-2486 (in PA, 800/438-2487). In Canada call 519/836-2840.

### Delta Carbide-Tipped Saw Blades

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"1" arbor hole. Others 5/8" arbor hole.