Better Homes and Gardens
WOOD
THE MAGAZINE FOR HOME WOODWORKERS

AUGUST 1988 • ISSUE NO. 24
Display until August 16

DRILL PRESSES
What to know before you purchase one
17 ways to put this tool to use in your shop

IMPROVE YOUR PROJECT PHOTOGRAPHS
Our tips help you get professional results

SHOP SAFETY
Your eyewear options

SUPER PROJECTS
Outdoor planters
3 cutting boards
Adjustable sawhorse
Mosaic wall hanging
Hillbilly carving
Low-boy truck
Rugged dump truck

EYE-CATCHING WOOD MOSAICS
See page 38

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EYE-CATCHING WOOD MOSAICS
See page 38
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Better Homes and Gardens
WOOD

This issue's cover wood grain: Sassafras

AUGUST 1988 ISSUE NO. 24

WOOD PROFILE
PADAUK: THE WOOD OF KINGS, RAILROAD TRAINS, AND MANY NAMES
From the Chalices of emperors to Empire-style furniture and Pullman cars, padauk has won worldwide fame under assorted names.

SHOP-TESTED TECHNIQUES
17 WAYS TO TURN YOUR DRILL PRESS INTO A SHOP HERO
Dust off your drill press and explore some new ways to expand the versatility of a valued workshop friend. We also show you how to build four helpful jigs to make your drill press even more effective.

HEAVY HAULIN' LOWBOY AND DUMP TRUCK
Our fleet of heavy-duty toy trucks continues to grow! The newest additions, a lowboy and dump truck, share the same sturdy, simple tractor design.

DEVELOP YOUR SHOP SKILLS
THE PERFECT HINGE MORTISE
Learn how the pros give their hinged projects that “cabinet-quality look.” We show you step-by-step how to cut hinge mortises.

CRAFTSMAN CLOSE-UP
SHE PAINTS WITH WOOD
Feast your eyes on some remarkable wood mosaics crafted by Texas artist Judy Gale Roberts. And don't miss the exclusive pattern Judy created for WOOD magazine readers.

MAKE YOUR BEST PROJECTS PICTURE-PERFECT
Even though you’ve rubbed on that final coat of wax, your project isn't “finished” yet! Learn how to make stunning pictures of your best handiwork.

WOOD MAGAZINE AUGUST 1988
A TERRIFIC TRIO

SUNBURST SINK BOARD 50
Laminate maple and walnut strips to create the cheeriest board this side of sunrise.

ART-DECO CHEESE BOARD 54
Step back into the past with our handsome board reminiscent of the 1920s and 30s.

TEXAS TOAST CUTTING BOARD 55
Take a small bite out of an evening and whip up our sandwich board for your next gathering.

TOOL BUYMANSHIP

THE HOLE STORY ABOUT TODAY'S DRILL PRESSES 56
Even though one Taiwanese plant produces most of the drill presses on the U.S. market, there are differences you should consider before buying. We tested 10 popular benchtop and floor models priced under $800.

TRIPLE-CROWN SAWHORSE 62
This sawhorse wins on all counts—it's sturdy, attractive, and adjustable. Build our design from a 2x4, a little maple, and less than a 4x8' sheet of plywood.

KEEP SAFETY IN SIGHT 64
If comfort and appearance have kept you from wearing safety glasses, you've run out of excuses. See what's offered in your price range.

PLANTERS APLENTY 68
Readily available, durable cedar fencing makes our trio of planters a handsome set for any patio. They're affordable, too—for about $90, you can knock out this set in no time at all.

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If you own a drill press, you need this chart.

If you're like most woodworkers, you have at one time or another ruined an expensive drill bit or cutter by running it at too high a speed in your drill press. So how do you go about finding out the recommended operating speed for any given tool so this doesn't happen? Up until now, it's been almost impossible!

Initially, we figured that a few quick calls to some drill-bit manufacturers would turn up all the information we needed. We were wrong! It seems that no one has ever charted drill press speeds to the extent that we think necessary.

We ran our tests on the specially outfitted Delta radial press shown below. (We replaced its original AC motor with a DC motor, added an electronic speed control, and measured chuck rpm at each belt setting with a tachometer to verify the results.)

The test itself consisted of drilling four holes with each bit in six materials to look for excessive heat buildup. A special thanks to Freud, Morris Tool Company, Black & Decker, Woodcraft Supply, Leichtung Workshops, and Northwest Carving Supplies for sending in products to test. We appreciate your help.

Why didn't we just print this information in the magazine? Two reasons actually. First, we know you don't like to tear pages out of WOOD magazine. And second, this data needs to be near your drill press. We've printed the charts on heavy stock and added a metal eyelet at the top to make it easy to hang or pin up. Our staff hopes that the chart serves you well for many years.

Staffers Jim Boelling, Bill Krier, and Jim Downing talk test results in the WOOD magazine shop.

Larry Clayton

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With this advanced technology, all shoulders and gullets are identical in shape and most important strength. The arbor holes are perfectly centered and rounded by precision grinding. An extra step to guarantee a true running blade.

Special Carbide Mix

Freud produces a special mix of carbide at their own factory. It is produced from titanium and carbon using cobalt as a binder. Producing this important part of the saw blade within their own factory assures the consistency and quality needed to hold a sharp edge.

The carbide is induction brazed onto Freud's laser produced blade bodies. This process is computer controlled to guarantee uniformity of brazing. A razor edge is then put on the teeth with a 400 grit diamond wheel. This guarantees you of a blade that will provide a maximum of production hours before sharpening is needed.

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**Professional Production Quality**

<table>
<thead>
<tr>
<th>Best Cut</th>
<th>Item No.</th>
<th>Description</th>
<th>Radius</th>
<th>Large Diam.</th>
<th>Cutting Length</th>
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### Talking Back

We welcome comments, criticism, 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 50316.

### Cut, But Not Forgotten!

Often, when we do research for our articles in WOOD magazine, we consult people we know in the woodworking field. That was the case recently as we prepared the "Basic Stave-Bowl Construction" article that appeared in our June 1988 issue. We received some excellent input from a couple of our California woodworking friends, Yosh Sugiyama from Redding and Andy Goldman from Placentia. Both of these gentlemen provided us with useful background information, and for that we thank them. We also apologize for accidentally omitting their names from the credit line at the end of the stave-bowl article. We do appreciate your help, guys.

### Combination Machines Update

Zinken International, manufacturers of the MIA 6 and ZC 21 featured in the April issue of WOOD magazine, has closed its U.S. operations. We have no further information available at this time.

Toolmax changed its mailing address to P.O. Box 539, Murphys, CA 95247. You can reach a representative at 209/728-3417 or toll-free at 800-535-4788 (California residents call 800-325-8330).

We incorrectly listed the weight of the Kity K5 in our comparison chart. The correct weight is 165 pounds.

### More Than One Way to Cane a Chair

In separate letters commenting on the trimming technique we used in our June 1988 article, "Re cane a Chair in a Jiffy," two readers suggest a different approach. Edward M. Tansey of Wakeman, Ohio, and Wendell J. Kopp of Oak Ridge, Tennessee, prefer to trim the excess cane deep in the groove before filling in the spline. They suggest tapping the webbing firmly in the groove, trimming the excess material with a sharp wood chisel, applying woodworker's glue, and then driving in the spline. We trimmed the excess webbing after applying the glue but before tapping the spline all the way in groove. Our local caning expert taught us to trim away any "fuzz" after fully seating the spline because the danger does exist that a beginner may trim the cane too short, allowing some to escape and not fully line the spline groove. We took our final picture before removing unsightly remnants.
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Issue Four: Turning Miniatures, Ceramic Sculpture, Making Miniature Furniture, A Model Turned Cottage, Model Soldiers, Period Furniture, Miniature Books, Turkish Carpets, Small Ship Models, Architectural Periods, Doll's Houses, Pin Dolls to Make


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If a customer requests a color other than white, I mix 3 parts of white primer with 2 parts of the desired color. The tinted primer provides an adequate base for the polyurethane topcoat.

—Danny S. Ward, Spanish Fort, Ala.

As president of an Oriental importing company, you must know a lot about rattan and wicker! Rattan and wicker continue to be popular for home furnishings. We appreciate your suggestion.
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GET A GRIP ON HANDSCREWS
You can apply a moderate amount of torque with hand screw handles, but most of us have difficulty bearing down on the smooth handles.
TIP: Bicycle inner tubes provide an inexpensive, quick solution to this gripping problem. Use baby or talcum powder to help stretch and position the inner tube.
—Calvin H. Henne
Bridgeport, Neb.

FOLLOW SOME BASIC LINES ON YOUR SAW TABLE
Aligning the ripping fence truly perpendicular to the blade of your table saw can be pretty iffy—especially with a narrow or loosely fitting fence. Similarly, accurately setting a 45° angle on a miter gauge can be tricky.
TIP: Clamp a carpenter's square at a right angle to the miter-gauge groove, top drawing, right, and score a fine line in the surface of the table with a steel scriber. Next, clamp the square in place so the legs of the square are equally long, middle drawing, right, and scribe another line that intersects the first one at 45°. Finally, flip over the square, clamp in place at the correct diagonal, and scribe a third time. This provides you with accurate reference lines for setting your miter gauge at the three most common angles.
—From the WOOD magazine shop

PUT A LONG MEMBER IN A SHORT SPACE
Occasionally the rung in the back of a chair or a stretcher between chair legs will break, even though all the chair's joints remain tight. At first glance, replacing the broken member seems to require disassembling an otherwise healthy chair.
TIP: Turn a replacement part or use the old one if it can be repaired. You may need to shorten one tenon so you can wiggle the damaged piece into the original position. Remove the shortened piece. Drill a 1/4" hole in the center of the shortened tenon deep enough to accept a 2'-long dowel and a ballpoint pen spring. Next, bore a 1/4" hole at least 1/2" deep in the middle of the rail as shown in the drawing at right. Apply glue to both ends of the rung and slip into place as you would reload a roll of toilet paper. The spring will push the dowel into place and, when the glue sets, the dowel will make the repair permanent.
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TIPS FROM YOUR SHOP (AND OURS)
Continued from page 16

INEXPENSIVE FRAME CLAMPS FROM CABINET HINGES
Relatively high cost keeps some woodworkers from appreciating the convenience of commercially available picture-frame clamps. Here’s a picture-perfect solution.

TIP: Make this picture-frame clamp with four 4" strap hinges, four 18" lengths of ¼" threaded rod, and 12 nuts. First, at the ends of the hinges, ream holes large enough to accept the threaded rods, and then bend right angles into the leaves as shown. For assembling smaller picture frames, you may wish to cut a set of shorter threaded rods.

—George A. Heffelfinger
Leesburg, Pa.

Rx FOR BALKY TAPE MEASURES

With extended use, metal tape measures get gummed up and no longer retract smoothly. Moreover, the painted markings wear thin.

TIP: Pull the tape all the way out and apply a thin coat of auto body wax to both sides. When you roll up the tape, the wax will protect the markings on the face of the tape while lubricating the inner mechanism so it works smoothly.

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S606Y 3/32 12
S608Y 1/16 12
S610Y 5/32 12
S612Y 3/32 12

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S604Y 1/8R 11
S606Y 3/32R 12
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S610Y 5/32R 12
S612Y 3/32R 12

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S116 3/4 12
S118 1" 12
S120 1 12
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S610Y 5/32R 12
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Problem: How to glue the arm back on the armchair.
King Solomon, proverbial for his wisdom in governing the Israelites during the 10th century B.C., must have really known his wood, too. He chose stalwart padauk for the pillars of his temple.

French kings Louis XV and Louis XVI were separated from Solomon by thousands of years. Yet, these 17th-century rulers also favored a red-orange padauk they called narra. With it, royal woodworkers crafted kingly cups and chalices. Because water placed in these vessels turned yellow, royalty believed the “poison” had medicinal properties.

A century later, the colorful wood of Solomon and the Louis attracted even wider acclaim. As a veneer named amboyna, padauk was featured in Empire-style furniture.

Far removed from European pomp and furniture fashion of the 1800s, convicts sent to British penal colonies in the Andaman islands off Burma labored to supply the padauk sought by world craftsmen. In fact, Chicago's Pullman Company imported much of this exotically beautiful and durable “Andaman” padauk to panel railroad passenger cars.

Wood identification
All seven species we recognize as padauk belong to the genus Pterocarpus. African padauk (P. sinyensis), sometimes referred to as vermilion, is the only padauk species readily available today. Others occasionally sold include: Andaman padauk (P. dalbergioides), Angola padauk or muninga, kiaat (P. angolensis), Burmese padauk (P. macrocarpus), narra (P. indicus), and sandalwood padauk (P. santalinus).

Padauk grows in tropical climates, although the geography changes from rain forest to dry, nearly treeless plains with each species. You’ll find padauk in India, Indochina, the South Pacific, West Africa, and even southern Florida.

Except for squatty African muninga, most padauk trees look like elms, with large, spreading crowns reaching to a height of 120'. Averaging 7' in girth, their slightly irregular, fluted trunks have smooth, yellow-tinted bark. Trunks often have no branches for the first 65'.

The leaves of some padauk species provide protein in human diets as a substitute for green vegetables. All padauk bear distinctive, round, inedible fruit banded by a flat wing that gives them a flying saucelike appearance. In fact, pterocarpus means “winged fruit.”

Depending on the species, padauk's coarse-grained heartwood varies in color from a lustrous purple-red to orange-red. With age and exposure to sunlight, it turns deep maroon. Quarter-sawn wood features a pronounced ribbon stripe. Sapwood never reaches market.

Working properties
About as heavy, but stronger than oak, padauk generally works exceptionally well with either hand or power tools. You’ll have no trouble gluing padauk, and screws remain secure.

The wood sands easily, but for a glass-smooth finish, we recommend a paste wood filler or sealer to even out its open grain. Clear finishes should contain an ultraviolet inhibitor to reduce padauk's tendency to darken. Sanding dust may stain your hands and clothes, and may even irritate your nose. And, padauk's bright dust can discolor adjacent unfinished stock if it’s of a lighter shade.

Uses in woodworking
A first-class furniture and cabinet wood, padauk also makes fine turnings, carvings, and musical instruments. Because it has a high resistance to abrasion, great strength, and doesn't readily decay, it adapts well to cutting board stock. Seaworthy boats have even been made of padauk.

Cost and availability
Due to freight costs, padauk prices run higher inland than on the East, West, and southern coasts. Except for Ambonya burl and vermilion, little padauk becomes veneer.

African padauk costs about the same as top-grade black walnut. Other padauk demand higher prices, as do veneers.
WAYS TO TURN SHOP

We were curious about how many different jobs a drill press can actually do, so we went to work in our shop exploring its uses. Whether the stock is flat or round, small or long, the drill press can handle it. WOOD* magazine Design Editor Jim Downing even came up with some clever jigs (see pages 30-31 and 74-75) to stretch the use of this handy machine even further.

WORKING L-O-N-G

Trying to drill accurate holes near the ends of stock with a standard-size drill press table is a lot like balancing on a high wire. It's a tough job!

Here's a solution:

We clamped a piece of 3/4" plywood to the drill press table. Make the support as long as necessary, and clamp the workpiece to the fence to keep it from shifting.

GET THE RIGHT ANGLE EVERY TIME

With our easy-to-make adjustable-angle jig (see design, page 31), you'll never again have to eyeball the angle of cut. To use this jig, just loosen the wing nuts so the fence portion can move freely. Then, use a sliding T-bevel or an adjustable triangle to set the required angle and re-tighten the wing nuts.
YOUR DRILL PRESS INTO A HERO

In our shop, the drill press earns its keep. We turn to it for help with a myriad of shaping, sanding, boring, cleaning, grinding, and polishing chores. You, too, can test the limits of this truly versatile performer.

We'll bet some of you have discovered other interesting uses, or developed innovative jigs, for your drill press, too. How about sharing with the rest of the WOOD magazine audience? Just jot down a quick note describing the technique and, if possible, a snapshot or sketch showing how you do it. We'll pay $25 for each entry we publish, and we'll also tell everyone who supplied us with the idea.

Send your entry to:
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WOOD® Magazine
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Des Moines, IA 50336

SPACE SUCCESSIVE HOLES PERFECTLY

If you've made a cradding board, cradle, or other project that calls for drilling hole after evenly spaced hole, you'll appreciate this technique.

To drill a succession of evenly spaced holes, use our "high-low" fence (see page 31). Start by marking the hole spacing on the stock. Center the bit on one of the marks, clamp the stock, and fasten the fence alongside the stock.

Now, pencil a reference mark on the fence, unclamp the stock from the table, and slide the stock along the fence, drilling holes where marked.

For greater accuracy, use a brad-point bit rather than a twist drill. The brad point will produce a straighter hole because it won't skew off course with hard and soft grain.

DON'T GO 'ROUND GUESSING

You also can use the angle-drilling jig on the previous page to take the guesswork out of drilling round stock, such as a dowel. To be certain you'll drill through the center of the stock, first set the jig at a 45° angle by using a sliding T-bevel as in tip #2. Lower the tip of the bit until it touches the bottom of the jig's V. Clamp the stock to keep it from rolling. Now you're ready to drill the hole. Use a pilot-pointed bit such as a brad-point or Forstner for precise drilling.
SHOP HERO

5 GETTING A HANDLE ON SMALL STOCK
We've had small parts literally fly out of our hands or break apart during drilling, so anytime you can't get a hand on the stock, just clamp it with a hand-screw. You'll increase both your control and margin of safety.

Do you want even more control, more safety? Then secure the clamp to the drill press table.

6 CIRCLE CUTTING THE SAFE WAY
If you've ever had your fingers smacked by a rapidly spinning circle cutter, you'll appreciate this little tactic. Place the stock against the fence and clamp it with a notched hold-down. Before you start cutting, spin the circle cutter by hand to make sure it clears the fence and hold-down.

In the interest of safety, we painted the ends of the circle cutter yellow for clear visibility.

For best results and less overheating, cut until the pilot drill just penetrates the bottom surface of the stock. Then, turn over the workpiece, put the pilot drill in its hole, and finish the cut.

7 HAVE A BALL DRILLING SPHERES
Remember that ball you wanted to attach to a handle on a tool or a favorite toy project? Here's an easy way to put a hole through the center of any sphere.

To start, drill a hole that's somewhat smaller than the ball's diameter into a clamped piece of scrap stock. The secret to this technique is to not change the position of the table or scrap while switching to the desired bit. Place the ball on top of the hole, clamp it, and drill away.

8 DRILL HOLES INTO ENDS OF DOWELS
To drill a hole into the end of a short length of dowel, clamp a scrap piece of wood to the table, and drill a hole in it that's the same diameter as the dowel. Without changing the position of the table or scrap piece, change bits and insert the dowel into the hole. Now grab the dowel with a handscrew to keep it from rotating, and drill the centered hole. This technique also works well for longer dowels. Just swing the drill press table to one side so the dowel clears its edge.

9 MAKE A MIGHTY-FINE MORTISE
Even if you don't have a mortising attachment (see page 60), you can work without one. Lay out the mortise in pencil and center the bit on it. Using a bit the same width of the mortise, drill the end holes first to control the size of the opening.

With a bit $\frac{3}{16}$" smaller than the width of the mortise, bore out the remaining wood between the holes. You will have a minimum of $\frac{3}{16}$" wood on the inside of the edges—enough for hand chiseling up to the edges.
GETTING "IN SHAPE" WAS NEVER EASIER
Here, your drill press works like a mini-lathe. You can make your own work arbor from carriage bolts or lengths of all-thread rod.
By using wood rasps, files, sanding blocks, dowels wrapped in sandpaper, or other abrasives, you can shape many small objects.
This photo shows us shaping a pair of drawer pulls, believe it or not. After smoothing on the work arbor, cut the pulls apart as shown.

HAVE BIG SUCCESS WITH SMALL PARTS
You also can insert one end of the stock directly into the chuck, tightening until the part is firmly held (without crushing the wood). Shape with rasps and successive grades of abrasives.

BE A SANDING DISC JOCKEY
You can save your skin by using a jobber stick like the one shown here. Attach the stick to the workpiece with instant glue or hot-melt glue, and then saw the stick off after you've finished the shaping.
Keep in mind that a slow spindle speed—500 to 700 rpm—gives you the best control when shaping delicate work.

YOUR DRUM CAN HUM
You just can't top drum-sander attachments for sanding curved edges.
We first cut notches in each side of 1/4" hardboard as shown at left. The notches corresponded to the sizes of the common drum sanders.
We swung the drill press table off to the side so we could plunge the sander through the cutout in our auxiliary table. With this setup, you'll have less chipping of sanded edges as well as edges that are square to the face of the stock.
14. **GOOD-BYE, RUST. HELLO, SHINY TOOL**

**Question:** How do you turn old tools into new ones?

**Answer:** With a flap sander, make your tools look like they did when you bought them. With a flip of a switch, you're ready to chase away corrosion on all your tools.

15. **BE SHARP!**

You can quickly sharpen your own jointer/planer blades at home with this handy jig. Now you don't have to take the blades out of your shop and pay someone else to sharpen them, or laboriously do it yourself by hand. (See page 74 for how to build and use this grinding jig).

16. **HERE'S A POLISHED PERFORMER**

Slap a buffing wheel on your drill press and you're ready to clean and polish neglected hardware such as drawer and cabinet handles. Use the buffing wheel in combination with a metal polishing compound to achieve a lusty finish. For best results, run the buffing wheel between 1,500 and 2,000 rpm.

17. **DO YOU KNOW ABOUT THIS CLAMP?**

When a conventional clamp just doesn't do the job, don't forget your drill press. It may offer an effective solution, especially when you're out of other clamps.

Your drill press will enable you to direct pressure from the center of the glued piece, applying the force evenly. This technique is simple; just position the work to be clamped, lower the quill, and tighten the depth stop.

This works great for a variety of applications, especially when you're preparing stock for the lathe. Here, we've attached an auxiliary faceplate to the clamped piece.
FIVE TIPS FOR BETTER AND SAFER DRILL PRESS USE

- DON'T GO OFF THE DEEP END
  Achieving exact depth is easy using the handy technique shown at left. Mark the hole depth on the end of the stock, and with the switch off, bring the bit down so its tip aligns with the mark. Lock the drill press depth stop at that point, raise the drill, line the bit up with the marked hole, and proceed.

- MAKE YOUR FLUTES PLAY SWEET MUSIC
  Don't place your bit so far into a chuck that you cover the flutes (hollow portion). Covering the flutes may dull the cutting edges and inhibit the bit's ability to remove cuttings when drilling deep holes. Raise and lower bits often to clear flutes of debra (not completely clearing top of hole).

- AVOID CHAIN REACTIONS
  To keep track of your chuck key, attach it to the side of your drill press with a cord or string. Do not attach it with a chain. If you accidentally turn on the machine with the key inserted, chain links may literally become snarled. Always wear adequate face protection when operating a drill press.

- WEAR DOWN SANDING DRUMS EVENLY
  If you've done a lot of drum sanding on a drill press, you know how a drum tends to wear in one area until you stop sanding to move the drum. The solution: The handy foot pedal shown at above, left. Simply step on the foot pedal to lower the sander. The upward spring-action of the drill press will slowly raise the drum sander as you work.

- DON'T LOSE YOUR TEMPER!
  Like people, drill bits lose their temper (hard cutting edge) when caught speeding. Keep your bits sharp by remembering these points:
  - Run larger drill bits slower than smaller bits.
  - Drill slower in hardwoods than you would in softwoods.
  - Your bit is too hot if water sizzles on its surface. Use water to cool it down.
  To help you keep your bits from speeding, WOOD magazine's experts have developed a drill press speed chart. As a reader service, we'll send you this invaluable chart for only $1 (to cover printing and postage). See the Editor's Angle on page 6 for more information. Then post the chart near your drill press.
CONSTRUCTION AHEAD

Note: The instructions and the parts listed in the Bill of Materials are for one tractor. Cut twice as many parts if you want to build two tractors.

HEAVY HAULIN'

START WITH THE TRACTOR
1. Cut a piece of 3/4" pine to 2" wide by 12" long for the cab parts (A).
2. Measuring 1" from each end of the pine, mark the location for a 1 5/8" dado 3/8" deep. Cut the marked dados as shown on the drawing on the opposite page.
3. Next, crosscut the pine piece into two equal lengths. Mark the windshield location on one of the pieces. (The pine piece is still extra)

The construction business has never been better. The roaring success of our Fat Cat Bulldozer in the December 1987 issue of WOOD® magazine sent Design Editor Jim Downing scurrying to the drawing board to create more road-building pieces. Now we have a fleet!

Build two identical tractors, add a box to one for the dump truck and a lowboy to the other, and watch as your youngster’s imagination moves mountains.
LOWBOY AND DUMP TRUCK

long, so mark the top of the windshield flush with the top of the dado where shown on the photo below. See the Tractor Drawing for size of the window opening. Drill a blade start hole in the center of the windshield, and cut the opening to shape with a coping saw as shown in the photo. Sand or file the windshield edges smooth.

Mark the windshield location, drill a blade start hole, and cut the windshield opening to shape.

4 Apply glue to the mating surfaces, align the dados, and clamp the cab parts (A) together face to face. Later, use a sharp chisel to

TRACTOR

HOOD

FIFTH WHEEL

CHASSIS

ONE WAY
LOWBOY AND DUMP TRUCK

remove all the excess glue, including that inside the cab opening. Trim the top and bottom of the cab lamination to length (3") where dimensioned on the Tractor Drawing. Sand a ¼" round-over along the sides of the cab top.

5 Cut the hood (B) to size. Sand a ¼" round-over on the top corners. Then, drill two ½" holes ¾" deep for the headlights and a ½" hole ¾" deep centered from side to side for the radiator cap in the hood where dimensioned on the Tractor Drawing.

6 With the bottom and edges of the cab and hood flush, glue and clamp them together. (We placed scrap pieces under the clamp heads to prevent denting the soft pine.)

7 Cut the chassis (C) to shape (we did this on a bandsaw), and sand a ¼" round-over along the front corners. Mark the axle hole center points on one side of the chassis. Hold the chassis firmly in a hand-screw clamp, and use a drill press to drill the 7/16" axle holes.

8 Cut the fifth wheel (D) to size. If you plan to build the lowboy later and hitch it to the tractor, drill and countersink a ½" hole where shown on the Tractor Drawing.

9 Leaving a ¼" gap at the front to form the bumper, glue and clamp the cab assembly to the chassis. Later, glue and clamp the fifth wheel on top of the chassis and against the back of the cab. Sand smooth, and glue a ½" button into the radiator cap hole.

FORMING THE DUALS

Note: You’ll need four inside wheels (E) and six outside wheels (F) for each tractor. In addition, if you make the lowboy, make four inside and four outside wheels.

1 To make enough wheels for one tractor, cut a ¾"-thick piece of pine to 4" wide by 33" long. Use a piece ¾"x4x27" for the lowboy. Starting 3" from either end, mark center points 3" apart down the center of each pine board.

2 With a compass, mark a 2"-diameter circle (1" radius) at each marked center point.

3 Chuck a 1" Forstner bit into your drill press. Attach a scrap work surface to your drill press table. As shown in the photo above, center the bit over a marked center point, and bore a ½" deep hole for each outside wheel (6 outside wheels on the tractor and 4 on the lowboy). We used the stop on our drill press to ensure uniform hole depths.

4 Chuck a circle cutter to your drill press. Turn the cutter blade to cut a perfect wheel where shown on the drawing above. Raise the cutter blade ½" higher than the bottom of the pilot bit. Center the pilot bit over the centered depression in each 1" hole, and slowly cut the wheels to shape as shown in the photo above right.
Center the circle-cutter pilot bit over the Forstner-bit depression, and cut the wheels to shape.

5 Center the circle-cutter pilot bit over the remaining marked center points, and cut the four inside wheels to shape.

6 Remove the circle cutter, and chuck a 3/8" twist drill bit into your drill press. Using a hand screw clamp to secure the wheels, enlarge the 3/8" axle hole in the center of each wheel to 3/4".

7 Cut a piece of 3/8" all-thread rod to 5 1/2" long, and chuck it into your drill press. Attach two wheels at a time to the work arbor where shown on Sanding The Duals Drawing. Starting with 80-grit sandpaper and proceeding through finer grits, sand the wheels smooth. Sand a slight round-over on each wheel as shown in the photo above.

HERE'S HOW TO BUILD THE DUMP-TRUCK BOX

Note: You'll need 1/4" stock to build the box. We resawed 2 x 4 pine stock on the band saw to 3/8" thick, and then sanded it to 1/4" thick.

1 Cut the box bottom (G) and front (H) to size. Now, cut the sides (I) and cab overhang (J) to a rectangular size, mark the radii, and cut the pieces to shape.

DUMP TRUCK BOX

2 Glue and clamp the box bottom and front between the two side pieces, making sure all the edges are flush. Scrape off the excess glue. Later, sand the box smooth, and glue and clamp the cab overhang to the front of the box.

3 Glue and clamp the box to the tractor, flush with the back end of the chassis.
LOWBOY AND DUMP TRUCK

NOW, LET'S CONSTRUCT THE LOWBOY TRAILER

1 Cut a piece of 3/4" pine to 4 1/4" wide by 12" long for the bed (K). Miter-cut the front end of the bed for an 11" finished length. Lay out and cut the notches for the rear duals where dimensioned on the Lowboy Trailer Drawing at right.

2 Mark the axle hole center, and drill the 7/8" axle holes.

3 Cut a piece of 3/4" pine to 2 1/2" wide by 12" long for the gooseneck parts (L, M). With the saw blade 45° from vertical, cut part L to length. From the remaining pine stock, measure 3 1/4" from the square end, and miter-cut gooseneck part M to the length shown on the Gooseneck Detail.

4 Using the dimensions on the Lowboy Drawing, glue gooseneck part L to the front end of the bed (K). (We used masking tape to hold part L in position on the bed.) After the glue dries, remove the tape, and glue and tape part M to part L. Let the glue dry and remove the tape.

5 Clamp the lowboy assembly to the top of your workbench. Now, to strengthen the joints, use a brad-point bit (a regular twist bit will tend to wander), to drill two 7/8" holes through M and 1/2" into L where shown on the Lowboy Drawing and accompanying Gooseneck Detail. (When drilling the holes, we eyeballed the angle, and placed scrap pieces under the gooseneck to support it.) Flip the assemblies over, and repeat the process to drill through the bed and 1/2" into the other end of L.

6 Cut four 3/4" dowels 2" long. Glue two dowels in place in M and L, and let the glue dry. Next, glue two in place in K and L. After the glue dries, trim and sand the ends flush with the bottom of the bed and the top of the gooseneck.

7 Drill a 1/4" hole 1/2" deep centered from side to side in the bottom of gooseneck part M where shown on the Gooseneck Detail. Cut a 1/2" dowel 1 3/4" long, and sand a chamfer on one end of it. With the chamfered end protruding, glue the dowel into the hole.

ATTACH THE DUALS AND APPLY THE FINISH

8 Cut part N to size, miter-cutting the front at 20°. Glue and clamp it to the back of the bed (K) with the back of N flush with the back end of the bed.

3 Follow the procedure in step 2 with two wheels and two washers to form the front-axle assembly.

4 To add the hub caps, set the tractor and lowboy assemblies on their side. Place a dab of glue on the ends of the axle dowels, and glue a 1/2" wood button to the end of the dowel. After the glue dries, flip the assemblies over and repeat for the other hub caps.

5 Apply the finish (we used Varathane Professional Clear Finish, an aerosol polyurethane). STOP

Note: If you don't have the issue with the Fat Cat Bulldozer, send us a self-addressed, stamped no. 10 business envelope to: Fat Cat Bulldozer, WOOD Magazine, Locust at 17th, Des Moines, IA 50336. We'll send you a free photocopy of the how-to article. Offer expires March 1, 1989.

Produced by Marlen Kemnet
Project Design: James R. Downing
Photographs: Bob Calmer
Illustrations: Kim Downing, Bill Zahn

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THE PERFECT HINGE MORTISE

Hand-cutting mortises (gains) for hinges can be tedious work, especially if your project has lots of doors. Worse yet, one little slip and you end up with an ill-fitting hinge. Here’s how to speed things along — and end up with a perfect fit every time.

1. Separate the hinge leaves (if possible) and cut a piece of double-faced tape for each. The tape helps you accurately position the leaf, and holds it securely in place for step 2.

2. Tape the hinge leaf in position, drill pilot holes, and screw the leaf to the surface. This way, the leaf won’t slip when you mark the hinge mortise and drill the pilot holes. To avoid damaging the heads of finish screws, use surplus screws of the same size.

3. Carefully score end and side cuts with a sharp knife. Scoring gives you more precise lines than you’ll get with a pencil. It also helps ensure that your initial cuts won’t split the wood fibers along the grain.

4. Back out the screws and remove the leaf. Mark the mortise’s depth. Holding your chisel perfectly vertical with its bevel facing the inside of the mortise, make stop cuts at the ends and side. Easy does it. Don’t try to cut to the full depth in one operation, lest you score too deeply and overshoot your mark.

   Next make a series of crosswise depth cuts along the length of the mortise — the more cuts, the better.

5. Holding the chisel at a low angle to the wood, bevel side down, clean out the hinge mortise. Work from the center toward the ends. After you’ve made these lifting cuts, check the depth of the leaf in the mortise. Repeat steps 4 and 5 until the leaf lies about \( \frac{1}{8} \) inch above the surrounding surface.

6. Holding the chisel bevel side up, make light, flat paring cuts across the width of the mortise to achieve a perfectly smooth, flat bottom. When you’re done, the leaf face should be perfectly flush with the surface.

Illustrations: Jim Stevenson
“I always wanted to work with wood,” explains Judy Gale Roberts, above. “But, in high school in Houston the principal wouldn’t let me take shop class. ‘Boys can’t take homemaking and girls can’t take shop!’ I was told.”

School rules didn’t discourage her, though. Fortunately for Judy, her father Pat, is an artist. She tagged along in his studio while he worked on clay sculpting, relief carving, and painting. Hands-on experience with her father’s work also nurtured her creativity.

Following high school, Judy enrolled in Houston’s Museum of Fine Arts. It proved disappointing. She already knew the first-year basics. “I decided hands-on learning was preferable, and started working with Dad,” she says.

We first spotted Judy’s spectacular wood among the selections readers send in for “Project Showcase.” In Lufkin, Texas, we got a much closer look while Judy shared her skills with us. Judy’s creativity was nurtured by her artist father, Pat Roberts.
SHE PAINTS WITH WOOD

Judy Gale Roberts crafts spectacular wood mosaics from a palette of surprising color and beautiful grain.

Lufkin, Texas never made it as a cowtown. Oil wells failed to gain a foothold there, too. Logging trucks, rather than hooves or drilling rigs, made all the thunder on main street.

Today, southern pine lumber remains big industry, but trucks bypass the business district. In fact, about the only unfinished stock you'll see downtown belongs to woodworking artist Judy Gale Roberts.

Her studio/gallery on East Lufkin Avenue fills a once-vacant storefront—the result of a state-assisted program to revitalize Texas' small-town downtowns. In exchange for low-rent space, Judy and a couple other notable artists serve as a tourist draw. Despite the high-quality attraction, Lufkin hasn't seen a boom. There's still plenty of parking space within footsteps of the newly occupied shops and galleries. Occasionally, though, visitors peer through gallery windows. At the studio of Judy Gale Roberts, they discover wood more spectacular than the potential of any seen on local logging trucks.

"WHAT WOOD IS THAT?"

No one refrains from a question when they first glimpse Judy's work: "How many different kinds of wood are in this picture?"

"Did you carve these?"

"Isn't this marquetry?"

"What sort of stains do you use?"

Even those claiming decades of woodworking experience aren't without comment. "They look at my pieces and say 'This is walnut here. That's maple there.'" she says. "They really find it difficult to tell what wood it is."

The petite artist giggles thinking of the illusions she creates.

With a frank, it-was-beyond-me smile, Judy admits that she only recently discovered the name for her form of wood mosaics. "In 15th-century Italy," she recites, "the inlaying of contrasting woods to form pictures was called intarsia."

She doesn't have any stock secrets, either. Judy relies on western red cedar, the same stalwart wood the nation looks to for siding, shingles, and outdoor projects such as decks and planters. "I've experimented with other woods, but keep going back to red cedar," she says. "I never get bored with it. For my purposes, no other wood can match red cedar for varying color and grain."

There's another bonus in Judy's preference for western red cedar—one for the buyer. "This wood doesn't deteriorate," she explains. "So, 100 years from now someone could sand and refinish one of my pieces and the wood will look as warm and colorful as it does today."

DEVELOPING FEELING, PIECE BY PIECE

Of course, Judy owes much of the know-how she uses today to her father, as well as her sense of color and design. In fact, Judy shared in the toil of a business her father once owned called "Custom Art." The two artists exclusively catered to architects and designers who needed artwork to complement building interiors.

About those days, Judy recalls, "We worked in all different types of mediums. The first thing we did in Continued"
wood were some huge flowers about 20' high for the atrium of a bank. Next came a large wall mural for the restaurant at the airport Quality Inn. Then, we did a 1.4 x 20' mural for Dow Chemical.

Pat created the designs, but he also helped Judy cut and shape the wood. "What we did then was rougher than what I do now, and it lacked the great variety of color," she says.

Four years ago, when Houston’s galloping economy slowed to a walk, Judy and her fiancé, Jerry Booher, decided to move where the art market might be better, and gave Florida a try for a few years. Although back in Texas now, Judy doesn’t regret the departure. "Despite leaving Dad behind, the move proved really good for me," Judy says, "because design became my total responsibility."

Judy mastered the basics of fitting mosaics by enlarging her father’s small drawings. But Jerry, an experienced machinist, taught her why some designs won’t work because the pieces can’t be cut on the band saw. Judy began to think of designs in relation to tools, and simplified them. And, she learned the necessity of keeping her work within a price range that sells.

Bombarded with new design ideas, Judy began to portray Florida’s abundance of fish, flowers, and wildlife in wood. She pored through books to find out more about what she saw. "I try to read as much as I can on the subject so I can put life and feeling into the figure," she explains. "Who would want one of my porpoises or pelicans if they looked like stuffed, lifeless specimens?"

WOOD WORK TO FALL IN LOVE WITH
At first, Judy worried that the public might not accept her designs. She needn’t have.

At a Florida art fair, a lady purchased a piece featuring a cartoon-like mother cat and her kittens that Judy titled "Kitty Litter." The woman was so fond of that picture when she finally could hold it in her arms, she began to cry," Judy remembers. "And, after she left, I found myself standing there wiping tears from my eyes, too. I guess I get attached to a piece after spending so much time on it. That’s especially true of large pieces. They take up so much space on the workshop wall that when they sell I can’t get used to the void. It's devastating."

Devastating, maybe. But at times thrilling, too. When famed underwater explorer Jacques Cousteau paid a visit to St. Augustine to overhaul his ship, Judy greeted him with a wood mosaic of the Catypso. "I was so excited, I could hardly speak a word," she says of the time she presented the gift to the sea-faring celebrity.

People even give names to pieces they buy from Judy. Grinning, she starts a story. "I made a clown picture for a man in Ohio. After I sent it to him he wrote: 'Oliver arrived just fine.' The man had hung 'Oliver' in a special place and talked about him as if he were a person. That always makes me feel good. Selling directly to the public might be more of a gamble, but it’s satisfying." At prices that approach $500 per square foot for intricate, custom-designed murals, and as much as $1,500 for the 24 x 42" "Family Portrait," shown below, direct sales also put food on the table.

COLLECTING BOARDS FOR THE PALETTE
Painters draw their hues from tubes of artist's acrylics or oils. Perky Judy selects her palette board by board at the local lumberyard.

"When we go to a lumberyard, I'm like the proverbial kid in a candy store," she beams. "Each piece of red cedar is a new discovery. That's why I have to sort through the boards. If a yardman nags me about it, I show him my brochure so he can see what I do."

Judy never sees just wood. To her, darkly streaked, figured areas become threatening sky or storm-lashed water.

What she sees and buys becomes part of a mental inventory of images. "I never forget the boards I have; I just keep them in the back of my mind. When I draw a design, I know which boards I'll use in it," explains Judy. "Or, I may design a piece around some spectacular figure or color in a particular board."

Judy and Jerry buy 1 x 12" and 2 x 12" nominal, utility-grade western red cedar, even with lots of knots, because that grade offers the greatest contrasts. Most of their lumber comes surfaced one side only, so Jerry runs it all through the planer, a process that Judy views as a further revelation of hidden treasures in color and grain. He rips the wide stock for easier handling.

A fondness for animals and a whimsical imagination result in pieces just made for cat lovers. Judy's "Family Portrait" has all eyes focused on the clan's rascal.
FILLING A FRAME WITH WOOD—AN INTARSIA PICTURE STORY

When she began her intarsia techniques, Judy’s last step would be to frame the assembled pieces. Now she begins with the frame. “It’s a lot easier to adjust the pieces of the design to fit the frame first,” Judy says, “and then move the board to the workup before shaping, then step back and view it. Sometimes, we make a change.”

In their creative timetable, the first “standup” comes at about one-third of the way through the process. “If the piece took one day of cutting and fitting,” Jerry says, “it’s going to take two days of shaping and finishing. Remember, each piece has to be touched a lot more than once.”

So where does it all begin? Follow Judy through the steps of her technique, and try to find inspiration for a design you’ve created especially for you on page 42.

**STEP 1. Select the grain and wood color to match your design.** After Judy draws the full-size pattern from her smaller sketch, she begins searching through her cedar boards. The medium-weight, transparent drafting paper on which she draws her pattern telegraphs wood color and grain to her exploring eyes as she moves it over the board. Photographed below, when she finds a perfect match for one piece or area of the pattern, she sets the pattern on the board, slides carbon paper under the pattern, and traces the appropriate outline on the wood, below. After assigning that piece a number and marking it on the wood, she moves on to other sections until she transfers and numbers all the pattern pieces. In the process, Judy varies color, figure, and board thickness (normally from ¾” to 1⅜”).

Sometimes, Judy moves the board around under the pattern, scanning it for the specific color or grain pattern.

With carbon paper, Judy traces a piece in the design onto the red cedar board and assigns it a number.

Continued...
Jerry’s shop-made gauge tells him which size saw blade to use for cutting out the pieces. Tight cuts require the ¼” blade.

As the cutout pieces come from the bandsaw, Judy assembles them on the framed backing of ¼” lauan plywood.

Judy leaves a ⅛” space between pieces to give the design depth. Here, she determines how to shape the tail.

**STEP 2. Cut out the pieces for your picture.** In the shop, Jerry does most of the bandsawing, but Judy often helps out. Two Sears 12” band saws, one fitted with a ¼” blade, the other with a ⅛” blade, provide the ability to make a full range of cuts without changing blades. The “go-no-go” gauge, above left, Jerry made from polyester resin poured into a spray can cap, duplicates the minimum ⅛” turning radius of a ¼” blade. It shows him which pieces require the tighter turning radius of the ¼” blade.

**STEP 3. Fill in the frame.** As Jerry band-saw the numbered pieces from the cedar stock, Judy assembles them—jigsaw puzzle fashion—onto the framed backing of ¼” lauan plywood, above center. To give the mosaic more depth and definition, Judy spaces the pieces about ⅛” apart, above right. At this point, Judy sees her choices of color and grain beginning to work together. She also visualizes how to sand to shape the pieces that will give her work a three-dimensional quality.

**STEP 4. Shape the wood.** A few years ago, Judy shaped pieces with any tool that removed wood, including files and rasps. Today, she works with sophisticated equipment, such as a quartet of inflatable drum sanders in 8”, 4”, 3”, and 2” diameters, and a stationary disk and belt sander. Red cedar sands easily, even with the crudest of tools, but when a 2 x 4” mosaic contains 1,000 pieces, machinery helps.

Often, shaping means little more than rounding edges. Flower petals, trees, and bird and animal bodies, however, receive nearly a complete contouring under the bite of 80-grit sandpaper, below left. Swipes with 120-grit paper smooth the surfaces.

**STEP 5. Spray on a finish, then smooth some more.** Jerry takes over the finishing after Judy shapes the pieces. He sprays all except the backs of each piece with as many as three heavy coats of Krylon-brand clear acrylic. The red cedar soaks it up like a sponge. To get at the sides of even the tiniest pieces, Jerry impales the pieces on dowels fitted with old X-acto blades, below right. After the pieces dry, Jerry sands them with 0000 steel wool before the final coat. Some custom work receives up to five coats of finish.

**STEP 6. Reassemble the pieces for the glue-down.** To fasten the finished red cedar to the backing of the frame, Judy has always relied on yellow woodworker’s glue. However, she first dry-assembles the pieces to make certain that each one functions in the design as she planned it.

At the inflatable drum sander, Judy sands a section of tree trunk to a gentle roundness with 80-grit sandpaper.

Not all pieces must be shaped, according to Judy. But, the raccoon’s tail must look as if it curls behind the tree trunk.

Holders made from dowels and X-acto blades make it possible for Jerry to spray even tiny pieces on all sides.
TRY YOUR SKILL AT INTARSIA

HERE'S A PATTERN FOR YOU DIRECT FROM JUDY GALE ROBERTS!

When we asked Judy the title for the owl wall plaque shown here, she hesitated a minute trying for something clever, then exclaimed “Oh Hoot!” That’s pure Texas!

Judy suggests that you don’t need a band saw to cut these pattern pieces. A jigsaw or coping saw will do just fine. And, you can even make it less intricate by cutting each leaf as one piece rather than two as shown. “Then, all you need do is carve the lines on them,” she notes. The shaping (by sanding or with a rasp) doesn’t have to be elaborate either.

Regarding finishing, she advises, “I like my pieces to be really smooth to the touch, and therefore do lots of sanding. But this plaque could look equally nice with some roughness and texture, especially on the tree.”

To make the owl plaque, you’ll need:

- Carbon paper
- Medium tracing paper for the pattern
- One ¾x8x24” western red cedar board of any grade that shows color variety (or a selection of scraps)
- A ¾x8x24” piece of lauan plywood for backing
- Yellow woodworker’s glue
- Clear finishing material

Note: Judy always makes the frames first, but for this frameless project she advises cutting out the pieces first. After you lay them in position on the backing, draw an outline around the picture with a pencil. Then, saw the backing to the shape of the pattern before gluing down the pieces.


For a list of Judy’s patterns, send your request with a self-addressed, stamped envelope to J. G. Roberts Patterns, P.O. Box 1925, Lufkin, TX 75902.

Written by Peter J. Stephano
Photographs: Bob Hawkes
Project design: Judy Gale Roberts
MAKE YOUR

With a good 35-mm camera, some inexpensive lights, a few accessories, a basic technique, and a little work, you can take excellent photos that capture and enhance the beauty of your woodworking projects.

Left: An electronic flash washed out the detail in the photograph of the carving and created a harsh shadow. In addition, the background detracts. Above: Two photo lamps, a photo background, and the techniques described in this article produced this photo.

S

kipping on the finish of a carefully crafted project cancels out your woodworking skill. So do poor photos. And, in photography as in woodworking, technique, time, care, and quality tools yield the best results.

NOT ALL CAMERAS ARE CREATED EQUAL

For professional-quality, studio photos to document your work or sell to juried competitions and craft fairs, start with a 35-mm (or larger format, such as 120 film) single lens reflex camera (SLR). Why? Viewfinder-type cameras have a viewing lens separate and offset from the lens that takes the picture. Your eye never sees exactly what the film records. An SLR, however, uses the same lens for viewing and picture-taking. This enables you to compose your picture perfectly because you see exactly what you’ll get on the film. And although most new SLRs have an automatic feature, you’ll have the best results with manual settings.

For the bulk of project photography, the standard 50-mm focal length (distance from front of lens to film) lens works fine. It sees things the way your eye does. However, in some situations, such as when photographing small objects, it just won’t do the project justice.

Most 50-mm lenses can’t focus on objects closer than 18” from the camera, which means that objects smaller than 8” won’t fill the viewfinder frame. If you want pictures of miniature pieces, solve the problem by purchasing an inexpensive set of close-up attachments that screw onto the front of your lens. Used individually or in combination, these accessories allow you to fill the frame with objects 1” tall.

Photographing large objects, such as a bed or hutch, in cramped spaces with a normal lens poses another problem—sometimes you can’t back up far enough to fit all the object in the viewfinder. In this situation, a wide-angle lens works perfectly. Wide-angle lenses have focal lengths of 35 mm and lower. But, you can get too much of a good thing. The wider the angle (the lower the number), the easier it distorts.

A 50-mm lens may also distort somewhat. The part of the object closest to the lens can appear abnormally large, and vertical lines converge. Our eyes and brain compensate when we look at such an object, but not the camera lens. A longer-than-normal lens, such as an 85- to 135-mm, corrects the illusion.

Prevent damage to the lens by adding a lens shade. This inexpensive device also keeps stray light from degrading picture quality.

For the absolute sharpest photographs, you’ll need a camera support that holds the camera still during the exposure. Tripods make the best supports, but you can get by with an inexpensive camera clamp—a C-clamp with a tripod screw attached. To increase your camera’s steadiness during the shot, purchase a cable release so you won’t have to touch the camera.

HOW TO BE SAFE AT THE RIGHT SPEED

Film has two critical characteristics—speed and type. Speed, expressed as a number, indicates how long the film must be exposed to
light before it accurately records what you're photographing. "Fast" films (higher numbers) require less light and exposure times than "slow" films (lower numbers). The usual trade-off for higher speed is less definition in your photo. For sharp pictures and tolerable times, select medium-speed films.

Type of film translates to prints or slides, and also whether you expose it with daylight, flash, or photo lamps. For black-and-white prints, a film such as KODAK PLUS-X PAN Film does the trick. For color pictures, you have two choices. Color prints require a film such as KODA-COLOR VR-G 200 Film; for slides, use KODAK EKTACHROME 160 Film (tungsten). With an 80A filter that screws onto your camera lens, you can use a film made for daylight exposure—such as KODA-COLOR VR-G 200 Film—indoors, with photo lamps.

Prints, both black-and-white and color, will do if you want to display your work. Most juried competitions, art fairs, and publishers only accept color slides (sometimes called transparencies).

LIGHTS AND Backgrounds: Pros Rely on
In photographing your projects, you have three types of lighting to choose from. Daylight provides the most convenient source. However, you'll have little control. Sunny days produce harsh shadows. Overcast skies or shade won't give you enough lighting contrast and your photographs appear flat and lifeless.

Electronic flash, although inexpensive and portable, doesn't allow you to see the lighting effect until after the picture has been processed. You can't soften glaring highlights, lighten shadows, or eliminate reflections beforehand.

Photo lamps provide the best alternative to daylight and flash because you control the amount of light. Thus, you'll see the effects before you take the picture.

Shaped like large light bulbs, photo lamps are specifically designed for photographic use. A basic setup requires one ECT (500-watt) lamp, one ECA (250-watt) lamp (ECT and ECA are industry designations for lamp type and use), and two 10-12" photo reflectors rated for 500 and 250 watts. Either buy the light stands for the reflectors, make your own, or purchase spring-loaded clamps you attach to a support.

To soften the light for project photography, you can use diffusers to position in front of the light. These are available ready-made, or you can make your own from a piece of matte acetate mounted to a frame. With this setup, don't let daylight into the room during photography or you'll disrupt color balance!

For backgrounds, you have two choices. Either photograph an object in a setting that relates to its use, such as outdoor furniture on a patio, or in front of a paper photographic background. In your first option, the project suffers from surrounding distractions. The second method focuses only on the object.

Standard backgrounds come in rolls 53" and 107" wide and a variety of colors. Many photographers prefer a medium gray, such as Thunder Gray or Slate Gray (standard industry colors).

You can buy or make a holder for the background to support it. Always unroll the background so that it comes down behind and under the piece to be photographed with a smooth transition from the vertical to the horizontal. For professional quality, never try to substitute a freshly ironed bed sheet for background paper—it will still look like a sheet!

A SET MADE FOR STARS
The technique for good composition begins with setting up the camera and tripod. Next, look through the viewfinder and determine the viewing angle that best illustrates your project. Usually, you position the camera so that you see the object as your eyes would. Photograph a table with the camera above it and tilted downward. To photograph a large armoire, keep the camera at eye level. Always move the camera close enough to the object so that the area of interest—your work—nearly fills the frame.

Without fingers to give these pieces proportion, would you know they were only 1" tall? Items such as coins, keys, pencils, etc. also will work.
MAKE YOUR PROJECTS PICTURE-PERFECT

viewfinder frame, and carefully focus on the object.

If the size of an object isn’t obvious, place a prop next to it to show relationship (see photo, preceding page). Don’t be afraid to turn the camera vertically to capture all the image in the frame.

To light your set so your work looks its best, arrange the photo lamps with the 500-watt light high and to one side of the camera and at a 45° angle to the subject. Place the 250-watt fill light near to and on the other side of the camera, as shown in the drawing at right. Diffuse the fill light or move it far enough back so that it won’t cast a second shadow off the project.

When you adjust the lights, keep in mind that you want to show size, shape, texture, and detail (see jewelry box photo, lower right). You may need more than one photograph to completely show your work, as shown in the table photos, far right.

THE LIGHT AND DARK OF CAMERA SETTINGS

With your work, the lights, and the camera in place, you next have to determine exposure settings. The two camera settings that determine the amount of exposure are aperture size (how much light actually reaches the film) and shutter speed (the length of time you allow the light to expose the film).

Aperture sizes show up as “f” numbers, such as f/16 or f/5.6. Fractions of a second indicate shutter speeds, such as 1/4 or 1/250 of a second. The best combination for most of your project photography will be f/16 to f/8 with the corresponding shutter speed determined by your camera’s metering system. These apertures give you more “in focus” area, called depth of field, than a wider setting, such as f/2.8.

To help determine exposure settings when light and dark woods and varying backgrounds might fool a camera’s light meter, pros turn to the neutral gray card. Set this gray piece of cardboard near the object.

To obtain a professional-quality photo with minimum shadows, set up your lights and camera as above. For a project approximately 2’ x 2’, the main light, fill light, and camera should be about 4’ away from it.

This properly lighted photo of a 12”-long jewelry box shows how a different amount of light illuminates each plane and adds dimension.
APPROXIMATE CAMERA EXPOSURE SETTINGS FOR EXAMPLE SHOWN IN DIAGRAM

<table>
<thead>
<tr>
<th>TYPE OF PICTURE</th>
<th>FILM</th>
<th>FILTER</th>
<th>TYPICAL CAMERA SETTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black-and-white print</td>
<td>KODAK PLUS-X PAN Film</td>
<td>None</td>
<td>1/6 sec. @ f/16</td>
</tr>
<tr>
<td>Color print</td>
<td>KODACOLOR VRG 200 Film</td>
<td>80A</td>
<td>1/4 sec. @ f/11</td>
</tr>
<tr>
<td>Color slide</td>
<td>KODAK EKTACHROME 160 Film (tungsten)</td>
<td>None</td>
<td>1/6 sec. @ f/16</td>
</tr>
</tbody>
</table>

Point the camera and fill the viewfinder frame with it, and the camera's built-in exposure meter makes an average reading compensating for shadows as well as bright spots. If you use an 80A filter to balance daylight film with photolamps, put the filter on the lens when you take the reading.

For the most satisfying results, borrow a technique from the pros called "bracketing." Bracketing consists of a series of five different exposures: the calculated exposure, and four others—two on either side of the calculated exposure—allowing more and less light to reach the film. For example, if your calculated exposure is 1/40 second at f/16, your bracketed series would be: f/8, f/1/15, f/1/30, f/1/60, and 1/125 second at f/16. You can also bracket by keeping the shutter speed constant and changing the lens aperture.

FOR A FINAL FINISH

When you have print film processed, always ask for glossy paper because it produces the best detail. Inspect the results. Look for proper exposure, sharpness, and color. Any problems in these areas may be your fault, but they could be that of the processing lab. Sometimes a lab can reprint a negative and improve the quality.

PHOTO SUPPLIES YOU'LL NEED FOR PRO-QUALITY PICTURES
(In addition to camera, lenses, and film)

- Lens cleaner and tissue: $4
- Cable release: $5
- ECA/NECT photo lamps, each: $3
- Tripod: $40
- Lens shade: $5
- Neutral gray card: $7
- Paper background (9' x 12 yards): $30
- 80A filter: $10
- Close-up lenses: $15
- 10" light reflectors, each: $25
- Light stand, each: $20
- Light diffuser: $15

Written and photographed by Gary A. Zeff
Projects crafted by: carving, David Yende; miniature vessels, Jerry Glaser; jewelry box, Charlie Johnson; table, T. C. MacMichael.
CURIOSITY GOT HIM
Brent L. Veleker, 38
Lockport, Illinois
Machinist

When Brent's mental gears start shifting to creation, he sprints for the woodshop. This time, what he went round and round about was the construction of a spinning wheel.

Researching spinning wheels provided Brent with only the rough dimensions he needed to complete his solid-cherry spinning-wheel project. But, he took it from there, first building the 1 1/2 x 6 1/2 x 18” platform and the 20” diameter great wheel that mounts on it. His calculations of 3 1/4” in overall length and 35” for height turned out to be on target.

About the spinning wheel he crafted, Brent says, “One of the hardest parts was making the wheel. The spokes are longer than the radius between the hub and the rim.” In order to properly fit the spokes in place, he drilled holes in the four-piece, dovetailed rim and in the hub. Then, Brent saved the hub in half, fitted the spokes in the rim, and glued the hub back together around the spokes.

Brent likes dark, rich, naturally aged cherry. To get it, but still protect the wood, he applied a clear Minwax finish. By the way, Brent also built his lathe, band saw, and jointer!

A JEWEL OF A BOX
Rusty Martin, 38
Poplar, Montana
High School Activities Director

Rusty’s eye for detail shows in this musical jewelry box he made for his wife, Juanita. He resawed the walnut to precisely the thickness he wanted: top, 1/2”; sides and drawer front, 3/16”; drawer sides, 3/16”; base, 3/16”, and 3/8” for the base trim. He assembled the 7 x 7 x 14” box with mitered joints and routed the thin edges. To mount the purchased, pre-assembled inlay flush with the top, Rusty says he cut out an area with router, chisel, and knife that “wasn’t even 3/8” deep.”

The drawer separates earrings and baubles. With a dado blade, Rusty notched two sets of 1/4 x 1 x 6” strips, then crisscrossed them for compartments. So necklaces won’t get hung up in the works, he boxed in the music box movement.

Rusty hand-rubbed the box with oil. He then applied a liquid wax.

To submit your projects . . .
Send a 35-mm color slide with the project as the focal point and a simple background—no people. Include a description of materials, special joinery, finish, and dimensions. WOOD® magazine will pay $25 for published projects. Slides cannot be returned unless you enclose a self-addressed, stamped envelope.
TEAMWORK HALVES THE EFFORT AND QUADRUPLES THE PROJECTS
Frank and A.J. Bock, 58 and 57
El Toro, California
Professor of Anthropology, Petroglyphologist
Not sold on the veneered cedar chests they saw in furniture stores, Frank and A.J. joined forces to make this 17" x 17" x 45" clean-lined, traditional chest of solid eastern red cedar which smells as good as it looks. Teeming with enthusiasm over their success, the brothers—who share unique professions in the study of ancient man and cultures—went on to make three more as gifts for their daughters.

Frank and A.J. edge-joined random-width, aromatic cedar boards they first planed down to $\frac{3}{4}$" thickness for top, bottom, and sides. Rabbeted joints hold the chest together; locking hinges brace the top. Inside, they constructed a tray made from precut, tongue-and-groove aromatic cedar sold for closet lining. The tray rests on a cedar railing to make it easy to lift out and remove large objects.

After sanding their way through multiple grits of sandpaper to a final polish with 0000 steel wool, Frank and A.J. finished the exterior with "seemingly dozens of coats" of tung oil. The interior was left unfinished so contents would be dulled in cedar fragrance.

After sharing the labor of four cedar chests, a rocking burro for a grandson, and other projects, the brothers still enjoy working together making sawdust in the shop. How's that for an enduring, woodworking brotherhood?

GLIDE-A-BY BABY IN GRANDPA'S OAK CRadle
Daniel Schildkraut, 57
Mesa, Arizona
Retired Physician
As his first "built-from-scratch" project, Dan designed the 32"-high oak cradle for his expected grandchild around the size of a baby's mattress. The edge-joined, $\frac{3}{4}$"-thick cradle sides slope outward seven degrees and butt-join with the end panels.

Dan liked the smooth, near-flat back-and-forth movement of a porch glider, and thought baby would, too, so he bought glider hardware to hang the cradle in its stand. The stand itself features oak bars and stretchers mortise- and tenoned together.

To lighten the cradle's Mission-style appearance, Dan routed teddy bear and heart designs on the sides of the cradle and the stand. Several coats of Watco oil finished his project.
BRIGHTEN YOUR KITCHEN WITH OUR
SUNBURST SINK BOARD

A Terrific Trio
Liven up your kitchen work space with any or all three of our decorative boards. Not only will they stand the test of time, but they'll look darn good doing it.

FIRST, CUT AND LAMINATE THE MAPLE AND WALNUT
1 Rip and crosscut seven pieces of 1\(\frac{1}{4}\)"-thick maple (five-quarter stock) to 2\(\frac{3}{4}\)" wide by 22\(\frac{1}{2}\)" long for parts A. (We cut all seven pieces from a board 6" wide by 8' long.)
2 For the walnut strips (B), set your table saw fence \(\frac{1}{4}\)" away from the inside edge of the saw blade. Rip 14 strips \(\frac{1}{4}\)" wide from the edge of a piece of 1\(\frac{1}{4}\)"-thick walnut 22\(\frac{1}{2}\)" long. You also could cut 7 pieces of \(\frac{1}{4}\)" stock to 1\(\frac{1}{4}\)" wide by 22\(\frac{1}{2}\)" long, and then resaw two \(\frac{1}{4}\)" strips from each piece.
3 With the surfaces flush, glue and clamp two walnut strips (one along each edge) to each piece of maple. Later, scrape off the excess glue.

MAKE THE TAPER JIG AND CUT THE WEDGES
1 Cut a piece of 8\(\frac{1}{4}\)" plywood to 6" wide by 30" long. Mark three reference points where dimensioned on the drawing at right. Using a framing square, draw two lines to connect the points.
2 Cut along the marked lines to form the wedge-shaped taper in the plywood (we used a band saw).
3 Position your table saw fence and jig where shown on the drawing at far right. Now, using the drawing as a guide, cut two wedge-shaped pieces from each lamination.

HERE'S HOW TO LAMINATE THE WEDGES
1 To form the clamping jig shown in the photo on the opposite page, lay a piece of plywood about 30" square on top of your workbench. Now, cut two pieces of \(\frac{1}{4}\)"-thick scrap stock about 1" wide by 26" long. Nail one of the strips onto the plywood near an edge. Then, position the 14 wedges, edge to edge, with the points converging where
shown in the photo below. While holding the laminated pieces tightly against one another, nail the second scrap strip to the plywood and against the other straight edge of the wedges. Remove the wedges from the clamping jig.

Tap the wedges into the corner of the clamping jig, and then hold the wedges in position with nails.

2 Lay waxed paper on the plywood between the strips. Spread woodworker's glue on the mating edges of the wedges, and position them where shown in the photo above. Now, lightly tap the pieces toward the inside corner of the jig, and drive a #6 finish nail into position at the end of each wedge. Check for a flush top surface and tight joints. (We found it necessary to tap a few of the wedges in tighter and re-nail after initially nailing all the wedges in place.)

3 Let the glue dry, remove the nails, and scrape the excess glue from the lamination.

**CUT THE TEMPLATE AND CUTTING BOARD TO SHAPE**

1 Measure the interior opening (front to back and side to side) of your sink basin (we measured ours 1" from the top edge). On a piece of cardboard, mark layout lines the exact size of your basin opening.

2 Mark a radius at three of the corners to connect the layout lines on the cardboard. Leave a square corner where the walnut strips converge; you'll mark and cut it to shape later. (To determine the necessary radius for a tight fit onto the sink basin later, we marked different sized radii on cardboard scraps, and cut them to shape. Next, we trial-fit... Continued
SUNBURST SINK BOARD

each scrap against the rounded inside corner of the sink. Once we found the right radius, it became a template to mark the three radii onto the cardboard template.
3 Draw four more lines 5/8" outside and parallel to the first lines drawn (later these will be the outside edges of the cutting board). Connect the outside lines by marking radii 3/8" larger than the ones marked in the previous step (our outside radii measured 2 3/8"). Carefully cut the cardboard template to shape.
4 Mark the location, draw the 1" finger hole circle, and cut the hole in the template to shape.
5 Position the cardboard template on the sink board lamination and trace its outline and the finger hole location onto the sink board. (You may need to move the finger hole around a bit until it is centered over a piece of maple.)
6 Position the rip fence on your table saw (we moved ours 16 1/2" away from the inside edge of the blade), and trim the board where shown on the drawing below. Next, cut the other two edges square. Fi-

MARKING THE CUTTING BOARD WITH THE TEMPLATE

- Leave this corner of the template square
- First lines drawn on template correspond to size of sink-basin opening
- Second lines drawn on template will be the finished size of the cutting board
nally, use a band saw to cut the three rounded corners, and then sand them smooth.

7 Bore a 1" finger hole through the cutting board where marked.

NOW FOR THE SURFACE SPLINE

1 Cut a piece of 1 \(\frac{3}{16}\)" stock to 8" square for the drilling jig. Mark diagonals to find center.

2 Mark and cut a 3\(\frac{3}{8}\)"-square notch at one corner of the jig where shown on the drawing at right.

3 Chuck a circle cutter to your drill press, and position the outside edge of the cutter blade 3\(\frac{3}{4}\)" from the center of the pilot bit. Raise the bottom tip of the cutter \(\frac{1}{4}\)" higher than the bottom of the bit. For a cleaner cut, you want the bit to make contact with the jig before the cutter enters the lamination.

4 Center the jig under the pilot bit, and clamp it to the drill press table. Slide the cutting board into the notched corner, and clamp it to the table. Start the drill, and slowly cut into the jig and sink board until you've cut 1/2" deep with the cutter. Remove the cutting board and jig from the drill press table.

5 Fit your router with a 1/2" straight bit. Clamp the sink board and drilling jig (the jig helps support the router) to a workbench. Starting at the outside edges and working in, rout a 1/2"-deep recess in the corner of the board. Rout just up to the groove you cut with the circle cutter. Now, as shown in the photo at right, clean the ridge between the routed area and circle-cutter groove with a 1/2" chisel.

6 Mark a 3\(\frac{1}{4}\)" radius on a piece of 1/2" walnut where shown on the drawing at right. Cutting just outside the line, hand-saw the surface spline (C) to shape. Check the fit of the spline into the routed recess, and sand if necessary.

7 Glue and clamp the walnut spline into the recess, noting the direction of grain shown on the Exploded-View Drawing. After the glue dries, use the cardboard template to mark the radius on the splined corner, and cut it to shape.

CUTTING THE GROOVE IN THE SINK BOARD

After routing the excess material, clean the surface between the routed area and circle-cutter groove with a sharp chisel.

SANDING, ROUTING, AND FINISHING

1 Sand the sink board smooth.

2 Rout a 1/2" cove along the bottom edge of the sink board (see the Cove Detail accompanying the Exploded-View Drawing).

3 Rout a 1/4" chamfer along the top edge of the sink board and 3/8" chamfers on both edges of the 1" finger hole.

4 Finish-sand the sink board, and apply the finish (we used Behlen's Salad Bowl Finish).

Project Design: Jim Boelling
Photographs: Bob Calmer
Illustrations: Mike Henry, Bill Zaun
START WITH THE BASE
1 Cut two pieces of 3/8"-thick ebony (walnut also would work) to 3" x 6" for the base sides (A).
2 Locate and mark a centerline across each piece where shown on the Exploded-View Drawing. Scribe a 2 7/8" radius on each, cut to shape on the band saw, and sand smooth.
3 Cut the center support (B) to 7/8" wide by 1 7/8" long from 3/4" stock. Mark a 3/8" radius on one end (see the drawing for reference). Cut the radius to shape on the band saw, and sand smooth.
4 Using the dimensions on the drawing, mark the dowel hole center points on the center support. Clamp the support in a handscrew clamp, and drill the holes to size on a drill press.
5 Using the center support as a guide, center it over the marked centerline on one base side, and drill a pair of 3/8"-deep holes into the base side. (We held the center support in place with double-faced tape when drilling.) Repeat for the other base side.
6 Cut two pieces of 3/8" dowel to 1 1/2" long.

CUTTING AND LAMINATING THE MAPLE BOARD
1 Cut three pieces of 3/8"-thick bird's-eye maple to 3 3/4" x 9 3/4" long for the cutting board (C). Glue and clamp the three pieces together edge to edge.
2 After the glue dries, scrape off the excess. Crosscut about 1/4" off one end of the laminating to square it with the sides.
3 Mark the centerline and the radius center point on the board where shown on the drawing. Now, mark a 4 7/8" radius on the board.
4 Center the support (B) over the centerline and flush with the bottom edge of the board. Trace the support's outline onto the maple board. Now, cut the board and the notch to shape.

ROUTING AND FINAL ASSEMBLY
1 Rout a 1/4" round-over along the edges (not on the bottoms) of the board and base sides where shown on the drawing. Sand smooth.
2 Glue, dowel, and clamp the center support between the base sides. Scrape off any excess glue.
3 Check the fit of the maple board on the base, and sand the notch if required for a good fit.
4 Apply several coats of Behlen's Salad Bowl Finish or vegetable oil.
TEXAS TOAST CUTTING BOARD

LAMINATING AND SHAPING THE BOARD
1 Rip and crosscut three pieces of 1 1/16"-thick stock (we used Honduras mahogany) to 3 1/2 x 12" long. Glue and clamp the pieces together edge to edge, with the edges and ends flush. Later, scrape off the excess glue, and sand the top and bottom surfaces smooth.

2 Crosscut the ends for an 11 1/2" finished length.
3 Now, using the dimensions on the drawing and a compass, mark the radii. Cut the board to shape on a band saw. Leave a square corner at the bite mark; we'll cut it to shape later. Sand a slight round-over on all edges.

“TOASTING THE CRUST” AND APPLYING THE FINISHING TOUCHES
1 To darken the edges of the cutting board, singe them with a small propane torch, being careful not to burn the top and bottom surfaces. Darken the edges to a uniform color. If you don't have a torch, you could stain the edges darker.
2 Now, cut the bite mark to shape on a band saw.
3 Sand the top and bottom surfaces of the board smooth again. This will help remove any burn marks or stain that may have seeped to the surface.
4 Apply the finish (we applied several coats of salad-bowl finish). See the Buying Guide for our source.

BUYING GUIDE

Bite into the construction of this cutting board tonight, and you'll be ready to serve sandwiches on it tomorrow. It's one great cutting board any way you slice it.
THE HOLE STORY ABOUT TODAY'S DRILL

A drill press rarely captures the limelight in a workshop—it's content to plug away, standing tall while performing workaday tasks. However unassuming, though, a drill press ranks only a step below a power saw in the hierarchy of valued workshop friends.

After unpacking a mountain of boxes, we stepped back to appraise the drill presses under $800 assembled for this article. Our workshop reminded us of a family reunion: We had a roomful of drill presses so similar that, with one exception, they appeared to be cousins.

And in fact, importers agree that just two companies manufacture all the Taiwanese drill presses exported to the United States. Taiwanese workers assemble many of the drill presses we tested—AMT, Delta, Black & Decker, Grizzly, and Orbital by Jet—right in the same factory, Rexon Company. Although Sears stands firm on its policy not to reveal manufacturing sources, their competitors say they've seen Sears machines on the production line, too.

According to Mike Mangan, Sears product manager, American-made machines have priced themselves right out of the market. "The U.S. lost the market on the drill press," Mangan said, "and will never regain it, from what I hear." The Delta radial drill, manufactured in Tupelo, Mississippi, was the only U.S. product we tested among 10 drill presses.
In particular, we noted similarities in the head assembly, elevating track, power cords, switches, and tightening knobs. A couple of the machines even packed identical generic instruction manuals!

But that’s where the similarity ends: Engineers from American firms specify how they want their machine built in Taiwan. They may specify American-made motors, Japanese-made sealed bearings, or their own ON/OFF switch. And certainly, engineers specify a production quality level based on price.

DRILL PRESSES: WHO NEEDS ONE, ANYWAY?
Drill presses continue to be one of the most popular stationary power tools in the home workshop. A recent survey of WOOD magazine readers indicates that nearly 60% already own a drill press. An additional 11% of our readers plan to purchase a drill press in the next 12 months.

The woodworker’s yearning for a drill press stems from a need to precisely control drilling, often repeatedly drilling hole after hole to a prescribed depth. And although most of us routinely drill 90° to the surface, nearly all of the larger drill presses we tested offer a tilting table to drill angled holes.

But drilling holes represents only a fraction of drill press capabilities. The drill press shines at drum sanding, mortising, countersinking, and other tasks. (A related story beginning on page 26 outlines numerous ways to expand the use of a drill press.)

THE IMPORTANCE OF SPINDLE SPEED
We tested drill presses with up to 16 speeds ranging from 150 spindle rpm to 4,700 rpm. From talking to shop experts around the country, we found out that if there’s any drill press shortcoming, it’s that too many operators fail to understand or heed recommended spindle speeds.

In our own WOOD magazine shop, we have ruined several expensive large-diameter Forstner bits by running them at too high a speed—it’s just too convenient to run the machine on the last-used belt arrangement. And once the bit begins to smoke, you’ve destroyed the steel temper.

When you flip open the top of larger drill presses, you’ll see three step pulleys connected by two V-belts. On the inside of the lid or on the head, a chart tells you how to set up the two belts to attain each desired speed. Most charts won’t tell you, for example, how fast to run a 1½" Forstner bit in maple. (You’ll want to see page 6 for details on how to order WOOD magazine’s drill speed chart.)

So for drill presses, it’s the range of spindle speeds and the horsepower that you must carefully consider. We did detect differences between the 1/2- and 3/4-horsepower motors when running larger bits and circle cutters. Sadly, at least one importer has proof that some companies slap 3/4-horsepower labels on 1/2-horsepower motors.

CHOOSING BETWEEN FLOOR AND BENCHTOP MODELS
Before getting too involved in a drill press purchase, you’ll have to choose between a tabletop and floor model. But only you can match a drill press with your pocketbook and space requirements.

The benchtop press will continue to be popular in small workshops where space dictates limitations. Some woodworkers lug their drill press to a workbench and bolt it down whenever the need arises. The smaller, lightweight Black & Decker and Sears benchtop models fit this application.

The sturdy AMT and Orbit benchtop machines we tested weigh too much for one person to place either machine on a bench. You should mount both of these machines—full-size drill presses with a short column—to a bench or table.

However, most woodworkers rarely move their drill press table lower than 7" to 9" below the chuck—the range of benchtop models. We put a new drill press in our shop three years ago and still haven’t cranked the table lower than 8". And if, for example, you had to bore a hole into the end of a table leg with your benchtop press, you should be able to swing the head around and drill off the floor.

Unfortunately, for woodworkers without floor space, benchtop presses do eat up a lot of precious workspace. But if you can spare floor space and an extra $40-$100, consider purchasing a floor drill press. You can forget luging a drill press onto a table or spending the time and money to make a separate table for a benchtop unit.

Continued
DRILL PRESSES

THE SPINDLE—THE HEART OF THE MACHINE
Quill travel describes the depth of a hole you can drill without changing the table elevation. Most of the Taiwanese models we tested have a 3¾ to 3½" quill travel. Three exceptions—the Grizzly G-1201, the Black & Decker 1782, and the Orbit 1758—have even longer reaches.

We believe a drill press should be free of runout—the condition when the circular drilling motion becomes eccentric. Because three-jaw chucks don't necessarily clamp the bit exactly on center each time, we reinstalled the bit at least twice more to check for runout. The presses passed our test with no signs of appreciable runout, although the big Grizzly and the Black & Decker drilled with less vibration.

But remember we tested new machines. Will you experience runout in a few years? It's only a guess. We can't attest to the quality of the sealed ball bearings in the spindle assembly, shown below; but we can tell you only Delta's radial drill has durable, expensive thrust bearings.

Engineers designed these machines to press vertically. If you apply a lot of sideways pressure, such as routing (not advised with a drill press) or drum sanding, you could damage the ball bearings. Only the big Grizzly, as shown in the photo bottom right, and the Delta radial have a bolt to eliminate play between the quill and the head.

All of the floor models have three-jaw ¾" chucks, many of them made in the Rexon plant. Orbit, not satisfied with Taiwanese quality, ships their machines with German-made Rohm chucks.

DEPTH CONTROL CHOICES OFFER ADVANTAGES
Most of the machines we tested have a dial-stop system to lock in the desired depth of the hole. To establish a drilling depth, "zero" the dial, lower the drill bit to the desired level, and lock in the depth.

If you fail to firmly tighten the locking knob and then apply a lot of pressure to the feed handles, you can pound past the depth stop and drill too deep. And sadly, you can't take full advantage of the extra-long quill travel of Black & Decker, Orbit, and big Grizzly presses because dial stops allow you to set only to about 3¼" drill depth.

Setting a depth with a threaded rod, shown in the photo below, requires a little more setup time. With a wrench, you must lock two nuts together on the thread rod. Even though the threaded rod system takes longer to set, we believe this mechanism performs more reliably.

A threaded rod depth stop, shown above on the Sears 21385, takes longer to set than the dial systems, but the threaded rod ensures more accurate repetitive drilling.
WHATEVER HAPPENED TO THROAT DEPTH?
If you haven’t followed drill press marketing in the past few years, you may be surprised that most manufacturers no longer speak of throats to express the maximum depth between the column and the drill-bit center. In today’s advertising world, the same drill press that once had a 7” throat now has a 14” swing—the maximum diameter of a circle you could spin around without hitting the column. That’s advertising!

TABLE MATTERS
We expected all the tables to tilt, but were surprised to find Black & Decker’s 1782 table fixed at 90°, as shown in the photo below.

The Black & Decker table has another deficiency. Although all of the other floor drill presses we tested have a cranking device to raise and lower the table, you must push the Black & Decker table by hand.

We think a floor-model drill press needs to have a rack-and-pinion table to lessen the chance of injury and to fine-adjust the table height. Without a cranking mechanism, a 25-pound table can easily accidentally drop and crush fingers.

Michael Austin, product manager for Black & Decker, confirms that his firm uses original Toolcraft castings formerly produced in another Taiwanese plant. “We are looking to make improvements in our drill press,” Austin says. “We have recognized the faults and there will be improvements in a redesigned, upgraded unit we plan to introduce early in 1989. We think it will be a super unit and it will be sold under the DeWalt label.”

Only the Sears table has the tilting scale on the same side as the tightening handle as shown in the photo below. On the negative side, note in the photo below how the front of the Sears table hits the column when swung around.

Most of the drill presses we tested have a forging hole in the center if you accidentally pilot too deep. However, Orbit ships their 14-58F drill press with a milling table seen primarily in metal shops. Because milling tables must retain coolant to bathe metal, they lack a center hole—and thereby a forgiving margin of error if you drill too deep.

FINAL OBSERVATIONS
We’d like to see better depth-stop knobs and belt-tension lock handles. The locking bolts with plastic knobs work fine until the plastic breaks off—only a carriage bolt remains. In the photo below, compare the plastic knob to the Sears and benchtop Black & Decker knob with a pinned flipper lever.

Most of the engineers curiously specify the ON/OFF switch on the side of the drill press. Sears and Delta put their switch in front where you can get to it quickly. They also incorporate a plastic safety key to prevent curious hands from turning on the machine.

And finally, the bottom line: cost. In our tests, the lower-priced machines held their own against machines that retail for twice as much. Think long and hard before you spend $400 on a drill press that performs like a $200 model.

But don’t overlook quality and a dealer network. Dean Ruffner, a Jet product manager, minces few words about today’s competitive market. Of the drill presses on the market, Ruffner says, “I’m seeing a downhill run on quality to become competitive. The first way a company cuts cost is in the service department. Then you can cut costs by accepting lower-quality motors and chucks. We once had a 10 percent return on motors until we upgraded about eight years ago. The average consumer won’t notice some differences, but Taiwan will build any quality level you want.”
### Drill Presses Under $800: Tale of the Tape

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
<th>Number</th>
<th>Speeds</th>
<th>Spindle Thrust (Inches)</th>
<th>Chuck Capacity (Inches)</th>
<th>Horsepower</th>
<th>RPM</th>
<th>Locking System</th>
<th>Table Travel (Inches)</th>
<th>Back &amp; Parallel</th>
<th>Work Light</th>
<th>Height (Inches)</th>
<th>Weight (Pounds)</th>
<th>Warranty</th>
<th>Suggested Retail Price</th>
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<td>460</td>
<td>4900</td>
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<td>18</td>
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<td>17</td>
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<td>1/4</td>
<td>1725 H</td>
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<td>Y</td>
<td>26</td>
<td>6</td>
<td>152 yrs.</td>
<td>$279.99</td>
</tr>
</tbody>
</table>

1. (D) Dial (TR) Threaded rod
2. (S) Single knob (D) Dual knob
3. (N/A) Head bits, swivels, and moves in and out; table doesn't lift
4. Optional
5. Maximum distance table lowers from bottom of chuck
6. Includes stand, but no motor
7. Prices may be discounted 10-30%

### Manufacturers List: Drill Presses

- **American Machine & Tool Co.**
  - Fourth Avenue and Spring Street
  - Royersford, Pa. 19468
  - Call 800-246-8020 for nearest dealer

- **Black & Decker Inc.**
  - 1901 Jefferson Ave.
  - Forney, Texas 75126
  - Call 800-422-2621 for nearest dealer

- **Delta International Machinery Corp.**
  - 2400 Alpha Drive
  - Pittsburgh, Pa. 15238
  - 800-367-8789

- **General by J. Philip Humfrey**
  - 3211 Kennedy Rd. #7
  - Scarborough, Ontario M1V 2J1

- **Grizzly Imports**
  - P.O. Box 2069
  - Bellingham, WA 98227
  - 200-647-6606

- **Orbit by Jet Equipment & Tools**
  - 1901 Jefferson Ave.
  - Forney, Texas 75126
  - Call 800-422-2621 for nearest dealer

- **Sears, Roebuck & Co.**
  - Contact local store for latest tool catalog

### Mortising Shortcut

For the woodworker who occasionally relies on a mortise-and-tenon joint, a mortising attachment for a drill press answers the call.

Complete mortise attachments cut from 1/4" to 3/4" mortises and start at about $30—considerably less expensive than purchasing a plunge router and much faster than chiseling by hand. The setup requires attention to detail, but a slow feed rate minimizes deflection of a specialized bit surrounded by a box-cutting chisel.

You should only consider mortising attachments with replacement bits. As with the AMT attachment we tested, right, most attachments include hold-downs absolutely essential to accurate work. Mortise the ends first and then connect the two holes with successive holes.
DELTAS DISTINCTIVE RADIAL PRESS

Perhaps Delta should rename their 32” radial press a “radical press”—there’s nothing like this machine on the market for under $5,000. It’s the only machine we tested that we could tilt the head, which greatly simplifies drilling holes at an angle on long stock. Woodworkers also love the 32” swing—created by the head that slides in and out on the column. For these features, woodworkers pay a premium price for this benchtop machine.

This threaded-rod stop adjusts quickly. In addition, it’s easy to turn the head 90° and disc-sand or polish in a convenient position.

Unfortunately, the radial’s slowest speed—700 rpm—runs faster than the recommended speed for circle cutters and most Forstner bits in hardwood. And, we miss a table with a cranking mechanism.

Written by Carl Yoss
Technical Consultant: George Graneth
Photographs: Jim Kascontas
TRIPLE-CROWN SAWHORSE

This handy-to-have-around sawhorse literally rises to the occasion. Build one for use as a ripping support, or build a pair and raise projects to back-pleasing heights.

FORM THE END SUPPORTS
1 Cut two pieces of \( \frac{3}{4} \)" plywood (we used A-C fir plywood) to \( 20 \times 22\frac{3}{4} \)" for the end supports (A).
2 Cut two pieces of \( \frac{3}{4} \)" maple to \( \frac{3}{4} \)" wide by 20" long for the banding (B). Glue one piece to the bottom of each end support.
3 Using the dimensions on the Exploded-View Drawing, mark a centerline the length of one end support. Measuring from the centerline, lay out and cut the angled sides on one end support. Use this support as a template to mark the shape onto the second end support, and cut it to shape.
4 From the center point at the bottom, mark a 4" radius. Cut the arc to shape, and again, use this support as a template to mark the arc onto the second support. Cut it to shape, and sand both arcs smooth.

ATTACH THE CENTER PANELS TO THE END SUPPORTS
1 Cut the spacers (C) to size. Center the spacers on each end support, and glue and screw them into place, using the hole sizes in the Screw Hole Detail.
2 Cut the two center panels (D) to size. Locate and mark the center of one panel, and mark a 1"-diameter circle. Drill a blade start hole, cut the circle to shape with a jigsaw, and sand smooth. (The circle cutting helps reduce the total weight of the sawhorse.) Trace the circle outline onto the second panel, and cut that circle to shape.
3 On one center panel, mark the locations for the two \( \frac{3}{4} \)" holes, referring to the drawing for dimensions. Clamp the two panels together with the edges flush, and drill \( \frac{3}{4} \)"...
holes through both panels where marked. Remove the clamps.
4 Cut the four maple corner braces (E) to size, bevel-ripping a chamfer along one edge of each.
5 With the top edges flush, glue and screw one center panel (D) to a spacer (C) on each end support (A). See the Screw Hole Detail for hole sizes. Repeat for the second panel. Now, glue and screw the corner braces (E) into position.

ADD THE ADJUSTABLE CENTER SUPPORT
1 Cut the adjustable support (F) to 19 x 29”. Mark and cut a taper on each end of the piece (see the Exploded-View Drawing for dimensions).
2 Cut the top beam (G) to size (we cut ours from a 2 x 4). Rout a \( \frac{3}{4} \)” round-over along the top edges. Cut or rout a \( \frac{3}{4} \)” groove \( \frac{3}{4} \)” deep down the center of the beam. Center and glue the beam to the top of the adjustable support.
3 Slide the adjustable support between the center panels. Using the two previously drilled \( \frac{3}{4} \)” holes in the panels as guides, drill just far enough into the adjustable support to make a mark.
4 Remove the support, and drill a pair of \( \frac{3}{4} \)” holes through the support where marked with the \( \frac{3}{4} \)” bit. Now, as shown in the photo below, mark parallel lines on each side of each \( \frac{3}{4} \)” hole to the bottom of the support. Center and bore a \( \frac{3}{4} \)” hole between the lines 2” from the bottom of the support where shown on the Exploded-View Drawing.
5 Using a jigsaw, saw along the marked lines from hole to hole to form the slots where shown on the Exploded-View Drawing.
6 Slide the support between the center panels until the top beam rests on top of the center panel, and trace the \( \frac{1}{2} \)”-diameter circle onto the support. Remove the support, and cut the hole to shape.

MAKE THE WRENCH AND ADD THE CARRIAGE BOLTS
1 To make the wrench (H) for ease in loosening and tightening the wing nuts, cut a piece of \( \frac{3}{4} \)” maple to \( 1 \frac{1}{4} \) x 3”. Using tracing paper, transfer the wrench pattern onto the stock. Drill the holes where shown, and cut the wrench interior and exterior to shape.
2 Sand the parts smooth, and prime and paint as desired.
3 Position the adjustable support between the center panels. Install the carriage bolts through the holes. Slide a flat washer onto each bolt, and then thread on the wing nuts. Drill a \( \frac{3}{4} \)” pilot hole \( \frac{1}{2} \)” deep, and add a \#8 x 1 1/4” wood screw to hang the wrench.
4 Raise the adjustable support to the desired height, and use the wrench to tighten the wing nuts.

If you have an uneven shop floor, the tapered sides on the adjustable support allow the support to be tilted and positioned level.}

Mark lines on the adjustable support, perpendicular to the beam, on each side of the holes.

Project Design: Jim Boelling.
James R. Downing
Photographs: Bob Calmer
Illustrations: Kim Downing, Bill Zuna

WOOD MAGAZINE AUGUST 1988
Don’t have illusions about protecting your eyes. According to the National Society to Prevent Blindness, hospital emergency rooms annually treat at least 35,000 people for eye injuries received in the home workshop! Jim Boelling, above, our Project Builder at WOOD magazine, once nearly counted himself among the statistics.

“I was working for the local school district in their furniture factory,” Jim recalls. “The union required us to wear both eye and ear protection. So, I was wearing my safety glasses one afternoon when I started up the big, straight-line saw to rip 2x2” table legs from rough 8/4 oak. As I turned to feed more board into the blade, it happened. WHAM! My glasses exploded off my face and dropped. I heard tinkles like a handful of buckshot on a tin roof as carbide flew everywhere. A chunk of barbed wire buried in the wood had fractured 14 of the 28 carbide teeth on that saw!” He exclaims. “One tiny piece of carbide had hit the edge of the lens, chipping it. My optometrist said the carbide would have penetrated my eye socket and probably killed me if I hadn’t worn my safety glasses. To this day, I can’t help viewing thick boards with suspicion—through safety glasses!”

Whatever excuse you might have for not wearing eye protection in the shop, it won’t hold up. Today’s standard lineup of safety glasses presents dozens of style and comfort options to fit all budgets. However, when it comes to a standard of protection, there’s only one.

‘REAL’ SAFETY GLASSES HAVE A PEDIGREE

“Real” safety glasses must meet ANSI Z87.1-1979 (“Z87” for short), the performance standard for protective eyewear set by the American National Standards Institute (ANSI). ANSI, a voluntary organization, coordinates the development of standards used in business, industry, government, and educational institutions. It wrote the Z87 standard for the workplace. But, your home workshop differs only in size, not in the number of possible hazards you risk.

Most safety glasses or goggles manufactured after 1979 that meet Z87 will have that fact right on...
SAFETY IN SIGHT
metal fragments strike fast. Safety glasses will protect you.

them. Look at the lenses (usually in the top center or outside edges at top and bottom). As shown in the top photo, below left, each lens displays the manufacturer's monogram or trademark—such as TO for Tintus®, AO for American Optical, X for UVEX, VC for Pearle Vision Center. Inspect the frame on the front and temple or ear pieces and you'll see a Z87, bottom photo, below left. Older glasses may only carry the lens marking.

Although these markings generally hold true in indicating compliance with Z87, a few very contemporary, wraparound styles, though completely safe, carry no marking at all. Kathy Peterson, a spokesperson for American Optical, maker of the "Saf Scanner," a one-piece molded model of safety eyewear, explains: "ANSI sets the minimum performance standard for designs of glasses with a frame and two lenses. Our Saf Scanners are of one-piece construction. They meet or exceed ANSI Z87. But, because of the design, we cannot imprint the designation on them."

LENS AND FRAMES: PARTNERS IN SAFETY
Both the frame and the lenses of safety glasses work together for the utmost protection. If one partner meets the standard, the pair won't protect you.

For instance, the lens might not shatter under an impact. The impact, though, could drive the lens out of a regular frame and into your eye! Lenses in plastic safety frames must be mounted from the front with a strong retention lip to prevent them from projecting back into the eye. Metal frames use an equally effective lens insertion.

Warning: Don't confuse "impact resistant" lenses with industrial quality safety glasses. Regular prescription (Rx) glasses are, by law, required to be impact resistant. However, safety glasses must withstand nearly four times the impact (in foot-pounds of pressure) of regular prescription glasses.

Frames for regular glasses have no strength or impact requirements to protect you. But safety frames, like safety lenses, must tolerate pressure and impact from the front and sides. Metal frames, for example, must show no cracks or solder breaks after being bent in half until the lenses touch, and then straightened.

YOUR OPTIONS IN SAFETY EYEWEAR
Top-notch eye protection should be your only consideration when it comes to selecting eyewear. The chart, next page, details the minimum eye protection you need for different types of woodworking processes and hazards.

Your eyesight, however, partially determines your style options. For instance, if you don't require corrective lenses, you can choose (1) goggles, (2) prefabricated safety eyewear (prefabs) with noncorrective clear (plano) safety lenses already in place, or (3) safety frames in which plano safety lenses are inserted.

If you need corrective lenses, you can (1) wear goggles or prefabs designed to be worn over your regular glasses, or (2) order prescription safety glasses made.

Contact lens wearers can (1) wear their contacts protected by goggles, prefabs, or safety glasses with plano lenses, or (2) remove contacts and wear prescription safety glasses instead. Note: Contact lenses—either hard or soft—do not protect your eyes. Never wear them in shop situations without adequate safety eyewear.

THE COST OF QUALITY PROTECTION
Surprisingly, protection at the Z87 level starts at $1.89, and may go as high as $100. Generally, at the lower end of the scale you're trading off some optical clarity in the lenses and custom fit. On the high end, you'll get glasses you can wear in the shop and out to dinner, too.

Prefabricated plano safety eyewear, either as glasses or in a wraparound style, comes ready to wear with plano lenses in place for $4 to $25. Prefabs offer many choices in style: (1) regular spectacle looks alike with side shields that may or may not be removable, (2) ones that wrap around your face, giving you wider peripheral vision, and (3) glasses in which the shields are an integral part of a plastic frame.

You can wear some prefabs over prescription glasses. Others have adjustable temples or come in more than one size. When you purchase prefabs from an eyewear specialist, the specialist usually can make some adjustments for a better fit.

In general, you'll pay more for "prefabs" that have frames and lenses of the same quality as regular glasses. The quality of the optics usually ascends with the price, although some pairs for $5 still have good optics.

Prescription safety glasses give you a custom fit, usually the clearest look at your work, and, if you choose, a pair of glasses you could wear all the time (with side shields removed). Prices for most safety frames fitted with single vision prescription safety lenses range from $30 for a not-so-stylish pair to $60 for plastic-framed glasses (bifocals and trifocals cost more) that look as handsome as any fashion pair. Some plastic-framed and metal-framed pairs soar to the $100 level.

Continued

WOOD MAGAZINE  AUGUST 1988
KEEP SAFETY IN SIGHT

A few safety glasses have permanently attached side shields; some have no shields. Most safety glasses, though, can be fitted with side shields. Side shields provide you with 20 to 25 percent more protection than safety glasses alone, according to Dr. Joseph F. Novak, a University of Pennsylvania clinical professor of ophthalmology and eye-safety consultant to U.S. Steel. And, shields add only $1 to $5 to the price. The bottom line: Buy shields and wear them.

GOGGLE-EYED OVER SAFETY
Fitting closely to your face, goggles give you the best impact protection from every angle. They're the safe choice when you work with chemicals, such as strippers (see chart for special chemical goggles). Many goggles with an adjustable elastic band fit easily over regular glasses. Neoprene head straps may be used with chemical goggles.

And yes, some goggles even prove comfortable worn over prescription glasses. But at only $2 to about $10, goggles won't be the highest quality optical product. What you see may be a little fuzzy. "Seeing with a slight distortion through goggles won't harm your eyes. Instead, it will save them," reminds Dr. Novak. We found, by the way, that goggle optical quality does vary greatly between brands and price ranges.

SAFETY LENSES—A TOUGH MATCH FOR STEEL WOOL
Both plastic and glass lenses can meet the Z87 standard. However, plastic—specifically polycarbonate plastic—receives the highest recommendation from a safety standpoint from a majority of manufacturers. Polycarbonate tops glass and CR-39, another high-quality plastic, for impact resistance.

You'll find that plastic lenses have greater impact resistance than glass. They're also lighter. And although plastic lenses do pit and scratch easier than their glass equivalent, this won't reduce their impact resistance as with glass.

You should always ask for "scratch-resistant" lenses. Scratch resistance, like safety lenses, has come a long way. For example, in Titmus test comparisons, their scratch-resistant lenses are eight times more resistant to scratching from a pencil than uncoated lenses. At Pearle Laboratories, the scratch-resistant lenses test 15 times more resistant than untreated ones when rubbed with 0000 steel wool!

HOW TO DEAL WITH MULTIPLE DISTANCES
If you want to see to saw safely, you may need bi- or trifocals. If your regular glasses, for instance, magnify so you can see clearly close up, but your vision gets fuzzy when you work at the table saw, you can get one pair of safety glasses made to cover both distances. Consult an ophthalmologist or optometrist about your specific distance problem. He or she can write a prescription that will correct for two or three distances.

Another option: If you almost exclusively do one type of woodworking at a single distance—such as lathe turning—you can get single-vision safety glasses or bifocals corrected to a specific distance(s).

Your prescription for correction won't specify safety glasses. That's up to you to request. Simply order frames and lenses that meet ANSI Z87. When your glasses arrive, inspect them for the manufacturer's monogram on the lenses and the Z87 imprinted on the frames.

Note: You won't always find safety glasses on display because they rarely account for a large percentage of sales. Ask for them.

WHERE TO BUY SAFETY GLASSES
- Hardware stores and home centers sell goggles and prefab safety eyewear. However, all of their products may not meet the Z87 standard, so read labels and warnings carefully.

STOP YOUR GLASSES FROM ATTRACTION SAWDUST
Static electricity attracts sawdust to lenses, especially plastic ones. Dennis Tuminello, a woodworker who heads Pearle Laboratories in Dallas, has the solution: "Start with scratch-resistant lenses for some antistatic protection. Then, clean them with ArmorAll, a product available at hardware stores."
## SAFETY EYEWEAR LINEUP

<table>
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<tr>
<th>TYPE</th>
<th>PROTECTION</th>
<th>FEATURES</th>
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<td>★</td>
<td>★</td>
<td>*</td>
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<td>297 lenses</td>
<td>★</td>
<td>★</td>
<td>*</td>
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<tr>
<td>Detachable shields</td>
<td>★</td>
<td>★</td>
<td>*</td>
</tr>
<tr>
<td>Permanent wire-reinforced shield</td>
<td>★</td>
<td>★</td>
<td>*</td>
</tr>
<tr>
<td>Wear over normal glasses</td>
<td>★</td>
<td>★</td>
<td>*</td>
</tr>
<tr>
<td>Wipes on charger</td>
<td>★</td>
<td>★</td>
<td>*</td>
</tr>
<tr>
<td>Chemical sprays</td>
<td>★</td>
<td>★</td>
<td>*</td>
</tr>
<tr>
<td>Hand tools only</td>
<td>★</td>
<td>★</td>
<td>*</td>
</tr>
<tr>
<td>Frontal impact protection only</td>
<td>★</td>
<td>★</td>
<td>*</td>
</tr>
<tr>
<td>Glass work wear</td>
<td>★</td>
<td>★</td>
<td>*</td>
</tr>
<tr>
<td>Adjustable temple</td>
<td>★</td>
<td>★</td>
<td>*</td>
</tr>
<tr>
<td>High-quality safety supplies</td>
<td>★</td>
<td>★</td>
<td>*</td>
</tr>
<tr>
<td>Scratch-resistant lenses available</td>
<td>★</td>
<td>★</td>
<td>*</td>
</tr>
<tr>
<td>Metal frames</td>
<td>★</td>
<td>★</td>
<td>*</td>
</tr>
<tr>
<td>Plastic frames</td>
<td>★</td>
<td>★</td>
<td>*</td>
</tr>
<tr>
<td>Under $20</td>
<td>★</td>
<td>★</td>
<td>*</td>
</tr>
<tr>
<td>Under $25</td>
<td>★</td>
<td>★</td>
<td>*</td>
</tr>
<tr>
<td>Under $100</td>
<td>★</td>
<td>★</td>
<td>*</td>
</tr>
</tbody>
</table>

- **Opticians and optical centers**, such as Pearle Vision Centers, Sterling Optical, and others, fill prescriptions, make prescription safety glasses, sell safety glasses with plano lenses, and sell prefab safety glasses. Some, with affiliated optometrists, also write prescriptions.

- **Optometrists** usually provide the services of opticians and optical centers, plus they test your eyes. **Optometrists** are doctors of medicine who also prescribe corrective lenses. Some will dispense glasses; others only provide the prescription you fill elsewhere.

- **Safety specialty stores** carry goggles and prefabs and from bulk often will break out a single pair for you. Find them in the Yellow Pages under "Safety Equipment."

Written by Emily Freeman Pinkston
Photographs: Hopkins Associates;
Jim Kascoutas
BUILD THIS TERRIFIC TRIO FOR YOUR PATIO OR DECK

PLANTERS

Blooming beauties rise to the occasion in these outdoor decorators. Simple to construct, the framework consists of 2x4 stock, handsomely covered with weather-resistant cedar fencing. Each planter has a shelf you can position to elevate your favorite plants to just the right height. With a total cost of under $90, what better way to display your greenery?
Note: The following directions are for the medium-height planter. To build the other two planters, refer to the Bill of Materials on page 72 for the short planter and page 71 for the tall planter. Although the sizes of the parts vary from planter to planter, the parts for all three planters are lettered the same. To build the shortest and tallest planters, follow the directions for the medium-height planter.

CONSTRUCT THE SKELETON FRAMEWORK

1. Cut four uprights (A) and cross members (B) to the sizes listed in the Bill of Materials. (We ripped and crosscut the uprights to size from one 8’ pressure-treated fir 2x4.)

2. Clamp two cross members between two uprights as shown on the drawing below. Check for square, drill ⅜” pilot holes, and screw the frame together. Repeat for the second frame.

3. Clamp the remaining four cross members between the two assembled frames. Now, drill pilot holes, and screw them in place as shown in the photo at right.

NAIL ON THE SIDING

1. Cut eight corner siding pieces (C) and the center siding pieces (D) to length. (We used 1x6x8’

Construct the two frames, clamp the cross members between them, and screw the cross members in position with 3” deck screws.

Continued
PLANTERS APLENTY

MEDIUM-HEIGHT PLANTER

Bill of Materials

<table>
<thead>
<tr>
<th>Part</th>
<th>Finished Size*</th>
<th>Material</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1 1/2” x 1 1/2” x 23 1/2”</td>
<td>fir (treated)</td>
<td>4</td>
</tr>
<tr>
<td>B</td>
<td>1 1/2” x 3 1/2” x 16 1/2”</td>
<td>fir (treated)</td>
<td>8</td>
</tr>
<tr>
<td>C</td>
<td>3/4” x 3 1/2” x 23 1/4”</td>
<td>cedar</td>
<td>8</td>
</tr>
<tr>
<td>D</td>
<td>3/4” x 3 1/2” x 23 1/4”</td>
<td>cedar</td>
<td>16</td>
</tr>
<tr>
<td>E</td>
<td>3/4” x 5 1/4” x 22 1/2”</td>
<td>cedar</td>
<td>4</td>
</tr>
<tr>
<td>F</td>
<td>3/4” x 2 1/2” x 22 1/2”</td>
<td>cedar</td>
<td>4</td>
</tr>
<tr>
<td>G</td>
<td>3/4” x 3 1/2” x 22 1/2”</td>
<td>cedar</td>
<td>4</td>
</tr>
<tr>
<td>H</td>
<td>1 1/2” x 1 1/2” x 19 1/4”</td>
<td>fir (treated)</td>
<td>2</td>
</tr>
<tr>
<td>I</td>
<td>3/4” x 5 1/4” x 19 1/4”</td>
<td>cedar</td>
<td>3</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: 3” galvanized deck screws, #7 galvanized nails.

cedar fencing. In checking sources, we found that 1x6 cedar fencing varies from 5 1/4” to 5 1/2” in width. With this in mind, 5 1/4” is the widest board you'll find on these three planters.

2 Bevel-rip one edge of each corner siding piece at 45° to obtain the finished width (we did this on the table saw).

3 Holding the beveled edges tight, nail two corner siding pieces to each corner of the framework. Keep the top edges of the siding pieces flush with the top of the framework. (See the Siding and Trim Drawing for details.)

4 Measure the distance between the corner siding pieces (C), divide this distance by 4, and rip each center siding piece (D) to this width plus 1/8” (we cut our pieces to 3 1/2” wide). Next, starting at the outside and working in, as shown in the photo at right, nail the center pieces in place. Plane one edge of each of the last two remaining in-

After assembling the skeleton frame, nail the siding pieces in place by starting at the outside and working in. Plane the center piece to fit.
Bill of Materials

<table>
<thead>
<tr>
<th>Part</th>
<th>Finished Size*</th>
<th>Material</th>
<th>Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1 1/2&quot; x 1 1/2&quot; x 29 3/4&quot;</td>
<td>fir (treated)</td>
<td>4</td>
</tr>
<tr>
<td>B</td>
<td>1 1/2&quot; x 3 1/2&quot; x 7&quot;</td>
<td>fir (treated)</td>
<td>8</td>
</tr>
<tr>
<td>C</td>
<td>3/4&quot; x 3 3/4&quot; x 29 3/4&quot;</td>
<td>cedar</td>
<td>8</td>
</tr>
<tr>
<td>D</td>
<td>3/4&quot; x 4&quot; x 29 3/4&quot;</td>
<td>cedar</td>
<td>4</td>
</tr>
<tr>
<td>E</td>
<td>3/4&quot; x 5 5/8&quot; x 13&quot;</td>
<td>cedar</td>
<td>4</td>
</tr>
<tr>
<td>F</td>
<td>3/4&quot; x 2 3/8&quot; x 13&quot;</td>
<td>cedar</td>
<td>4</td>
</tr>
<tr>
<td>G</td>
<td>3/4&quot; x 3&quot; x 13&quot;</td>
<td>cedar</td>
<td>4</td>
</tr>
<tr>
<td>H</td>
<td>1 1/2&quot; x 1 1/2&quot; x 9 3/4&quot;</td>
<td>cedar</td>
<td>2</td>
</tr>
<tr>
<td>I</td>
<td>3/4&quot; x 5 5/8&quot; x 9 3/4&quot;</td>
<td>cedar</td>
<td>1</td>
</tr>
</tbody>
</table>

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

Supplies: 3" galvanized deck screws, #7 galvanized nails.

Cutting Diagram

Shortest Planter
14 Pieces—3/4" x 5 1/4" x 96" Cedar (1 x 6) for Parts C-G, I

Medium-Height Planter
10 Pieces—3/4" x 5 1/4" x 96" Cedar (1 x 6) for Parts C-G, I

Tallest Planter
6 Pieces—3/4" x 5 1/4" x 96" Cedar (1 x 6) for Parts C-I

Tallest Planter
2 Pieces—3/4" x 3 3/8" x 66" Treated Fir (2 x 4) for Parts A, B

CUT AND ADD THE TRIM PIECES
1 Cut the base pieces (E) to length plus 1".
2 Hold the pieces in place, and mark the length needed (a combination square works well for marking the 45° angles). Miter-cut both ends of each base piece. (We cut ours on the table saw using a miter gauge to push the pieces over the angled blade. You could also cut the pieces on the radial arm saw.)
3 Bevel-rip the top edge of each at 45° to trim the board to width. Nail the pieces in place around the perimeter of the base.
4 Mark the lengths needed, and cut the top trim pieces (F) to length plus 1". Now, rip the pieces to width, and miter-cut them to length. Nail the pieces in place flush with the tops of the siding.
5 Measure the distance, and cut the top pieces (G) to length plus 2". Now, bevel-rip the outside edge of each piece to trim the piece to a 3 1/2" width. Carefully measure the distance, and miter-cut the top pieces to length. With the outside edge of each G flush with the outside face of each F, nail the top pieces in place.

WOOD MAGAZINE AUGUST 1988
ADD THE SHELF
Note: The shelf allows you to raise or lower your potted plants for the best viewing height. We positioned our shelf so the top of the pots was about level with the top of the planter.

1 Rip and crosscut the shelf cleats (H) to size from 2 x 4 stock. Now, cut the shelf boards (I) to size.

2 To locate the shelf for the planter, measure down from the top edge of each planter the height of the flowerpot plus 3/4", and make a mark on each upright. (For example, if your pot is 8" high, measure down 8 3/4" and make a mark on each upright.) Then, lay the planter on its side, position the top edge on one cleat (H) even with the marked lines on two of the uprights, and screw it into place. Lay the planter on the opposite side, and repeat to fasten the second cleat.

3 Lay the shelf boards on the cleats (we didn't nail ours in place in case we ever wanted to change the cleat positions for new pots), and add the plants. Finally, call the neighbors over for coffee on the patio—they can't help but notice your sharp new planters.

SHORTEST PLANTER
To build the shortest of the three planters, refer to the Bill of Materials on this page, the Cutting Diagram on the previous page, and the directions starting on page 69 for the medium-height planter. Although the sizes of the parts vary, they are lettered the same, and the building procedure is nearly identical to that of the medium-height planter.

TALLEST PLANTER
To build the tallest of the three planters, refer to the Bill of Materials and the Cutting Diagram for the tall planter on the previous page and the directions starting on page 69 for the medium-height planter. Although the sizes of the parts vary, they are lettered the same and the building procedure is nearly identical to that of the medium-height planter except for the shelf. Due to the small opening at the top, attach the cleats (H) before attaching the siding.
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C.M. Smethg
Fisgth, TX

The Editor
The Woodwork's Journal

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A. Mortenson
New Milford, CT

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Hobby Workhorse

Save $\$ Sharpening Your Own Jointer/Planer Knives

Instead of waiting days for a sharpening shop to grind your jointer knives, do the job in minutes at your drill press.

You can save the expense of someone else sharpening your jointer/planer knives by building this jig conceived by WOOD® magazine Design Editor Jim Downing. As shown below, the secret to the success of this

Whether your hobby is building planes, trains, automobiles or hobbyhorses, you need the right tool for the job.

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See the Moto-Tool at your hobby, craft or hardware dealer. And put a little more horsepower into your hobby.
sharpener is that the knife passes across the stone at an angle. Result: only the outside rim of the stone touches the knife, creating a sharp edge and minimum heat. After you build the jig, you'll only need to fashion a knife carrier for each of your knives (if they're different in size).

To use the jig:
- Put the grinding stone into the chuck and set your drill press for 3,000 rpm.
- Clamp the inclined jig table to the drill press table, positioned so the stone centers within the curved guard.
- Clamp the knife into the carrier.
- Raise the table so the knife just touches the stone.
- Adjust the carrier fence so the bevel on the knife centers on the stone (see the end view illustration above).
- With the drill press still turned off, slide the carrier/knife assembly across the stone to check for adequate clearance.
- Don your face shield, start the drill press, and slide the knife across the stone. Slide in a slow and steady movement (about 1" every second). Once past the stone, slide the knife back across the stone and repeat until sharp. You may have to raise the table slightly to remove any nicks in the knife.

Caution: Raising the table too much will put excessive pressure on the stone, causing the knife edge to overheat or possibly shatter the stone. So take it easy!
- Finally, remove the knife from the carrier and when away the burr from the knife's back side.

Jig design: James R. Downing
Illustrations: Mike Henry, Bill Zaun

---

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CARVE HILLBILLY WILL

An Ozark caricature by Harold Enlow

Harold Enlow lives in Dogpatch, Arkansas, smack dab in the middle of the Ozark mountains. Figures of local characters and fictional folk such as Hillbilly Will stream from his studio.

"I have my carving studio-workshop at home, on our peaceful 38 acres where deer often graze in our field," Harold says, describing One in a collection of regional patterns from the nation's top carvers.
the setting. "My wife, Elaine, does all the finishing on my carvings, and our four-year-old daughter, Katie, plays in the woodchips with our dog, Wendell."

Harold began carving as a hobby in the Army. After his service stint, he learned more about carving by working alongside master carver Peter Engler in Silver Dollar City, Missouri. From there, Harold moved to Dogpatch. Now, in addition to his carving, he writes books and teaches the subject.

Renowned among carvers and the public for his caricatures, Harold says of Hillbilly Will, "This reclining figure is typical of the Arkansas Ozarks' hillbilly all tourists anticipate seeing, but rarely do. However, there are a few of us left if you look in just the right places."

CARVING AND FINISHING HILLBILLY WILL
Harold likes basswood, and that's what he used for this 7 x 2½" figure. However, any carving wood that takes detail will work.

"Trace the pattern on the carving block so that the wood grain runs the length of the figure," he advises. "That way, your long, continuous cuts for the hair of his beard will flow smoothly."

This accomplished carver relies on a carving knife and a few small palm gouges to shape the figure and add details. For the tiny hairrows in the figure's hair, beard, fingers, and toes, Harold calls on a narrowangled V-tool. "Make sure your V-tool is extremely sharp," he notes, "or the cuts will be ragged instead of clean and smooth."

For finishing, Elaine thins artist's acrylic paints to stain consistency. After the paint dries, she applies a furniture antiquing finish, then wipes it off immediately. Sprayed-on acrylic protects the figure.


Design: Harold L. Enlow Photographs: Bob Calmer, Elaine Enlow
POWER TOOLS

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<thead>
<tr>
<th>Width (in)</th>
<th>20</th>
<th>24</th>
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<tbody>
<tr>
<td>Speed (rpm)</td>
<td>206</td>
<td>230</td>
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</tbody>
</table>

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<tbody>
<tr>
<td>Speed (rpm)</td>
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<tr>
<th>Width (in)</th>
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<tbody>
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<td>Speed (rpm)</td>
<td>230</td>
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</table>

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<th>Width (in)</th>
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<tr>
<th>Size</th>
<th>Spindle Width</th>
<th>Cabinet Paper</th>
<th>No Load Finishing Paper</th>
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<tr>
<td>1&quot; x 30'</td>
<td>1/2 dia.</td>
<td>50 pk.</td>
<td>100 pk.</td>
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<td>1&quot; x 24&quot;</td>
<td>1/2 dia.</td>
<td>75 pk.</td>
<td>150 pk.</td>
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<td>1&quot; x 18&quot;</td>
<td>1/2 dia.</td>
<td>100 pk.</td>
<td>200 pk.</td>
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<td>1&quot; x 12&quot;</td>
<td>1/2 dia.</td>
<td>150 pk.</td>
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<td>1&quot; x 6&quot;</td>
<td>1/2 dia.</td>
<td>200 pk.</td>
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<td>1&quot; x 3&quot;</td>
<td>1/2 dia.</td>
<td>250 pk.</td>
<td>500 pk.</td>
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WOOD MAGAZINE AUGUST 1988
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Japan buys more American wood and wood products than any other foreign nation. Industry trade data indicates that Japan spent more than $1.9 billion on U.S. forest products in 1987. Canada came next, then South Korea, China, and West Germany. Italy, the United Kingdom, Taiwan, Mexico, and Australia made up the second half of our top 10 customers.

LEARN TO CARVE FROM YOUR EASY CHAIR
Schenectady, New York's public television station, WMHT, has made it possible to learn woodcarving at home from an entertaining friend. At least that's the impression we got from watching a sample program of Woodcarving with Rick Butz, a 13-program series produced for that station. The program airs nationally on many PBS channels.

In the series, Butz (pronounced "boots") takes you step by step through a variety of woodcarving projects. From carving his renowned Adirondack characters (see "French Louie," WOOD® magazine, June, 1987, page 78) to an American eagle, chipmunk, sign, toys, and coat of arms, Rick laces his how-to program with interesting and amusing stories. To chip away with Rick, check your local TV listings.

CALIFORNIA REDWOOD LOGGERS FIND TREES WRAPPED IN RED TAPE
California lumber companies that harvest redwood deal with the tightest regulations in the industry, according to the Western Forests Products Association. The state requires detailed harvest plans that undergo a 45-day review. Typical plan applications run at least seven pages, include expected erosion hazards and other environmental impacts, and lists of adjoining landowners to be notified. Also, the plan may be subject to public hearings and appeals. California's rules also dictate logging frequency in timber tracts, list the hours of the day loggers fell trees, prescribe the days for log hauling, and allocate the percentage of trees removed.

Yet, the lumber companies don't gripe about the mind-boggling maze of red tape and readily comply with the reams of regulations. It seems that such strict control acts as a two-edged sword. It makes formerly active and vocal environmentalists happy as well as silent. And, the redwood loggers—often maligned as bad guys in the sixties and seventies for pillaging the land—now enjoy a public image as responsible reapers of the resource.

WOOD CAN'T GET ANY MORE EXOTIC THAN THIS!
You'd have a devil of a time finding goldie wood, red cedars, musk burl, blackheart dorel, and pinkwood at your neighborhood lumberyard. Your queries would only draw blank stares. Unless, of course, you were shopping on the Austrian island commonwealth of Tasmania, where these species are commonplace.

Or, you talked to Jim Heusinger, owner of Berea Hardwoods in Berea, Ohio. He sells them—and other equally exotic Tasmanian wood—as eye-appealing specimens for woodturners and other craftsmen.

"We don't even know the correct botanical names for all of these species," Heusinger says about his stash. "This wood comes from one wild, untamed wilderness that has to be cleaned for water reservoirs. The government was going to burn the trees."

Through a wood broker in Tasmania, Jim buys the wood about 30,000 board feet at a time, has it kiln-dried, and fronts the shipper for its voyage.

For imagination-boggling descriptions and prices of Jim's Tasmanian hardwoods, call him at 216/243-4452, or write for his brochure: Berea Hardwoods, 125 Jacqueline Dr., Dept. 10, Berea, OH 44017.
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