• BASIC CABINET CONSTRUCTION
  how to build them like a pro

• CLEAR FINISHES
  tips on selecting the right one

• WOOD TESTS
  dado blades/sets

• BUYING LUMBER
  by mail

• PROJECTS GALORE
  wooden pulls
  stereo unit
  cheval mirror
  quick-clamp
  end vise
  kid's safe

BUILD CABINETS
one easy step at a time
Introducing the New Delta 18" Variable Speed Electronic Scroll Saw.

At Delta, we don't believe anyone should impose their limits on you. That's why we've made the first infinitely variable speed scroll saw with an electronic "speedometer".

Take a curve anywhere from 100 to 2,000 CS/M. Watch the speed increase on the readout. Lock it in wherever it feels best.

Our electronics keep the blade speed constant. And a dry drive design makes for long, trouble-free performance.

The new Delta scroll saw makes intricate cutting a breeze—working in areas as tight as 1/64" diameter. For large jobs it has a big 2" thick capacity. And it makes cuts so fast and smooth, your sander will start feeling neglected.

Beyond simple cuts and curves, the 16" cast-iron table tilts to accommodate taper tenon and bevel cutting. It rotates 90°, and tilts 30° left, 45° right, 15° up, and 30° down.

Naturally, you'll want to put this versatility to work right away.

So we'll give you an assortment of 8 dozen blades with your new scroll saw.

With so many blades thrown in, you might expect to run through them like water.

But you won't. Our new solid "C" arm and constant blade tension keep blade breakage remarkably low.

And when you have to change blades, or thread one into an intricate series of internal cuts, our pivoting blade chucks offer the fastest blade changing and tensioning in the industry.

If all this sounds remarkably well thought-out, well, it ought to.

After all, Delta introduced the original scroll saw back in the '20's.

Now, it's only fitting we introduce the ultimate one.

Call us toll-free to learn the name of the Delta distributor nearest you. Delta International Machinery Corp. (Formerly Rockwell Power Tool Division), 800/438-2486 (in PA, 800/438-2487).

Behind Our New Name Is Our Old Reputation.
A message to the readers of Wood Magazine from Las Vegas entrepreneurs, Richard Malott and Junior Sealy

WE HIT THE JACKPOT IN LAS VEGAS

WHEN WE BOUGHT THE AUSTIN HARDWOODS FRANCHISE

**Facts**
- Started August, 1980 in the depths of the recession
- Began showing profit after four months
- Sales first year $370,000
- Sales second year $725,000
- Recovered entire initial $90,000 investment in 20 months
- Doubled our warehouse capacity July, 1983 from 6,000 to 12,000 square feet
- Sales this year $1,000,000 plus!

**Opinions**
We couldn’t have done it without the flexibility and expertise provided by the Austin Hardwoods program. The parent company has worked hand-in-hand with us, keeping us abreast of changing market conditions, new products, and effective marketing techniques. Their program allows the franchise owners to tailor their operation towards any ratio of retail/wholesale and hobbyist/commercial sales, and to grow as fast as they are able. Sure there was a lot of hard work, but the record speaks for itself. Our Austin Hardwoods franchise turned out to be a sure bet.

Details are too numerous to list. This is a tremendous opportunity to make money either as an owner/operator or as an investor. If you happen to love dealing in fine woods, all the better. Current total investment is approximately $90,000. Please let us hear from you.

**Franchise Marketing Department**
**Austin Hardwoods**  P.O. Box 3096 • Austin, Tx. 78764

Visit the Austin Hardwoods Dealer nearest you.

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<thead>
<tr>
<th>DALLAS, TX. 75229</th>
<th>DENVER, COLO. 80223</th>
<th>AUSTIN, TX. 78764</th>
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<tr>
<td>11353 Mathis</td>
<td>2625 S. Santa Fe Dr.</td>
<td>2119 Goodrich—P.O. Box 3096</td>
<td>10841 Hillpoint</td>
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<td>Myles Lasner</td>
<td>Russ Brown</td>
<td>Paul Fagan</td>
<td>Oren Drenchen</td>
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<td>(214) 281-4777</td>
<td>(303) 733-1292</td>
<td>(312) 442-4001</td>
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<td>1300 Stuchner-Airline #408</td>
<td>2901 S. Highland #15A</td>
<td>1184 NE 112th St.</td>
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<tr>
<td>Mike Loevenstein</td>
<td>Bill Bryant</td>
<td>Richard Malott</td>
<td>Bill Thurmond</td>
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<tr>
<td>(915) 593-0126</td>
<td>(713) 440-0764</td>
<td>(702) 733-6677</td>
<td>(206) 823-2515</td>
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<td>LORTON, VA. 22079</td>
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<td>8930 Telegraph Rd.</td>
<td>Opening Soon</td>
<td>2330 Fifth St.</td>
<td>923 Hunting Park Ave.</td>
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<td>Hinds Wilson</td>
<td>Call Directory Assistance</td>
<td>Joe Brown</td>
<td>Ted Missiras</td>
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<tr>
<td>(703) 550-7076</td>
<td>For Information</td>
<td>(714) 667-0704</td>
<td>(215) 848-9663</td>
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<td>TUCSON, ARIZ. 85705</td>
<td>PHOENIX, ARIZ. 85040</td>
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<td>3622 96th S.W.</td>
<td>2045 N. Forbes Blvd. #102A</td>
<td>3821 E. Broadway</td>
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<tr>
<td>(206) 582-5484</td>
<td>Ted Hill</td>
<td>(602) 243-7191</td>
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"SAVE $75 ON OUR TOP-QUALITY 15-PIECE FORSTNER BIT SET AND GET A TRIPLE-BONUS FREE!"

For accuracy, versatility, speed—and always satisfying results, there's positively nothing better than our genuine Forstner bits made in Germany of high carbon steel.

Fact is, only Forstners let you bore through any wood like butter (even veneer, end grain & knots). You get clean round, arc, oval, pocket, angle, flat bottom or thru holes—all smooth as glass. Without dancing, splintering, gliding or burning.

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2. Special $25 Forstner Bit
3. A 2-year subscription—Fine Tool Catalogs

Plus, automatic membership in the FTS Club where you'll get special discounts off our already unbeatable prices!

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Reg. $12.95 value

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- 15-pc. Forstner Bit Set plus all 3 Free Bonus Gifts for only $48.95
- $9.00 Forstner Bit Set
- 5pcs. Forstner Bit Set
- 1"-1"-1" for only $49.95
- 7 pc. set — $54.90
- 7 pc. set only — $32.95
- FREE 88-piece drill catalog (please enclose $0.00 for postage & handling)

Check on method order enclosed. Charge my

☑ Visa ☐ MasterCard ☐ Amex ☐ Diner's Club

Card No. ☐ Exp. Date

Bit Orders: Add $2.00 for postage & handling. Ct. Residents add 7% sales tax.

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Address __________________________
City ____________________________ State ______ Zip ______

The Fine Tool Shops, Dept. WFM5, 20 Backus Ave., Danbury, Ct. 06810

FREE 2½" FORSTNER BIT
Reg. $29.95 value
WHAT DO YOU SCORE ON THIS WOODWORKER'S QUIZ?

Find out and get an information-packed booklet on power tools FREE!

The quiz only takes a minute. Just answer each question; total your score and enter it on the coupon. Then fill in your name and address and send to Shopsmith®.

For your effort, you'll receive a FREE copy of "How To Determine Your Best Power Tool Buy", a fact-filled booklet to help you get the power tools right for your needs and your budget.

And as a special bonus, we'll also send you a one-year subscription to "Hands On," The Home Workshop Magazine. So grab a pen or pencil and get started!

Circle A, B or C for each question:

1. How much experience do you have in woodworking, home repair and/or home maintenance?
   A) Little or no experience.
   B) Some experience.
   C) A great deal of experience.

2. Which phrase best describes your workshop?
   A) A selection of hand tools and portable power tools.
   B) A table saw or radial arm saw, along with hand tools and portable power tools.
   C) A good selection of stationary and portable power tools, along with hand tools.

3. How involved do you want to become with woodworking, home repair and/or home maintenance?
   A) Not very involved.
   B) Moderately involved.
   C) Heavily involved.

4. What's the likelihood that you'll buy some kind of woodworking tools within the next year?
   A) Not likely.
   B) Somewhat likely.
   C) Highly likely.

5. Which describes you?
   A) I do home repairs and maintenance only when it can't be done any other way.
   B) I do some woodworking and a variety of home repairs and maintenance.
   C) I'm primarily interested in fine craftsmanship woodworking.

How to find your score:
It's easy! Give yourself nine points for each (A) you circled, six for each (B) and three for each (C). Then enter your total on the coupon, fill in the special blank about Question #5 and enter your name and address. Mail the coupon to the Shopsmith address below.

Your copy of "How To Determine Your Best Power Tool Buy" will arrive soon. And because you're interested in woodworking, we'll also send you a complimentary Information Kit about the Shopsmith MARK V, the complete home woodworking system anyone can use and enjoy. You'll also learn all about Shopsmith's exclusive Gold Medal Buyer Protection Plan and how you can try the MARK V in your shop for 30 days without risking a penny.

As a special gift, you'll receive "Hands On," The Home Workshop Magazine, chock full of useful plans, projects and articles on woodworking for a full year FREE of charge.

The MARK V combines the five power tools you need most — in one economical, space-saving unit. It's the tool to start with...the system you grow with!

My Test Score Is...

On Question #5, I circled the letter __________ Please send me a FREE copy of "How To Determine Your Best Power Tool Buy" and a FREE Shopsmith MARK V Information Kit. And be sure to sign me up for a one-year subscription to "Hands On." I understand I am under no obligation.

Name:
Address:
City:
State:
Zip:
Send to: Shopsmith, Inc.
The Home Workshop Company
6640 Poe Avenue, Dayton, Ohio 45414-2591

Dept. 372M
BOSCH Power Tools

BLOW OUT SALE!

LIST $159.00  SALE $87.45
Orbital Finishing Sander, Model 1288 034
- With 10,000 orbits per minute the counter-balanced, vibration-free 1288 034 gives maximum performance with less operator fatigue - it weighs just 6 pounds.
- The compact design allows closer quarter work - orbit diameter is 3 3/4".
- The bearings and drive mechanisms are completely sealed against dust contamination.
- Lever action, positive-paper clamping system saves valuable production time - sheet capacity is 4 1/4" x 11".
- Double insulated, UL listed, 115V AC.
SUPPLIED WITH: auxiliary handle and assorted sandpaper sheets.

LIST $155.00  SALE $93.00
3/8" 2-Speed, Variable Speed, Reversing Cordless Drill, Model 1920VS
- Totally portable, no cord required, plus amazing value and work power.
- Reversing switch for screwdriving, freeing walk-up bits.
- 2 speeds for low torque and speed to job.
- Rechargeable in 1 hour, charger has automatic cut-off.
- Delivers 300-650 RPM unloaded full charge.
- Switch lock prevents accidental tool switch-overs.
- Drill weighs only 2 7/8 lbs.
- UL Listed, complies with OSHA.

LIST $179.00  SALE $98.45
Orbital Finishing Sander, Model 1288 934
- Powerful and efficient dust-removal system prevents sandpaper clogging - ensures smoother finish and longer sandpaper life.
- The counter-balanced, vibration-free 1288 934 gives maximum performance with less operator fatigue.
- The compact design allows closer quarter work - it's 12" long, 5 1/4" wide, and 7 1/4" high with dust bag.
- The bearings and drive mechanism are completely sealed against dust contamination.
- Lever action, positive-paper clamping system saves valuable production time.
- Double insulated, UL listed, 115V AC.
SUPPLIED WITH: auxiliary handle, assorted sandpaper sheets and dust bag.

Orbital Action Jig Saws, Model 1581VS
- New 530 watt motor provides more power for the most demanding cutting applications.
- Adjustable foot plate lets left and right up to 45° with locks at 0° and 45° bevel for most cutting applications.
- Top handle design with trigger switch puts your hand over the work for extra control under heavy loads.
- Model 1581 produces 3,100 strokes/minute for cutting wood and light gauge metal.
- Model 1581VS has a variable speed switch 500-3,100 strokes/minute - produces full output at low speeds needed for cutting very hard materials.
- 115V, Double Insulated, UL Listed, OSHA, 5.75 lbs.
SUPPLIED WITH: Three assorted blades, blade locking screwdriver, anti-splintering device, hex key.

LIST $225.00  SALE $135.00
Orbital Action Jig Saw, Model 1582VS
- 530 watt motor provides more power for the most demanding industrial cutting jobs.
- Adjustable foot plate lets left and right up to 45° with locks at 0° and 45° bevel for most cutting applications.
- Model 1582 produces 3,100 strokes/minute for cutting wood and light gauge metal.
- Model 1582VS has a variable speed switch 500-3,100 strokes/minute - produces full output at low speeds needed for cutting very hard materials.
- Barrel grip and removable handle allow precise pattern cutting.
- 115V, Double Insulated, UL Listed, OSHA, 5.75 lbs.
SUPPLIED WITH: Three assorted blades, blade locking screwdriver, anti-splintering device, hex key.

LIST $209.00  SALE $125.40
1 HP Router, Model 1601
- Excellent power-to-weight ratio.
- Captive template guide for quick, easy setting.
- Fully insulated, 115V AC, UL Listed.

1 1/4 HP Router, Model 1604
- Excellent power-to-weight ratio.
- Captive template guide for quick, easy setting.
- Fully insulated, 115VAC, UL Listed.

3" x 24" Belt Sander, w/Dust Collector, Model 1272D
- 1.5 hp 1200 RPM, the 1272D is rated super-duty for production sanding applications. It sends dust to vented top surface for close-quarter work.
- Built-in vacuum minimizes airborne dust.
- Heavy-duty tracking system with twist knob allows easy belt adjustment.
- Lever-action release provides quick belt changing.
- Carbide wear-inserts protect housing from belt damage.

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WOOD MAGAZINE JAN/FEB 1985
THE SAW THAT TURNS BEGINNERS INTO EXPERTS!
Use this high-precision saw to make hundreds of profitable, unusual items: toys, name-bars, filigree work, clocks, holders...the list is nearly endless! Because the Model 1600 cuts so smoothly, sanding virtually unnecessary!

BUILT TO LAST!
The sturdy new Woodmaster Model 1600 gives you all the features found in more expensive machines including a big, 16-in. throat capacity, 2-in. cutting depth, a generous, oversize worktable, ball-bearing drive...and much more!

FULL TILTING WORKTABLE!
Unlike any other scroll saw, the Woodmaster's table tilts and locks in any position up to 45° right or left. This means you can produce work on the Model 1600 impossible to duplicate on any other parallel or C-arm scroll saw! Can be ordered complete with motor, stand and dust blower. Easy Terms.

30-DAY FREE TRIAL!
Send Complete Facts! See how you can use the Woodmaster Model 1600 in your own shop for one full month completely without risk! MAIL COUPON TODAY or:

Call Toll-Free
1(800) 824-7888 Oper. 642

Woodmaster Power Tools, Inc.
Dept. CW4
2908 Oak, Kansas City, MO 64108

No Obligation...No Salesman Will Call

Woodmaster Power Tools
Dept. CW4
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Kansas City, MO 64108

☐ YES! Please rush me, free and without obligation, your Complete Information Kit on the new MODEL 1600 SCROLL SAW plus facts on Woodmaster's 30-DAY FREE TRIAL Money-Back Guarantee!

Name
Address
City
State Zip

It wasn't easy, but I finally managed to round up the WOOD staff for a group mug shot the other afternoon. If some of these people look sleepy, you'll have to forgive them. They've been up late lots of nights making sure this magazine reaches you on time every two months. I'll go from left to right and back to front.

Marlen Kemmet, WOOD's How-To Editor, comes to us from Devil's Lake, North Dakota. Marlen's interest in woodworking knows no bounds; in fact, after hours, it's not unusual to find him turning a bowl or working on some other project in the shop.

I'm seated in the chair between Marlen and Jim Boelling, our Project Builder. Jim has been actively involved in woodworking since 1968, both as a practitioner and, since 1976, as a teacher of adult education classes.

Lee Gatzke, WOOD's Art Director, wears lots of hats around here, in addition to laying out the magazine. Lee's training in commercial art, his years of magazine design experience, and his knowledge of and skill in woodworking make him a valuable member of the staff.

In the back row, far left, is Pete Stefano, a veteran magazine man and our Features Editor. Pete does most of our Craftsman Close-Up features, travels around quite a bit gathering new material, and also coordinates the efforts of some of our free-lance writers.

To Pete's left sits Jim Downing, Design Editor. Jim's years of practical woodworking experience, his commonsense approach to figuring things out, and his well-developed design sense have found a home at WOOD.

Darlene Reynolds, WOOD's Administrative Assistant, makes order out of chaos everywhere she goes. Every operation in America should be blessed with someone with her considerable skills.

Larry Clayton
Like Having A Lumberyard Right in Your Shop!

PLANER MOLDER JOINTER

Here's What Woodmaster Owners Say:

Shop Test Results — "It does an excellent job of planing on a par with more expensive machines, and even better than some commercial models."

Jay Heflin, Editor, Workbench Magazine

Gets More Done — "I build grandfather clocks, music boxes, toy and picture frames. They say a craftsman is only as good as his tools, and let me tell you, my Woodmaster is tops. I get more done, and done right, than I ever did before."

R.V. Dehencourt, Cleveland, Ohio

Best Value — "After checking them all, Woodmaster was obviously the best deal for the money. Also, I would like to acknowledge the polite and prompt service."

E.D. Holz, North Carolina

Likes Woodmaster Best — "I have two other planers in my shop... wouldn't trade my Woodmaster for either one. I am delighted with its versatility and precision."

Ron's Custom Cabinets, North Dakota

SANDER

Paid Off Fast — "Paid for itself in no time flat."

E.L. Walters, North Dakota

FREE 30-DAY TRIAL!

Send Coupon Today For Complete Facts!

Saves You Money!

Put this versatile power-feed tool to work in your own shop. See how fast it pays for itself! Quickly converts low-cost rough lumber into valuable finished stock. Turns out perfect quarter-round, casing, base mold, tongue & groove... all popular patterns... any custom design. Joints super-true edges, squared stock, bevels and chamfers.

Makes You Money!

Now you can start your own high-profit business selling all types of millwork to lumberyards, carpenters, contractors, picture framers, do-it-yourselfers. Use it to make grandfather clocks, gun cabinets, furniture, toys, planters, porch swings, benches, paneling, flooring. In fact, this one power-feed tool opens up a truly astonishing range of products you can make and sell.

Revolutionary Quick-Change Molding Head!

Exclusive patented design lets you mold up to six patterns in a single pass! Eliminates time consuming set-ups. Uses low-cost cutterbits. Makes it easy to produce patterns impossible to duplicate on any other planer.

New Sanding Attachment

Quickley converts machine to one of the finest drum sanders available. Consistent power feed eliminates "low spots" and irregularities caused by hand sanding method.

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Woodmaster Tools, Dept. PW4, 2908 Oak, Kansas City, MO 64108

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NAME ____________________________

ADDRESS ____________________________

CITY ____________________________

STATE ____________________________

ZIP ____________________________

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Send for complete facts on how you can try this low-cost, 4-in-1 power tool in your own shop for 30 days completely without risk! We'll also send you complete details on how you are fully protected by Woodmaster's One Full Year Limited Warranty.
**SUPERSALE**

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<td>9321B 21/4&quot; Diam. 1/4&quot; Shank Boring Bit</td>
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<td>$69.80</td>
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<td>0010 Set of 3 3/8&quot; x 1/4&quot; x 4&quot; Jointer Knives</td>
<td>$18.29</td>
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<td>$27.45</td>
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<td>0041 Set of 3 3/8&quot; x 1/4&quot; x 4&quot; Jointer Knives</td>
<td>$36.58</td>
<td>$28.90</td>
</tr>
</tbody>
</table>

Sales Ends April 30, 1985

Note: All Saws & Dado have 3" Bore
All Router Bits have 1/4" Shank
ATB = Alternate Top Bevel

4 & R = 4 Teeth & 1 Flaker Tooth CT = Carbide Tipped

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LETTERS

We welcome comments, criticisms, suggestions...even an occasional compliment from readers. While the volume of mail we receive makes it impossible to answer every letter, we intend to publish excerpts from a cross section of our correspondence in each issue of the magazine. Send letters to:

Letters Editor
Better Homes and Gardens®
WOOD Magazine
1716 Locust Street
Des Moines, IA 50336


—Hugo Gregory,
Yonkers, N.Y.

When we built the marking gauge, we walked into a local hardware store and bought brass knurled nuts manufactured by Midwest Fastener of Kalamaazoo, Michigan. Apparently we had better luck than a number of readers, because we received several letters similar to Mr. Gregory's.

We haven't been able to locate a mail-order source for these nuts. Can any reader help?

Am well pleased with your advertising segments, as I just know there have to be cheaper places to buy tools and supplies than the local hardware stores.

—Jean Dresselhaus,
Lewiston, Minn.

Your magazine already has too much advertising, and that is why I have quit subscribing.

—Harold Sweeney,
Lancaster, Wis.

"It is a very hard undertaking to seek to please everybody," Publius wrote in the first century B.C. When it comes to the topic of advertising, nothing seems to have changed in 2,000 years.

Advertising revenues pay many of the bills around here, and when we're looking to buy tools and supplies, we join reader Dresselhaus and read all the ads we can find. We're sorry that Mr. Sweeney feels differently, and we'll miss him as a subscriber.

I want to tell you how much we have enjoyed the first issue of your magazine, WOOD. I work for Kittinger's Furniture Company as a cabinetmaker. I also have a workshop at home and build for family and friends. I have searched for many years for a magazine such as yours with fresh ideas and good instructions to expand my own ideas.

My wife loves the magazine. We both feel that it is going to be a welcome addition to our household.

Welcome to our home.
—Alfred and Diana Jacob,
West Seneca, N.Y.

We're honored to be invited into your home, and we'll do our best not to wear out our welcome.

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buying a basic, commonsense tool kit

Perhaps you’ve just completed a beginning woodworking course, or maybe you’ve recently assembled your first kit project. You thoroughly enjoyed these tastes of woodworking, and now you’re ready for bigger challenges. But one obstacle blocks your way; you don’t own the proper tools.

What tools does a beginning woodworker need, and how should he or she acquire them? In an unsolicited poll of WOOD staff members, we assembled a basic tool kit for woodworkers—tools we think should be a part of any woodworking shop. With this equipment—and skill—you can perform most woodworking operations.

As you read the list, you’ll notice we don’t mention stationary power tools—the table saws, drill presses, band saws, and jointers that professional woodworkers and serious amateurs swear by. We left them out because this is a basic tool kit.

In at least one case, we did so with great reluctance. All of us would have liked to include a table saw in the package, but it was omitted for reasons of economy.

Even without the table saw, if you walk into your local tool shop and ask for everything on our list, the clerk might ask you for a $1,000 bill. How can you get a start in this hobby without robbing a bank? We believe the answer is to plan carefully and buy wisely.

Plan Ahead

Equip your shop a few tools at a time. As your skills improve, so will your tool inventory. In this basic kit, we list the tools that we find indispensable in bold-face type. They’re the items you’re likely to find most useful and use most often, so think about purchasing them first.

Can you sidestep any processes for which you’re not well equipped? Some retail wood outlets will joint, rip, thickness, and crosscut lumber to size, for example. You pay for this service, of course, but in the short run it’s less expensive than buying the tools you’d need to do the work yourself.

As you budget each new project, try to figure in the purchase of one new and necessary tool. You’ll spread out the cost of equipping your shop, and you’ll be able to enjoy a new tool with each new project.

Finally, remember that there are woodworkers who make exceptional pieces with hand tools only. We are addicted to the power tools in our shop, but we know that life can go on without them.
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**TOOL BUYMANSHP**

*Continued from page 10*

**basic, commonsense tool kit**

Be a Smart Tool Buyer
When you’re ready to buy tools, shop carefully. Check more than one store, read all the catalogs you can obtain (the information they contain will save you substantially more than the few dollars they may cost), and always, always look for sales and specials.

Mail-order advertisements in magazines such as WOOD regularly offer substantial price reductions on top-quality tools. And sales are such normal marketing techniques at several nationwide retail chains that it sometimes seems difficult to pay full retail price for their popular tools.

Many manufacturers offer several product lines: inexpensive tools for “hobbyists” and more elaborate heavy-duty models for commercial and professional use. How much tool do you need?

In general, it makes sense to buy the best equipment you can afford, particularly when you’re purchasing hand tools. It’s unlikely that a good saw or plane will become obsolete, and with basic maintenance there’s no reason why these tools can’t last for centuries. The thought that a great-grandchild might one day enjoy using your combination square could make spending extra dollars seem like a wise investment.

When it comes to power tools, however, it gets easier to fall into the “overkill” trap. If a 1-horsepower router will be entirely adequate for your needs, do you really need a 3-horsepower model?

Good tools don’t go out of style. A 100-year-old hand plane or wood chisel looks pretty much the same as a brand-new one, and some woodworkers insist that, the older the tool, the higher the quality. As this issue’s article about classic saws demonstrates, old tools can actually be more expensive than new models. But auctions and newspaper classifieds are often good sources for low-cost, high-quality items, so think about buying your
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Continued from page 12

basic, commonsense tool kit

tools used. You might even find a
great deal on that table saw we'd so
much like you to have.

Basic, Commonsense Tool Kit

Measuring tools:
- Combination square
- Sliding bevel
- Marking gauge
- Framing square
- Steel tape (10' or 12')
- Folding rule
- Compass
- Scratch awl

Cutting tools:
- Crosscut saw (12 pt.)
- Rip saw (6½ or 7½ pt.)
- Backsaw or dovetail saw (15 tpi)
- Coping saw
- Hacksaw
- Slip-joint pliers
- Needle-nose pliers
- Diagonal cutters

Shaping tools:
- Smooth plane
- Low-angle block plane
- Wood chisels (5/16, 1/4, 1/2, 1")
- Single-cut mill bastard file
- Round rasp
- Flat rasp
- Cabinet scraper and hand scrapers
- Utility knife

Joining tools:
- Claw hammer (16 oz.)
- Finish hammer (8 oz.)
- Nail set
- Wooden mallet
- Screwdrivers (Straight, Phillips)
- Doweling jig
- Bench vise or clamping system
- Bar or pipe clamps (2-3' and
  2-5' min.)
- Handscrews
- C-clamps

Portable power tools:
- Router (1 HP, 1/4" collet)
- (Purchase bits as needed: bead,
  chamfer, cove, dado, straight,
  round-over, rabbet)
- Circular saw (7 1/4")
- Drill (1/8" variable speed)
- Twist drills (1/16-1/2")
- Spade shaped drill bits
- Brad point drills
- Saber saw

Dual-action pad sander
- (straight-line and orbital)
- Belt sander (3" x 21" with dust
collection)
- Safety and maintenance:
  Face shield or safety glasses
  Hearing protector
  Dust mask or respirator
  Sharpening stone (dual-purpose,
  coarse/fine)
NEW FREUD HAND TOOLS!

Freud's high quality hand tools are an outstanding value! These items incorporate features that the most demanding professional will appreciate — at surprisingly low prices!

All blades are precision ground chrome vanadium, assuring very long tool life. The chisels and carving tools have handles of rare, close grained Boxwood, hooped at both top and bottom. The turning tools have long Ash handles. Each set comes complete with its own wooden box for storage.

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CS112  12 pc. Carving Set  $114.95
TT108  8 pc. Turning Set   $56.95

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SAWBLADES

<table>
<thead>
<tr>
<th>Blade Type</th>
<th>Price</th>
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<tr>
<td>LM27M 10&quot;, 24t, flat top rip</td>
<td>$42.00</td>
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<tr>
<td>LU73M 10&quot;, 80t, ATB cutoff</td>
<td>$42.00</td>
</tr>
<tr>
<td>LU84M 10&quot;, 50t, smooth comb.</td>
<td>$42.00</td>
</tr>
<tr>
<td>SET ALL THREE ABOVE</td>
<td>$125.00</td>
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<tr>
<td>LU82M 10&quot;, 60t, triple chip</td>
<td>$49.00</td>
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<tr>
<td>LU85M 10&quot;, 80t, super blade</td>
<td>$72.00</td>
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<tr>
<td>DS306 6&quot; dado 1/4&quot; - 13/16&quot;</td>
<td>$99.00</td>
</tr>
<tr>
<td>DS308 8&quot; dado 1/4&quot; - 13/16&quot;</td>
<td>$120.00</td>
</tr>
<tr>
<td>TR100 3 blades and 8&quot; dado</td>
<td>$259.00</td>
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</tbody>
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**COMPLETE GUIDE TO WOOD CARVING**

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Threaded inserts for wood

These inserts can be installed with a screwdriver, although we prefer to use a drill press (see page 51). Once in place they provide sturdy threads where you want them. Simply drill a hole the same size as the insert, then install a little below the surface. Available in ¼" and ½" sizes. Threaded Inserts, $26 per 100 ($.32 each) plus shipping and handling. We ordered ours from The Woodworkers’ Store, Dept. W, 21801 Industrial Blvd., Rogers, MN 55374, but they’re available at large retail outlets.

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WOOD MAGAZINE JAN/FEB. 1965
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Continued from page 21

Rotary part storage

Store screws, nails, and other hardware in a Turnbox container. Rugged plastic compartments are stacked five to a level on a steel spindle for rotary action. Though large enough for lag screws and carriage bolts, the pie-shaped bins won't sag when full. Screw holes in the base allow attachment to a workbench. The five-level Turnbox shown is 12" high and 8" in diameter with 25 compartments. Turnbox: Five-level, $12; Three-level, $8; Eight-level, $16. Available by mail order from Themans, Inc. Dept. W, 5721G Bayside Road, Virginia Beach, VA 23455.

Stainless steel caliper rule

This beauty of a caliper doesn't cost an arm and a leg. The vernier-style instrument is precise—measuring depth and inside and outside dimensions in both metric and standard scales. The slide moves effortlessly along the beam and locks securely in place with a thumbscrew. Knife blade points grasp round and thin objects securely and help you focus on fine marks. Made of hardened stainless steel with satin-polished chrome finish, this instrument is manufactured to industrial quality and should last for years. Central Forge Model 939 0-150 mm, 6" Caliper Rule. $11.50, direct from Harbor Freight and Salvage Company, Dept. W, P.O. Box 15833, North Hollywood, CA 91615-5833. Telephone 1-800-423-2561

Rechargeable cordless screwdriver

After using this lightweight power screwdriver, you'll be tempted to toss out all your others. The Skil Cordless Screwdriver weighs about a pound and drives up to 500 screws on a single charge. It has on/off plus forward and reverse switches. Speed is rated at 130 rpm, and the manufacturer says there's a built-in feature that helps prevent over-tightening. The unit requires three hours and a 110-volt outlet to recharge. The body of the tool is high-impact, shock-resistant plastic. A reversible bit—one end Phillips, the other straight—is included (regular drill bits won't work). 2000 Cordless Screwdriver. Available at retail outlets, about $30. The Skil Corporation, 4801 West Peterson Ave., Chicago, IL 60646.
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Remember, this William & Mary clock kit is available for $1 by mail only. With no further obligation on your part. Mail coupon today!

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Chippendale lowboy

Clock measures 7 3/4 inches tall, scaled 1 inch to 1 foot. Features a door that opens and closes to reveal the solid brass clock weights and pendulum! Kit has everything needed to assemble clock.

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Professional Quality Finishing Samples Include tinted glue, oil base stain (for authentic color), glaze stain for antiquing and highlighting and other materials to professionally finish your kit to museum quality.

*Plus shipping, handling and sales tax.
PRODUCTS THAT PERFORM

Continued from page 22

Clamps with bite

Stainless steel jaws with double rows of serrated teeth grab and hold wood, plastic, and soft metal at practically any angle. Clamps adjust to frames ½” to 3” wide, irregularly shaped moldings, compound miters, and joints larger or smaller than 45 degrees. Use a number of clamps to assemble longer miters. Pivoting jaws are ½” long; overall length, 9”; and maximum jaw opening, 3½”. Because of their teeth, these clamps are not recommended for use on finished wood. Iraids Multi-Clamps. $6.75 each plus shipping and handling. Available by mail order from The Woodworkers’ Store, Dept. W, 21801 Industrial Blvd., Rogers, MN 55374, through selected catalogue sources, and at some local hardware stores. Manufactured by Arvids Iraids, Cincinnati, Ohio.

No-bubble level and angle indicator

Using a new optical technology that eliminates the traditional bubble, the Ingon Level and Angle Indicator reads easily in any position. It determines horizontal, vertical, and any angle in between with 0.2° precision. To check angles, place the tool on or against the workpiece (magnetic models cling to saw tables), then rotate the adjustment screw until parallel lines appear in the window. To set angles, dial the desired number of degrees, then tilt the tool until the parallel lines appear. Made of black anodized, brushed aluminum, the rule is calibrated in inches and centimeters. Indicator frame and window are high-impact plastic. This tool comes in 10”, 24”, and 48” lengths, and either magnetic or nonmagnetic models are available. Ingon Level and Angle Indicator. Retail, from $51.45 to $73.95, depending on size and style. Or order direct from Sylvan Corporation, Dept. W 342 Madison Ave., New York, NY 10016.

Snap-tie board hooks

Falling hook frustration ends with PEG ems, plastic hooks that won’t come loose when you reach for a tool. Available as single hooks, double hooks, multi-tool holders, shelf brackets, and loop hooks, they’re packaged in quantities varying by size. The hooks can be used with perforated hardboard or their own Peg Strips. PEG ems. In retail stores at $1.09 per package. Peg Strips, 11” at $1.99, 16” at $2.99. Made by VSI Fasteners, Stanton, California.
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The goal of this book is to help people choose an appropriate adhesive for practically any “putting-it-together” task. In the process, author Robert Miller draws on more than 30 years of experience in the adhesives industry to share valuable ideas, useful tips, and practical information. Numerous photographs and drawings illustrate his points.

In a chapter on wood glues, Miller compares ready-to-use products, water-mixed adhesives, and two-part adhesives. Pointing out that the integrity of glue joints is important to both the durability and appearance of a woodworking project, he offers a detailed discussion of wood-grain direction, shrinkage, and major joint types.

A thorough examination of clamping includes plans for making a variety of clamps—a picture frame clamp and a simple spring clamp, for example—and discusses wedging and other homemade set-ups. The author covers joinery, veneering, and laminating as well.

Miller devotes a valuable chapter to basic repair techniques, and talks about mending split or broken parts, tightening loose joints, repairing drawers, and replacing broken veneer. He also discusses contact adhesives and their uses, and he addresses one question that has plagued woodworkers for generations, “Why didn’t it stick?”

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Adventures in Wood Finishing:
88 Rue de Chartonne.
By George Frank. The Taunton Press, Inc., New- town, Conn. 1981. 120 pages. $9.95

Although wood finishing may not sound like the stuff of which adventures are made, the title of George Frank's engaging book turns out to be entirely appropriate. With such clients as the Baron Rothschild, the Pasha of Marrakesh, and the "ex-khdeive of a certain North African country," and such experiences as being locked in a bank with a gang of amateur robbers, Frank's career as a master of stains and wood coloring has been anything but dull.

Working out of a small shop at 88 Rue de Chartonne in Paris, a few of his professional challenges have involved finding a way to duplicate the color of virgin hemp in wood, helping to make and finish a set of 34 Louis XIV chairs for the Royal Court of Egypt, and finishing all the woodwork in a bank lobby two days before its grand opening.

Frank blends personal anecdotes with practical information throughout the book. He talks about protecting wood, changing its color and tactile characteristics, accentuating wood markings with colored fillers, and also discusses charring and sandblasting wood surfaces. Woodworkers who haven't ventured much beyond conventional staining and varnishing because most volumes on the subject remind them of high-school chemistry texts will find this book a pleasant way to broaden their wood-finishing skills and knowledge.

More wood is ruined by finishing under improper lighting than it is by any other single cause ... You must have as much light as possible and it must be as close as possible to natural daylight.

We began by ordering two truckloads of the best horse manure and by making sure we could obtain enough old wood, for using aged wood is the first requirement in copying antiques.
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BOOKS WORTH READING

The American Shakers and Their Furniture.
By John G. Shea.
Van Nostrand Reinhold Co.
$10.95

This is a "How-they-did-it"—not a "How-to-do-it"—book, author John Shea explains as he examines the American Shakers of more than a century ago and investigates their superlative craftsmanship in detail.

Shea believes that understanding this workmanship—and the underlying economy of detail that allowed furniture of great strength to be fashioned from remarkably delicate parts—depends on knowing how the Shakers lived, worshipped, and worked. In search of this knowledge, he traces the history of the movement, from its beginning in England to its gradual decline, a decline caused in part, no doubt, by the Shaker belief in celibacy.

But if celibacy was the best-publicized Shaker characteristic, Shea believes that inventiveness was the most important Shaker trait. He notes that it contributed to the design of original types of chairs, chests, and desks.

Shaker craftsmen were highly skilled in all phases of cabinetry and allied trades. They used the most advanced tools of the day and often invented implements—a tongue-and-groove machine and a circular saw among them.

What may be of greater interest to home woodworkers, however, are the 88 scale drawings—one-half of the book—that are based on measurements of Shaker museum pieces ranging from candle sconces to classic chairs, tables, and chests.

"Shaker furniture is, above all, functional. It works and it serves. In strict adherence to practical principles, it discards all adornments of decorative embellishment which do not contribute to basic requirements."

"While they can't be credited with 'inventing' the rocking chair, the Shakers did more to develop its design and promote its use than any other chairmakers."
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No one knows everything about woodworking, but, with experience, we all run into better, safer, faster, or easier ways to do things. When we come up with interesting tips or techniques, we'll show them to you in this column. And when you share your favorites, we'll pay you $25 for each submission we publish. No shop tips will be returned. Send your tips to:

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Raising dents and scratches
Even the smallest dents and scratches mar the appearance of otherwise successful woodworking projects. To remove small dents or raise minor scratches in wood surfaces, wet and then cover the problem area with a damp cloth. Using a household iron on a dry setting, apply heat to the cloth for 15-second intervals. Take care to avoid scorching the wood.

Drill-bit straightener
Small-diameter drill bits are easily bent during normal use. To straighten a bent bit, chuck it into your drill and, while running the drill at full speed, insert the drill point into a piece of scrap wood. Apply slight sideways pressure to the drill to return the bit to its proper shape. When you release the pressure, the bit will continue to run true.
—Robert S. Tupper, Canton, S.Dak.

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DML
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A SUBSIDIARY OF VERNON AMERICAN CORPORATION
Continued from page 34

Avoiding nail splits
Even though you hammer carefully, your nail occasionally splits the wood. Blunt the tip of the nail by tapping it with your hammer to let the nail cut its way into the wood rather than part the material. Or, chuck a proper-sized nail into a drill (you may need to cut off the nail head), pre-drill holes, and then hammer and set nails.

First-aid for dull saber-saw blades
Halfway through a “must-do” project, you discover that the blade on your saber saw is dull, and you don’t have a spare. Touch up the blade with a triangular file. Place the blade in a vise with teeth pointing up (don’t pinch them). File away from you, giving each tooth two or three quick strokes. Rotate the blade 180°, and file the other side.

Repairing torn grain
No matter how skillful you are with a plane, the grain patterns of some wood species make it almost impossible to avoid raising and tearing the grain. To fix tears, apply several drops of cyanoacrylate adhesive (the “super” variety made for wood and leather) to the affected area. Sand the spot immediately. Sanding presses the raised wood down, generates heat to set the glue, and produces fine sawdust that mixes with the glue to create an invisible and permanent repair.

—Dean Case, Nevada City, Calif.

World-champion finishing jig
Applying finish to more than one side of an object is an awkward, messy chore. A steel swivel made to support a boxers punching bag makes an ideal shop aid for holding objects that need finishing. Attach the swivel to a secure overhead support, screw an eye-hook into the object to be finished, and hang the piece on the swivel. The workpiece—not the woodworker—does all the moving. (A plant hanger that swivels is an inexpensive alternative for working with light objects.)

—Tony Bofinger, Punxsy, Pa.

Continued on page 38
Announcing

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Precision performance. Revolutionary design. $495.*

J. Philip Humfrey is proud to present the next generation of the renowned Excalibur Precision Saw—Excalibur II—featuring outstanding quality and craftsmanship, exclusive engineering features, with the same precision and control from a revolutionary cutting mechanism.

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Continued from page 38

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Continued on page 42

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TIPS FOR YOUR SHOP
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Continued from page 41

Paint brush maintenance
Your paint brush is clean but not dry. What’s a good way to remove excess water or paint thinner? Hold the brush between your palms and spin it back and forth vigorously. Centrifugal force will spin away excess moisture and fluff out the bristles—which helps prevent the brush from drying into an unmanageable lump.

Sharpening with a drill press
Putting the proper bevel on chisels and plane blades isn’t an easy freehand skill. Use a drill press and drum-sander attachment with appropriate grit sleeves to grind blades. Clamp the blade or chisel in a drill-press vise with the blade perpendicular to the table and parallel to the quill. Position and secure the vise to the table with a C-clamp. With the sander turning slowly, raise and lower the quill to sharpen the blade. To move the blade closer to the drum, tap the vise with a mallet. Work slowly to prevent excessive heat buildup.

—J. J. Sawyer, Pensacola, Fla.
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split oak baskets
Don Yarger, student of an age-old craft

From finding a special tree nestled into a hillside to interweaving thin white oak splits, basket-making challenges the eye and hand, and rewards the craftsman with enduring creations that earn their keep.

Don Yarger, at 31, is still a few years away from becoming a "journeyman" basket maker, but he finds his apprenticeship a rewarding one. Don's work provides him, his wife, Annita; daughter, Jennifer; and son, Cody, with a comfortable home in Protem,
a small Missouri Ozark town just a few miles from Silver Dollar City where Yarger makes his living weaving and selling split-oak baskets.

Early baskets were crafted from many common materials — cattail leaves, reed, willow, and tree bark. But the most easily made, most durable designs were made from thin, flexible strips of green sapwood from ash, hickory, and best of all, white oak trees. In fact, one species of white oak peels so easily into splits that it’s referred to as “basket oak.”

Hunting the Basket Tree
Like wood-frame homes and table tops, baskets begin with trees, and Yarger knows that just any old tree won’t do. He prefers white oak but has also used walnut and hickory for his baskets.

His search for the perfect white oak begins on the northeast slopes of Ozark hillside. According to Yarger, there are three reasons to select a tree from a northeast slope. First, because the wind normally blows from southwest to northeast, the trees on a sheltered Northeast slope tend not to be twisted. Also, the wood isn’t dried out and brittle from too much sunshine. And third, since ground moisture remains longer on these slopes, the trees absorb and retain moisture so their wood tends to stay workable.

Finding the area is only the beginning. Next comes selecting the perfect tree—about 10 inches in diameter, free of branches for about the first 10 feet (to eliminate knots), and straight-grained.

How can Don tell if a standing tree is straight-grained? His trained eyes can spot a good tree a long way off: “I can tell how it’s going to split by the way the bark looks. If it runs pretty much straight up and down the tree, it’s going to be straight-grained and come apart pretty well,” Yarger explains.

Ideally, Don looks for a tree that will yield a 5- to 6-foot log from the base to below the lowest limb — the moistest part of the tree.

Laying Out, Halving, and Splitting the Log
After felling the tree with a cut as close to the ground as possible, and freeing the desired section from the rest of the trunk, Yarger studies the wood for halving and splitting.

“I look for knots when I lay it out on the ground,” he says. “If there is a knot, I make the first split close to it, since that section will be lost anyway. I split down from the top of the log to the base. That way, if there’s a knot in there somewhere, the split has a tendency to cut right through it. But I’ve found that if you run into a knot when splitting from bottom to top, the split usually runs around the knot and maybe even slabs off.”

Using a maul and steel wedge, the basket maker splits the log in half. Then he moves one third of the way down each section, where he drives in the maul to quarter the log. This way, Don knows he’s right in the run of the grain, since the true grain can’t be seen from the ends of a section.

After the log has been quartered, he crosscuts it into about 3-foot sections, then slabs off the heartwood, which, if it is relatively knot-free, he uses later for handles, ribs, and accent strips. Then, Yarger splits the quartered sections into eighths, called billets.

Removing the bark
Next, the individual billets are shaped to desired form, also on the shaving horse. “The object,” explains Don, “is to taper each end of the billet so that when strips come off, they’ll be wide in the center for
the bottom of the basket, and they'll taper toward their ends to form the basket's ribs.”

Don does this shaping with the drawknife, turning the billet to work it from both ends. He uses the same method to form weavers, the long, narrow, and straight pieces that tie the ribs together. He depends on a well-developed eye to maintain widths.

Traditionally, from the shaving horse, billets would move to the workbench to be split into weavers or ribs with a drawknife and a simple jackknife. Standing a billet on end, the basket maker would split it with the drawknife down its length parallel to the annual growth rings. He would keep splitting until the pieces could no longer be reduced by that method, then switch to the jackknife. Don knows the old way, too.

Placing the blade of the jackknife in the grain, Don begins the split. When the knife has separated enough of the wood to grasp by

Pulling the split by hand

hand, it’s put aside, and the pulling begins.

Hand-pulling becomes increasingly delicate as the strips near their final thickness. “If the split runs off to one side, you pull toward the other side,” he says while demonstrating.

Final hand-pulling

That’s the traditional way, but in the high production basket shop, the traditional takes too long. Instead of hand-pulling, Don has fitted a cooper’s spokeshave with a planer blade to shave weavers and ribs from the billets clamped on a shaving horse.

Shaving a split with a spokeshave

It’s still hard work, and the results aren’t always uniform. According to Don, “anything done by hand is going to have some variation on it.”

With no gauge to rely on, the shaving technique requires a practiced eye. “The thickness of the split is solely a product of how hard the spokeshave is pushed down and the strength of the maker’s pull,” Don says.

He makes his splits “down the tree” with the spokeshave and then works the tool back and forth following the grain and keeping it to the center. “The strips must be constant in their thickness, with ribs thicker and weavers thinner. If they’re thick on the ends and thin in the middle, the basket will have a weakness,” Don explains.

The splits come off the shaving horse moist and pliable, ready for weaving. They’ll stay that way for 3 to 4 days in normal weather, but hot days dry them out in an hour. That’s when Don wets the splits down with a sprinkling can or gives them a good soaking.

Two Types of Baskets in 50 Styles

To this basket maker, the world of split-oak baskets is divided into two parts—designs woven over a form and those built completely free-hand. Yarger makes both, in 50 different styles. Starting below, we’ll follow him through the steps in making a formed, rectangular basket that’s a popular seller.

1 Don begins by laying rib splits across the plywood box, then interweaves the side rib splits with the end rib splits. The interwoven ribs become the basket’s bottom. They’re tightened later in the process. So they’ll bend over the form, Don wets the ribs.
2 Weavers gradually build up the sides. The "over-one, under-one" is the "checker" pattern. A band holds the weave.

3 Don angle-clips the ribs so they'll tuck under the inside weavers. A thin-bladed knife helps to lift weavers slightly.

4 To add strength, Don uses two weavers at once, and binds them to the top of the basket with a lashing of narrow splits (weavers cut lengthwise).

5 Finishing the basket border, he uses a knife blade to tuck the lashing under a split after pulling it tight. Tucks are inside.

6 Doubled splits bound twice with thinner weavers make strong handles. Don spaces them between the ribs of both basket sides and lashes them.

7 The last tuck of the handle goes under the border splits. Don believes both basket and handle must be equally sturdy.
Brief history
During the 1700s, a cabinetmaker named Rock manufactured "Rock's Hard Maple Furniture." The name stuck, and the terms "rock maple" and "rock-hard maple" remain popular today.

For generations, in fact, hard maple has been used for furniture and other items that take abuse: desks, workbenches and butcher blocks, for example.

Wood identification
Twenty-three species of maple grow in Canada and the U.S. They form two broad commercial groups: soft maple and hard, or "sugar," maple—which is tapped each spring for its sap.

Hard maple flourishes west and south from southeastern Canada and Maine to Minnesota, Missouri, and Alabama. The largest quantities of hard maple are found around the Great Lakes, and Michigan and New York produce the most trees in this country. Soft maple follows the same range, but grows in damper ground—lowlands, swamps, and stream banks.

Maple sapwood has a clean, white appearance, is free from defects and is typically 3" to 5" thick.

MAPLE
hard, soft... and sweet

These qualities make it more valuable than heartwood, which is uniform in color and runs from light reddish brown to dark brown.

Generally straight-grained with a consistent texture, maple also can have a bird's-eye or curly (also called fiddleback) pattern. Many woodworkers find the unique grain patterns of maple burl particularly appealing.

Soft maple, although similar in appearance to hard maple, produces lighter wood with more pronounced grain.

Although not as tough, stiff, or heavy as hard maple, soft maple tends to resist warping and twisting better. Its color ranges from pale brown to almost white with brown streaks.

Working properties
Hard maple remains strong when bent, absorbs shock well, works nicely with both power and hand tools, and resists wear. It also turns well and requires no filling before finishing. Hard maple takes a high polish and has substantial screw-holding power.

Soft maple works even more easily than hard maple. It glues, stains, and finishes well but doesn't take as high a polish as hard maple.

Uses in woodworking
Soft maple, used principally for lumber, paper pulp, and other industrial applications, continues to be suitable for cabinet frames, unseen parts of upholstered furniture, and jigs and forms used in woodworking shops.

Hard maple applications include bowling alley surfaces, chopping blocks, piano frames, turnings, furniture (particularly figured-wood pieces), ladder rungs, rulers, tool handles, even clothes pins.

Cost and availability
Hard maple comes in average lengths of 6' to 12' and average widths of 6" to 10", while soft maple trees tend to produce somewhat wider boards. Both types are widely available and can be bought as lumber, veneer, and turning blocks. Maple is a relatively inexpensive hardwood, although bird's-eye, curly, and burl varieties can be expensive. ■
BUILD YOUR OWN wooden pulls

Whether you’re dressing up existing door and drawer fronts or starting a project from scratch, these easily made wooden pulls will help you get a good—and attractive—grip on the situation.

Hardwood Wire Pulls

1. Cut ½" stock to 2½" wide x 3½" long. Each block will yield two pulls. (Cut extra blocks; you may lose a few to machining errors.)

2. Cut the Wire Pull Template from ¼” hardboard (see the dimensions at right). Then, clamp the template to one face of the block, and trace the rounded corners and drill-hole positions onto the block. Cut the rounded corners on a band saw or saber saw and sand the cuts smooth. Drill a ½” hole in each
corner as marked. (We used a drill press and a Forstner bit for this step, since the grain can deflect a regular twist-drill bit.)

3 Mark the inside perimeter of the pull on the block. Using a band saw or saber saw, cut to the inside of the marked line to rough-out the inside of each block.

4 Construct the Wire Pull Jig as shown at left. The shape of the hole and the supports around it (Station 1), as well as the support blocks (Stations 2 and 3) must be cut and shaped accurately. Do not place any nails in the path of the saw kerf in Station 3.

5 Place each block in the first station on the jig and use a router fitted with a flush-trimming bit to trim the inside. (The ball-bearing pilot rides against the sides of the hole in the jig, cutting the block interior to its proper size.)

6 With the pull still in the first station, insert a ¼” round-over bit into the router. Rout the bottom and top inside edges of the pull as shown in the photo below. Move the pull to the second station and round-over the outside edges.

7 Move the pull to the third station and place the jig on a table saw. With the blade set 1¼” above the table surface, cut the pull in two.

8 Mark the centers of the ends of each pull, and drill a ¾” pilot hole ½” deep for a #8 mounting screw.

9 Sand by hand and apply finish.

Whistle Pull

1 Laminate the walnut and oak veneer in block form as shown in the top view in the Whistle Pull Drawing and the photo below.

2 Using a 1” plug cutter, cut the pulls from the block.

3 Mark the center of each pull on its back side. Clamp the pulls (one at a time) between the jaws of a handscrew, then clamp the handscrew to a drill-press table and drill a ½” hole ½” deep to accommodate an 8-32 threaded insert. (Threaded inserts in this size were ordered from Woodcraft, 41 Atlantic Ave., Box 4000, Woburn, MA 01888. Catalog 53, and are available from other mail order sources. You may be able to locate them locally, too.) Install the insert as shown in the drawing below, turning the drill press by hand. (Unplug your drill press before performing this procedure. We used a drill press, as inserts are very difficult to install evenly using a screwdriver.)

4 Use a round rasp to shape the grasp as shown in the photo below. (We clamped the pull in a vise to steady it for rasping.)

5 Round the top by sanding; hand-sand the pull and apply finish.

Hidden-Grasp Pull

1 Cut a piece of ¼” oak to ¼”×16” for four pulls.

2 Lay out the pulls by marking the oak at 3¼” intervals, leaving ¼”
Round-over the end with a belt sander or stationary disk sander, or rasp and sand by hand.

7 Locate and mark holes for mounting screws, and drill a $\frac{7}{8}''$ pilot hole $\frac{1}{4}''$ deep to accommodate $\#8$ wood screws.

8 Hand-sand each pull and apply finish. (We chose polyurethane.)

**Continuous Pulls**

1 To build the Continuous Pull Jig shown below, crosscut a $2 \times 4$ $(1\frac{1}{2}'' \times 3\frac{3}{8}''$) to the length of your router table. Bevel-rip the $2 \times 4$ at a $45^\circ$ angle as shown below, so that the shorter face of each piece is $\frac{3}{4}''$ wide. (You'll need both pieces of $2 \times 4$ for the jig.)

2 In one of the pieces, drill a $\frac{3}{8}''$ hole whose center is $\frac{1}{4}''$ in from the angled edge and midway along the length of the block. Clamp the piece to the router table so the $\frac{3}{4}''$ hole centers over the $\frac{1}{4}''$ core box bit. Clamp the other half of the block to the table as shown above.

3 Rip $\frac{3}{4}''$ lumber $1\frac{1}{2}''$ wide and $1''$ longer than length of door or drawer it will be attached to.

4 Pencil a mark $\frac{3}{4}''$ from one edge on one end of the $\frac{3}{4}''$ piece as shown. With the router off and the router bit set at about $\frac{1}{2}''$ above the table and protruding through the jig, push the marked end of the stock up next to the core box bit. The cut should start just above the penciled $\frac{3}{4}''$ mark. Start the router and push the stock over the bit to make the first pass. Raise the bit about $\frac{1}{4}''$ per pass until the full $1\frac{1}{2}''$ depth is reached.

5 "Break" the sharp edge on the pull with sandpaper. (We sanded the sharp edge by hand using 150 grit sandpaper followed by 220 grit paper attached to a sanding block.)

6 Cut an $\frac{1}{4}''$ rabbet $\frac{3}{4}''$ deep along one edge of the pull to mount it to the door or drawer. (We used a dado blade on the table saw to cut the rabbet, using push sticks to safely position the pull next to the fence and push the piece over the rotating blade.)

7 Cut the pull to the finished length. Finish-sand and varnish. Avoid varnishing the rabbeted edge that will be glued to the door edge.

8 Glue and clamp the pull to the door edge, being careful when clamping not to mar its surface.
Woodworkers who build cabinets or furniture always seem to be in need of just the right piece of hardware for one of their projects—hardware that meets a special need. Chances are good that the item you're looking for exists—but where? The products shown here represent but a few of the thousands of special-purpose hardware items available today.

It pays to know your hardware options, both at your local hardware store or home center and through mail order. For your convenience, on the next page, we list a group of mail-order firms (including The Woodworkers' Store, where we bought the items shown below) that offer selections of cabinet hardware. We think you'll find purchasing their inexpensive catalogs a good investment—and good reading, too.

Quick-Insert Hidden Hinges
Completely invisible with the door shut, and unobtrusive when its open, these hinges install easily and quickly. Just drill matching holes in the door and frame, insert the hinge into those holes, drive a single screw through each side into the wood, and you're done!

Plastic Drawer Dividers
Ideal for compartmentaliz-
mounted either horizontally or vertically.

**Plastic Magnetic Catch**
Especially suited for small doors, this catch mounts in a hole bored into the frame; the metal strike attaches to the door. The catch shown is available in brown and white plastic.

**Ornamental Surface-Mount Hinge**
Designed for ¾” flush inset doors, this hinge doesn’t require mortising. The leaves of the hinge align to ensure just the right space between the door and frame.

**Out-of-Sight Shelf Supports**
An interesting option to the more standard shelf support clips, these wire supports fit into small holes drilled in cabinet end and divider panels. Shelves with grooves cut into their edges slide onto the supports. To change shelf positions, just move the wire supports up or down.

**Easy-Does-It Glass Door Hinges**
Hinging glass cabinet doors can be a hassle, but not with this temper-saving piece of hardware. To install a pair of these hinges, drill holes in the top and bottom of the cabinet, fit plastic inserts into the holes, slip the hinges into the inserts, slide the glass door into the hinges, and secure the door by tightening the screws in the hinge.

**Slip-On Glass Door Strike**
This simple-to-install strike is the perfect match for the glass door hinges shown here. (You can also use it with the touch latch described above.) Foam rubber pads hold the strike securely in place.

**Mail Order Hardware Suppliers**
The companies listed below represent a good cross section of the firms selling cabinet and furniture hardware (and in many cases other items) by mail. We’ll tell you about others as we run onto them.

**U.S. Suppliers:**

**Ball and Ball**
436 West Lincoln Highway
Exton, PA 19341
215/663-7330
Mini catalog: Free
108-page catalog: $5

**The Brass Tree**
309 North Riverside Drive
St. Charles, MO 63301
Catalog: $2

**Constantine’s**
2054 Eastchester Road
Bronx, NY 10461
Toll free: 800/223-8087
108-page color catalog: $1

**Craftsman Wood Service Co.**
1735 West Cortland Court
Addison, IL 60101
148-page catalog: $1

**Garrett Wade**
161 Avenue of the Americas
New York, NY 10013
40-page brass hardware catalog: Free

**Horton Brasses**
Nooks Hill Road,
P.O. Box 120J
Cromwell, CT 06416
203/635-4400
Catalog: $2

**Imported European Hardware**
4295 South Arville
Las Vegas, NV 89103
702/871-0722
Catalog: $1

—Continued on page 115
COLOR me safe

Children of all ages will love to keep little treasures safe and sound in this walnut safe.

How to Make the Box

1 Rip and crosscut the box's top, bottom, and sides (A) to size.
2 Build the Box Joint Jig shown below. Then, test the jig with $\frac{3}{4}''$ scrap lumber to make sure the pieces will join together properly. Cut notches in the sides and top and bottom, using the Box Joint Jig as shown. (Notice that the side pieces have a finger at the front, while the top and bottom have a $\frac{1}{4}''$ space and then the first finger.)

3 Refer to the cutaway drawing for the location of the hole in the side of the safe that will accept the lock bolt. Mark its center point, then drill a $\frac{3}{8}''$ hole $\frac{3}{8}''$ deep.

4 Glue and clamp the sides to the top and bottom. Check for square with a try square. Remove excess glue from the box after the glue forms a tough skin. Round-over the four outside corners, using a belt sander or a router with a $\frac{1}{4}'''$ round-over bit. Cut a $\frac{3}{8}'''$ rabbot $\frac{1}{2}'''$ deep in the back of the box with a router; square the corners of the rabbit with a chisel.

5 Before cutting the back (B), measure the rabbeted opening to ensure a good fit. Cut B to size, then cut a $\frac{1}{2}'''$ rabbot $\frac{1}{2}'''$ deep around the outside edge of B. Glue and clamp the back to the box with the decorative rabbit facing out.

Assembling the Front Door

1 Cut door parts C, D, and E to size, then notch C as shown in the exploded-view drawing. (We cut the notches with a table saw fitted with a dado blade.)
2 Trace the outline of the hinges on the outside edge of E and cut mortises to house them.
3 To ensure good alignment of the lock bolt holes, dry-clamp pieces D and E together edge to edge. Use a drill press to drill a $\frac{1}{4}'''$ hole through D and $\frac{1}{2}'''$ deep into E to accept the lock bolt (F). Next, mark the $\frac{1}{4}'''$-long $\times\frac{1}{4}'''$-wide slot in the face side of part D for the sliding pin (G). (See the note on exploded-view drawing for position.) Using a $\frac{1}{4}'''$ bit, drill several holes side by side, then clean the slot with a chisel.

4 Glue and clamp door parts C, D, and E (we fit a $\frac{1}{4}'''$ dowel through the holes in D and E to keep the holes aligned while clamping).
To fit the inlay banding (H), rout a \( \frac{1}{8}'' \) groove just a hair shallower than the thickness of the inlay, then glue the inlay in place. Let the glue dry, then sand the inlay flush with the surface of the door.

**Making the Lock Mechanism**

1. Cut the \( \frac{3}{4}'' \) lock-bolt dowel (F), the \( \frac{7}{8}'' \) dowels for the knob shaft (G), the lock pins (I) and the three \( \frac{1}{4}'' \) lock dial dowels (J) to length.
2. Using tracing paper, transfer the template markings to the dials (see the template at left.) Now, cut a \( \frac{1}{4}'' \)...

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**Bill of Materials**

<table>
<thead>
<tr>
<th>Part</th>
<th>Finished Size</th>
<th>Material</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
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<td>4</td>
</tr>
<tr>
<td>B</td>
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</tr>
<tr>
<td>C</td>
<td>3/4'' x 2 1/2'' x 2 1/4''</td>
<td>walnut</td>
<td>2</td>
</tr>
<tr>
<td>D</td>
<td>3/4'' x 1 1/2'' x 5 1/2''</td>
<td>walnut</td>
<td>1</td>
</tr>
<tr>
<td>E</td>
<td>3/4'' x 1 1/4'' x 5 1/4''</td>
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</tr>
<tr>
<td>F</td>
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<td>1</td>
</tr>
<tr>
<td>G</td>
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<td>birch dowel</td>
<td>1</td>
</tr>
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</tr>
<tr>
<td>J</td>
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<td>birch dowel</td>
<td>3</td>
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</tr>
<tr>
<td>L</td>
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</tr>
<tr>
<td>M</td>
<td>3/4'' x 1/4'' x 6''</td>
<td>walnut</td>
<td>1</td>
</tr>
</tbody>
</table>

**Supplies:**
- car model paint (8 colors)
- 4 \( \frac{1}{4}'' \) x \( \frac{1}{2}'' \) brass screws
- 2 \( \frac{7}{8}'' \) brass butt hinges and screws
- paraffin wax
- inlay banding
- 4 rubber feet
- finish (polyurethane, tung oil, shellac, or lacquer)

*Continued on page 112*
news and events

"The old pioneer familiarity with nearby forests is gone, dimmed by 20th-century urban influences. People have lost contact with real definitions of quality. The Newsletter's goal is to help reawaken wood awareness."

—Wood Unlimited Newsletter

If you really like wood, you'll like the anecdotes and information in each issue of The Wood Unlimited Newsletter, a bimonthly publication edited by Larry Freye and other knowledgeable folks in Indianapolis. In four black-and-white pages, they present little-known facts about wood and in-depth pieces on such topics as veneers, plywood, and new technology.

Published as an industry service, the newsletter is circulated free to designers, architects, educators, and wood-products manufacturers. Your local lumberyard or hardwood retailer may have copies to give away.

Southeast Asia's Best Teak Soon Available

According to a friend of ours who is familiar with the international wood market, Thai teak will soon reach the U.S. in larger sizes and greater quantities. The Thai government has lifted its 1978 export restrictions, which limited shipments of teak lumber to small dimensions only. Many people think the Thai variety is the most desirable teak for woodworking, since it comes from 300- to 400-year-old trees (said to be the world's oldest). Noted for its fine color and texture, this stock works more easily than wood from younger trees.

Why? Because teak has the unusual ability to draw silica from the soil into its trunk as the sap flows. The silica breaks down and permeates the cellular structure as the tree grows old, acting much like a preservative. Young trees do have minute silica particles mangled in the grain, but the wood is rougher in texture and harder to work.

Woodworking Association of North America Launches Magazine

In our November/December issue, we mentioned that this newly formed group was seeking members, and that a quarterly magazine would be included in the organization's annual dues. The first issue is out. International Woodworking, Vol. 1, No. 1, contains 22 black-and-white pages, and covers tips, craftsmen, books, and events. For membership information, write Woodworking Association of North America, Dept. W, 35 Main St., Suite 6, Plymouth, NH 03264.

January 11–13

Woodworking World—The Houston Show

Location: Shamrock Hilton Hotel, Main Street, Houston, Texas

Admission: $5

February 1–3

Woodworking World—The Toronto Show

Location: Constellation Hotel & Convention Centre, Rexdale (Toronto), Ontario, Canada

Admission: $5

Tools, equipment, wood, and supplies for all levels of woodworking will be displayed and demonstrated by industry representatives. The schedule includes seminars on different aspects of woodworking. Hours for both shows: 9 a.m. to 6 p.m. Monday; 9 a.m. to 5 p.m. Tuesday. For additional information about either show, contact Woodworking World, 202 Main St., Plymouth, New Hampshire. Phone 603/536-3768.

February 16–17

Pacific Southwest Wildfowl Arts Festival

Location: Holiday Inn at the Embarcadero, 1355 N. Harbor Drive, San Diego, California

Admission: $2 donation

Wildfowl carvings, carvers, supplies, and demonstrations, plus decorative decoy competition with entrants from throughout the U.S. and Canada will mark this event's 11th year. (Decoy carvers wishing to enter the competition have until February 14 to apply.) Hours: 9 a.m. to 5 p.m. Saturday; 9 a.m. to 4 p.m. Sunday. For details, entry blanks, and further information, contact Kent Thompson, 530 B Street, Suite 2333, San Diego, CA 92101. Phone 619/231-7922.

News of interest to woodworkers and dates of national and regional woodworking events must be received at least three months before our publication date to be considered for the News and Events section. Send information to: News and Events, Better Homes and Gardens® WOOD Magazine, Locust at 17th, Des Moines, IA 50336.
How can one person make a building that will endure for centuries when another's work falls and turns to compost long before he dies? Take some time to study the skeleton of a well-framed old barn. It must have been well-framed. It's still standing, isn't it? You will see the truth of what a 1745 book of trades said of the carpenter, that "Strength is the chief of his study."

Study the barn's frame, its vertical posts, horizontal beams, and diagonal braces. Older than Stonehenge, this "post-and-beam" construction is the essence of the English building tradition. Indeed, the first English settlers in the New World built houses and barns that were not much different from the ancient stone monuments they had left behind: simple frames consisting of posts set into the ground with beams spanning their tops. They were wooden houses, but hardly the work of carpenters. It's no wonder there aren't any of them left.

If you think of a building as a human body, then the old-time carpenter's job is to make the bones and the skeleton—the strong frame to which the joiners and roofers later apply the protective skin. Good carpentry makes strong frames by exploiting the wood's strength in three dimensions: the size of the building's individual timbers, the connections between these pieces, and the design of the frame as a whole. When all these aspects of the building work together, the carpenter has earned his pay.

Beams
Take a wooden pencil and push in from its ends to make it shorter. No go. Now bend it and it snaps in half. The point is that it is easy to make a strong post but harder to make a strong, yet lightweight beam. You need a way to size timbers so that they are as strong as they need to be, but no heavier than they must be. Fortunately you can turn to a simple guideline for help: The strength of a rectangular beam varies directly with changes in width. With changes in depth, however, the difference in strength is squared.

Imagine that you have to support a load with a beam measuring 2 inches wide and 4 inches deep. A 4 by 4 would be twice as heavy and twice as strong. A 2 by 8, however, twice as deep as the original timber, would also be twice as heavy, but would have four times the strength. A 2 by 12 would be nine times as strong, and only three times as heavy. The more a carpenter knows about the strength of his timbers, the more confidently he can approach the limits of the material.

Joints
You often hear that old buildings are held together entirely by wooden pegs. True, the pegs are there, but the strength of the buildings is not in their pegs, but in their joints. These mortise-and-tenon joints interlock the timbers so that they sit solidly within one another. It is a rare building from which you couldn't remove every peg and have it stand as strong as before. (Try this with the nails in a modern structure.)

Carpenters at Carter's Grove plantation work on a seventeenth-century style tobacco barn.

Braced Frames
Although a post planted deeply in the ground won't fall over, it will invite destruction by termites and rot. Once you protect a building by placing it up on foundations, however, you must stiffen it by adding the strength of triangles to the rectangular frame.

Diagonal braces strengthen the building in several ways. Ideally, a post is a perfectly vertical column that is compressed but not bent. If the post does start to bow, it can snap relatively easily. Braces connected to the post prevent the bend from getting started. And, by blocking the closure of the right angles created between posts and beams, braces also prevent the collapse of a building under wind.

Continued on page 119
Woodworkers everywhere appreciate the beauty of well-crafted cabinetry. But many of these same people labor under a false impression—that cabinets must be terribly difficult to make. Not so! And to prove it, we're going to walk you through the steps that will yield good-looking cabinets every time.

We've selected a straightforward example—a base cabinet with a bar sink and a matching wall cabinet—to illustrate the basics you need to know as a novice cabinetmaker. (See the exploded-view drawings below for how they go together.) Once you've mastered the procedures that follow, you can handle many cabinetmaking situations. Though the dimensions, and maybe even the style of cabinet, may change, much of what you learn will still apply.

Continued
START WITH A PLAN

Obviously, before you order a single sheet of plywood or a board for your project, you have to have a good idea of how you want the end product to look. You’ll also want to settle on the cabinets’ overall dimensions.

The Rough Sketch

Though some visually oriented woodworkers can build as they go, most of us need a rough sketch to guide us along the way. This sketch needn’t be sophisticated (see our example in the shaded area at left), but do try to be as detailed as possible. It’s also helpful to draw front, end, and top views of the project as well as any other details that clarify construction. Since there are some cabinetmaking standards often used by professionals that you may not know about, we’ve included them in the box at left. Use them to flesh out your rough sketch.

The Story Pole and How It Can Help You

Once you have established the width, depth, and height of a cabinet, make yourself a story pole. This device, which can be a scrap piece of lumber or sheet goods, will show you exactly how much room the cabinet will occupy when it’s finished. It also shows you where various members of the cabinet will be located. And most important, a story pole allows you to measure distances exactly.

The photo at the bottom of the previous column shows what information we transfer to the front side of the story pole and how we use it to visualize the end result. (Essentially, what we have here is a section view of the cabinet near the front.) After studying the story pole and making any desired adjustments, we then turn our scrap board over and plot what amounts to a top view of the cabinet (see the photo above). If you want, you can use the same technique to take a look at the cabinet’s depth.

Make a Cutting Diagram

When you make a cutting diagram, you’re doing yourself a couple of big favors. Not only does the diagram help you figure the materials requirements for the cabinet, it also serves as a guide when it comes time to cut out the components.

Note: When laying out the cabinet’s end panels on the plywood, make sure that you have the grain running from top to bottom. The same applies to doors if you plan to use plywood for them.

HOW TO BUILD A BASE CABINET CARCASS

Start With the Base

The base of a base cabinet adds structural support at the bottom of the cabinet. It also helps form the toe kick, the strategically placed recess at the front of the cabinet that allows you to get close to the cabinet without kicking it.

Toe kicks typically measure 4” high × 3” deep when the cabinet is finished. But since the bottom of the cabinet sits on the base and the top edge of the bottom face frame rests flush with the bottom’s top edge, you have to make the base somewhat taller to end up with a 4” high toe kick. (After referring to our story pole, we cut the toe board 5” high and as long as the cabinet is wide.)

Now, lay the toe board on a flat surface and mark the location of the notches that the end panels will pass through. Also lay out the position of the end panels as shown above. (The notch at both ends of the toe board in this instance measures ¾” wide and 1” deep.)

After notching the toe board, cut the sides and the back of the base to size. Since neither the sides nor back will show when you complete the cabinet, you may want to use scrap wood for these parts.

After dry-fitting the parts, nail and glue scrap wood cleats ¾” in from each end of the back and 1½” in from each end of the toe board. Then, glue and nail the base together as shown in the photo below. Note that the cleats make aligning and nailing together the base pieces a very easy procedure.

While the glue is still wet, check for square by measuring diagonally from corner to corner as shown in the first photo on page 62. (If the measurements differ, your base isn’t

Assembling the cabinet’s base

Continued
Checking for square
square.) To square the base, you'll have to rack it as shown in the photo below. (You may have to make several adjustments to get the base into square, so be patient.)

Racking the base
To hold the base in square, nail braces across the corners as shown in the photo above.

Cut the End Panels
Typically, end panels measure \( \frac{3}{4}'' \) shorter than the finished height of the cabinet and \( \frac{3}{8}'' \) narrower than the depth of the cabinet. Start by cutting the side panels to size. Then, fasten the panels together (good faces out) with cleats tacked to two adjacent edges. The cleats keep the panels in alignment while you cut their notches.

Mark the location of the 4''-high \( \times \) 3''-deep notch on both panels. If you'll be using a table saw, you have to make sure not to cut too far when making your cuts. To do this, raise the blade to its highest setting and mark the point on the auxiliary fence at which the blade enters the work.

Set the fence the correct distance from the blade, test the measurement on scrap, and then make your first cut (stop the blade when your cutoff mark aligns with the one on the fence). Now, turn the panels over, reset the rip fence, and make the second cut.

You'll notice that the cuts fall somewhat short of the cutoff marks. Finish them with a handsaw, as shown in the photo below. Before separating the panels, make a

Notching the end panels
mark on the face of each (doing this will enable you to identify the outside of the panels later).

To complete the machining of the cabinet end panels, you need to cut a \( \frac{3}{8}'' \) rabbet \( \frac{3}{4}'' \) deep along the back edge of the panels. Unless you have a dado set or blade, making the rabbet requires two cuts. We show the setup for the first pass below. Note that a feather board and a brace (both clamped to the saw table) provide the necessary control to make the cut accurately.

To make the second cut, reset the rip fence, and the height of the saw blade, make a test cut, then complete the rabbet.

Rabbeting the end panels

Cut and Install the Bottom, Back, and Divider
Start by dry-fitting the end panels and the base. Pipe clamps will hold the assembly together well enough to take your measurements. Measure for the depth of the bottom as shown in the photo at the top of the next column (note that the bottom aligns with the front of the

Measuring depth of bottom
end panels and the rabbet in back). Measure again for the width of the bottom, then cut the bottom to size. (Since the divider panel is the same depth as the bottom, cut both parts using the same saw setting.)

Set the bottom on the base, then measure the height of the divider panel as shown in the photo below. Cut the divider to size.

Measure and cut the \( \frac{1}{4}'' \) hardboard cabinet back and the cleat

Determining height of divider

that joins the end panels at the top back of the cabinet. (We used a 5''-wide cleat.) Then, glue and nail the end panels and bottom to the base. Secure the cleat between the end panels, either using hot-melt

Securing cleat to end panels
glue as we did here, or with glue and clamps.
Predrill the hardboard back, then screw it to the end panels, base, and top cleat. Slip the divider into position and mark the bottom of the notch you need to cut in its top

Marking notch in divider
back edge (see the photo above). Notch and install the divider in its correct location. (Refer to your story pole for the exact location of the divider.)

HOW TO BUILD A WALL CABINET CARCASS
Though base and wall cabinets do share many construction similarities, they differ in several respects, too. That's why we feel it's necessary to take you quickly through the following wall-cabinet carcass how-to.

Begin by cutting the end panels to size (refer to your story pole or drawing for the correct size). Then, cut a 1/2" rabbet 3/4" deep along the back edge of the panels.

Now, cut 1/2"X3/4" hardwood cleats, and glue and screw them to the top and bottom of the end panels as shown in the photo below. After doing this, rip the top

Fastening cleats to end panels
and bottom the correct width, then crosscut them to the correct length.

Glue and screw the top and bottom to the cleats on the end panels, check for square, and allow the glue to dry. Then, measure as shown in

Measuring height of divider
the photo above determine the correct height of the divider panel. (Note that we took the measurement near the end panel. By doing this, we avoided getting an inaccurate measurement if the top or bottom panel had been bowed.) Cut the divider panel to size.

To add further stability to the cabinet, cut and install hardwood ledgers below the top and bottom shelves. (We used a 3/4"X3/4" ledger under the bottom shelf and a 3/4"X1 1/2" one under the top.)

Now, cut, notch, and install the plywood divider, and cut the back to size and screw it to the carcass.

BUILD THE FACE FRAME
Face frames tie the front of the cabinet together structurally and at the same time finish it off visually. When determining how wide to cut the various face frame members, keep in mind that you want it to look balanced when you complete the cabinet.

In the base cabinet we're using as our example, the stiles and the bottom rail measure 1 3/4" wide; the top rail, mullion (or vertical member between the stiles), and muntins (the horizontal members between the rails), 2 1/4". Why the difference? All parts in the latter grouping have two doors or drawers overlapping them, whereas the stiles and the bottom rail have only one doing so. The net result: a visually balanced frame.

Keep in mind, too, that whenever you cut face frame parts, you do so from the outside in: stiles first, then the rails, then the mullion, and the muntins. But when you assemble the frame, you do so from the inside out: muntins first, and so on.

Start by measuring the distance between the top of the cabinet carcass and the top surface of the cabinet's bottom. We added 1 1/4" (the width of the bottom rail) to this measurement to determine the length of the stiles.) Cut the stiles to length.

To figure the length of the rails, measure from the outside of one of the end panels to the outside of the other. Add 1/4" to that figure, then subtract the combined widths of the stiles. Cut the rails to size.

The photo below shows a quick, easy way to make sure the rails are

Checking length of rails
the right length. Set up a length stop, position the rail against it, and move the miter gauge forward just far enough to nick the rail. Pull the material back, check it for accuracy, and, if necessary, reset the length stop. Flip the rail over and make the cut from the opposite side. The nick will never show. This same procedure works well when cutting mullions and muntins, too.

Next, clamp the rails and the stiles together as shown in the photo below (note the placement of the clamps). Measure as shown to

Measuring length of mullion
find the length of the mullion, then cut it to length. Now, remove the
clamps from the frame, line up the ends of the top and bottom rails, and mark the location of the mullion as shown below. Use the same procedure to find the length of the muntins, then cut them to length.

Marking position of mullion

Lay out the face frame parts. If any of the parts happen to be crowned (you can check this by sighting down the face of each board), the crown must face out (see the sketch below). Mark the face of each part, then clamp all of them together. Once you have the parts aligned and in their proper spots, make two marks across each joint line where two members meet (see the photo below). Also mark each joint as A-A, B-B, and so on to avoid mixing up the parts.

Remove the clamps from the frame and then drill dowel holes, using your marks as a guide.

Remember that you want the combined depth of the mating holes ⅛" or so deeper than the length of the dowel pins you’re using.

Now, insert glued dowel pins into the holes you’ve bored, and assemble the frame—from the inside out. Use clamps to hold joints tight. While the glue is still wet, check for square, and rack the frame into square, if necessary. See the sketch below for how to do this.

When the glue dries, remove the clamps and sand the face frame smooth.

ATTACH THE FACE FRAME TO THE CARCASS

Glue and clamp the frame to the carcass, making sure that the top of the bottom rail aligns with the top of the carcass bottom, and that the frame overlaps both cabinet ends evenly. (See the photo below.)

Centering divider behind mullion

Center the panel behind the mullion. Clamp the two members together as shown in the photograph above and then drive your nails.

CUT AND INSTALL THE SHELVES

Usually, shelves measure ⅛" narrower than the width of the cavity into which they fit and ⅛" shorter than the distance from the cabinet’s back to the back side of the face frame, so you shouldn’t have any difficulty figuring their size.

Most cabinetmakers band the front edges of shelves with thin strips of a wood that’s compatible with that being used on the cabinet. But you also can band them with wood veneer tape, if you wish. Either way, be sure to figure the thickness of the material used into your calculations.

Marking dowel pin locations

Attaching the face frame

When everything aligns properly, drive finish nails through the frame and into the carcass sides and bottom.

Before nailing the mullion to the divider panel, be sure that you
Cut the shelves to size, then test-fit them to make sure there’s sufficient play to accommodate the shelf clips you’ll be installing later.

The photo at the bottom of the previous column shows the easiest way we know of to position the holes for shelf clips. The perforated hardboard serves as a template that ensures that the holes on either side of the shelves align exactly. Set the template on the cabinet bottom and against one of the end panels and drill a series of holes. Then, with the template in the same relative position, move it to the opposite panel and drill another series of holes using the same guide holes as before.

**Note:** If you drill holes into both sides of the divider, you’ll need to offset one set from the other.

### BUILDING THE DOOR AND DRAWER FRONTS

With *slab-type* doors and drawers, you simply cut the panels to the appropriate size, band or veneer the edges, and perhaps decorate the panel. But the *frame-and-panel* option consists of a joined frame into which a variety of inserts can go. In our example, we’ve chosen to go with a frame that fits together with dowels, just as the face frame did. We’ve also opted for *overlay* doors and drawers rather than the *lipped* or *flush* type.

Typically, doors and drawer fronts overlap their openings by ⅛” all around (the hinge configuration can alter this somewhat). In our example, to figure the size frames you need, add ⅛” to both the height and width of each opening. Then, cut the frame parts to size (rails fit between the stiles here, too).

You machine and assemble these frames somewhat differently than you did the face frames. If you go with thin plywood panel inserts, you may want to cut a groove in the center of the inside edge of the frame members, and insert the panel as you assemble the frame. For glass or other inserts, you assemble the frame first, then rout out a rabbet on the back side of the front that screws onto the drawer assembly. (Door fronts that are independent of the drawer allow you to change the look of a cabinet at a later date if you want without totally rebuilding the door.)

First, cut and fasten drawer-mount blocks to one end panel and the divider panel. (The bottom of the block should align with the top of the muntin below the opening.) The idea is to provide a surface on which the drawer slide can bear. You’ll want the block thick enough so that its face is flush with the inside edge of the stile and mullion.

How you size the drawers varies depending on the type of slide you use. With side-mount type drawer slides, you’ll usually want the width of the drawer to be 1” narrower than the width of the opening. (Check the drawer slide package instructions to make sure.) The height of the drawer parts should be ⅛” shorter than the height of the drawer opening. And as for the drawer’s depth, most cabinetmakers stop it just short of the depth of the cabinet. For example, if the distance from the front of the face frame to the cabinet back measures 23 inches, you’d want the drawer 22⅛” at most.

Now, cut the drawer parts to size and assemble them as shown in the photo below. Note that both ends of the drawer sides have rabbets that accept the front and back, and that all four sides of the box have

### HANG THE DOORS

Begin by screwing the hinges to the doors. (A general rule of thumb here calls for the hinges to be “a hinge-length in” from the top and bottom of the doors.) Then, position one of the doors over its opening as shown below (door must overlap opening evenly).

### Positioning door over opening

Now, mark the position of the hinge mounting holes on the stiles, drill pilot holes, and hang the doors.

### BUILD AND INSTALL THE DRAWERS

Drawers certainly can be made in several different ways, but we’ve chosen to make ours with side-mount drawer slides and a drawer

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*Continued*
$\frac{1}{4}''$ grooves $\frac{1}{2}''$ up from the bottom edge to accept the drawer bottom. Install the drawer slides according to manufacturer's instructions. Then, put the drawer in the cavity, stick a couple of pieces of two-sided tape to its face, and position the drawer front as shown in the photo below. When you're satisfied with the front's position, squeeze the front and the drawer together; pull the fixtures or other items make it impractical if not impossible to put a drawer where one would normally be. So what do you do? False fronts to the rescue! You build false fronts exactly as you do the fronts of drawers. But instead of screwing the front to a drawer, you fasten false fronts to the face frame with cleats. The photo below shows you how. Align

Positioning the drawer front

drawer partway out, and clamp the two together. Remove the drawer from the cavity and screw the drawer front to the drawer as shown here. (You'll undoubtedly have to shim and adjust the drawer slides to square the front with the face frame and to achieve a tight fit, and that can require patience. We use cardboard for our shims.)

ATTACHING A FALSE FRONT

In some cabinetmaking situations, such as in our example, plumbing

For tops without backsplashes, cut a piece of $\frac{3}{4}''$ plywood $\frac{1}{4}''$ wider and $\frac{3}{4}''$ deeper than the cabinet. Now, face the front and sides of the cabinet with $\frac{3}{4}'' \times 1\frac{1}{4}''$-strips on edge. Cover all exposed surfaces with plastic laminate, starting with the side edges, the front, and finally the top. Place the counter on the cabinet, scribe it to the wall if necessary, then fasten the top to the cabinet with metal angles.

If you want to add a backsplash, cut a $\frac{3}{4}''$ plywood countertop that measures $\frac{3}{4}''$ wider than the cabinet, and $\frac{1}{4}''$ deeper than the cabinet less the thickness of the backsplash. Band the front and both sides with $\frac{1}{4}'' \times 1\frac{1}{4}''$ strips on edge.

Now, for the backsplash, cut a piece of $\frac{3}{4}''$ plywood the width of the countertop, less the combined thickness of the scribe strip material that fastens to both ends of the backsplash. (The scribe strip allows you to custom-fit the cabinet to the wall.) Fasten the strips to the $\frac{3}{4}''$ plywood as shown below.

Next, cover the counter with plastic laminate, starting with the side edges, the front, and the top. Do the same to the backsplash—ends first, the top, and the front.

Now, screw the backsplash to the counter, set the cabinet and countertop in place, scribe the backsplash to fit snugly against the wall (if necessary), and fasten the top to the cabinet with metal angles. ■
We assemble every product featured in Kit Builder and give special attention to instructions, the quality of materials and parts, and the relative ease or difficulty with which the kit goes together.

In the 1770s, Joseph Henzey was a top chair maker in Philadelphia, the center of Windsor chair making in the American colonies. This bow-back armchair kit, a faithful reproduction of an original by Henzey, is a delight to build and an interesting lesson in nearly clamp-free joinery. The kit arrived with finely machined parts, glue, even a rope tourniquet for clamping the legs and stretchers. Sandpaper and stain were also included, but a finishing product was not. (Finishing is discussed in the instructions, but the choice—and purchase—of a varnish or oil finish is left to the individual.)

The clearly written step-by-step instructions were thorough and complete, although we felt that a bit more space could have been allotted to larger, clearer drawings. (The manufacturer told us that we had received preliminary plans and that final instructions were being prepared.) The chair is assembled in two general stages: from the seat down (for the leg assembly), and then from the seat up (for the back and arms). Construction took about four hours: less than two hours of actual working time (including 20 minutes for sanding spindle ends and finish sanding), plus two hours of waiting for glue to dry.

The Henzey Bow Back Windsor Arm Chair Kit. Available from Cohasset Colonials, Dept. W., 494IX Ship Street, Cohasset Harbor, MA 02025. The kit sells for $179 plus shipping. A color catalog of kits is available for $1.
Project showcase

There's a lot of quality woodworking being done these days, and we like to show it off. In each issue of WOOD, we devote this space to a display of projects submitted by our readers. From boxes to bowls, and carvings to cabinets, we'd like to see them if they're made of wood. To submit projects, follow the instructions at the end of the article.

A. Queen Anne Writing Table
Proving that he knows how to work the wood he's so knowledgeable about, our "Wood Profile" columnist, Paul McClure, of Tempe, Arizona, sent us this photo of the solid cherry writing table he made for his wife. To accentuate the "quilted" figure of the wood, Paul inlaid bird's-eye maple into bookmatched pieces of re-sawn cherry. Being "in the business" helped, because all the cherry came from the same piece of wood which Paul had picked up during his wood buying years for a large lumber company.

He glued up the cabriole legs after turning the table's "dove" feet on a lathe. To finish the piece, McClure sprayed on and then buffed out Deft Clear Wood Finish thinned with acetone. Designed to fit his wife perfectly, the table measures 42"x20"x29" high.

B. Touchdown Turning
An active member of the International Wood Collectors Society, Rex Vaught, of Rockville, Indiana, made this and several other full-sized footballs as gifts. Using a process he calls "post-blocking," Rex laid up pieces of walnut and maple for the body, which he turned on a lathe. The laces are inlaid holly, ebony, and walnut. Rex doesn't throw passes with his creation, but he does win cheers for his woodworking talents wherever it's displayed.

C. Catalpa Wood Carving
Fred Carrington of Nixa, Missouri, tells us that catalpa, a domestic softwood, can be worked green and will never crack. We hope so, because Fred used catalpa for this intricate carving, "Uninvited Guest," which depicts a scene from the Old West, Carrington's favorite subject area. Historically accurate down to the .50 caliber Smith & Hawkins rifle the figure reaches for, the carving stands 17" high.

Fred began the piece by fashioning a model in sculptor's clay. When he was satisfied with every detail, he began to carve. He spent six 50-hour weeks on the project.
which he finished with thinned artist’s oils and Minwax. Occasional buffing with a soft cloth is all that’s needed to keep the piece looking lustrous.

Incidentally, Fred belongs to a group called the Ozark Mountain Woodcarvers, headquartered in Branson, Missouri. If you ever have an opportunity to visit this group’s retail outlets—in Branson, Silver Dollar City, and Gatlinburg, TN do so. You’ll see some of the finest wood carvings anywhere.

D. Band-Saw Bowl
Robert St. Pierre, of Hanover, Massachusetts, uses a band saw, not a lathe, to build pieces like this handsome mahogany vessel which measures 12” in diameter by 7” high. Robert has devised a mathematical formula that allows him to cut a series of consecutive rings at varying angles and then lay up the pieces to make objects in virtually any shape he wishes. After gluing up his designs, he fine-sands the piece and then coats it with oil-based urethane.

E. Fine-Feathered Wall Clock
Plumage from a ringneck pheasant adds a warm, outdoors look to this oak-and-walnut wall clock made by Marlen Kemmet, who spends most of his time in the WOOD editorial offices and shop, where he works as the magazine’s “How-To” editor.

Marlen glued up four pieces of ¾” oak, alternating the grain to add visual interest, and routed a cavity in the back of the black walnut to accept a battery-powered clock movement. He applied satin-finish polyurethane to give his clock a low sheen. The feathers, attached with white glue, are untreated. If anything ruffles them, Marlen says, he holds them over steam to bring them back to shape.

F. Chinese Motif Table
Traditional Chinese designs inspired David Lawrence, of Exeter, Rhode Island, to plan and build this distinctive table, which measures 25”×48”×29” high. A 5/4 walnut top with padauk trim sits atop gracefully curved legs, which are bent laminated, and joined with splined miters.

In the Chinese manner, David used frame-and-panel construction to fit the top into the table’s edge molding. All the grid-work pieces on the table were made with mortise-and-tenon joints, a time-consuming method that ensures strength and stability in the piece.

To highlight the beauty of the wood, David rubbed on multiple coats of Watco Danish Oil.

To submit your projects:
Send a 35-mm color slide, with the project as the focal point in a simple background. No people, please! Include a capsule description—materials used, special joinery techniques, finish, for example. WOOD will pay $25 for published projects. Unless you enclose a self-addressed envelope with sufficient postage, we will keep all slides.

Send to:
Project Showcase
Better Homes and Gardens®
WOOD Magazine
Locust at 17th
Des Moines, IA 50336
Clean design and basic cabinet-construction techniques converge in this handsome stereo cabinet. The cabinet we built measures 50 3/8" W × 18 1/8" D × 30 3/4" H. Please turn the page for step-by-step instructions.

**Bill of Materials**

<table>
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<th>Material</th>
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*Dimensions of 3/4" plywood include veneer tape on all exposed edges.*

**Supplies:** woodworker's glue, 1 pair—side-mount door slides, 2 pairs—invisible hinges, 2 pairs—3/4" concealed wraparound hinges, 12—48 × 1 1/2" flathead wood screws, magnetic door catch hardware, 1/4" hardboard (for spines), red oak veneer tape, 8—shell clips, 1 pair—counterbalance hinges, 25—48 × 1 1/4" flathead wood screws, stain, varnish.
Building the Carcass

1. Start by studying the drawings and photos to familiarize yourself with the pieces. Give special attention to parts that call for veneer tape. Since the Bill of Materials shows finished sizes, you'll have to subtract veneer-tape thickness to determine actual cutting dimensions for these pieces.

2. Cut the back (A), end panels (B), bottom (C), lower divider panel (D), top shelf (E), and facer (F) to size. You'll need to cut a notch in the front edge of each end panel to accept the facer strip (F), and rabbets and dados in the end panels and back (see the Carcass Detail). Before cutting the dados in the end panels, measure the thickness of the top shelf (E). (The actual thickness of 1/4" plywood is not always precisely 1/4").

3. Dry-clamp pieces A-F, check for correct fit, and adjust if necessary. While the pieces remain clamped, drill pilot holes and screw pockets for #8 × 1¼" screws to attach the bottom of the unit to the back and end panels. We used 5 evenly spaced screws to attach C to B, and 7 screws to attach C to A. For mounting the divider panel (D) between E and C, drill 4 countersunk pilot holes to attach E to D, and 4 to attach C to D.

4. Glue, reassemble, and clamp the pieces together. Check for squareness, then install the #8 × 1¼" screws.

5. Cut and notch the upper divider panels (G) as shown in the Cutaway Drawing. Position them so their inside edges are centered over the lower divider panel (D), as shown in the Centering Detail.

6. Apply oak veneer tape to all exposed edges (see the Cutaway Drawing). Either iron-on edging or the type that adheres with contact cement will work well.
The Leg Assembly

1 Rip 13/8"-thick oak to 3" for leg parts (H, I). Miter both ends of each I and one end of each H to 45°, then crosscut all of them to length. Cut 3/4"-wide grooves 1" deep in each mitered end of the six pieces and fit with 1/4" spline material. Dry-clamp the legs together, checking for squareness and groove alignment. Glue, reassemble, and clamp the legs together, using clamp blocks as shown in the drawing below.

2 After the glue has dried, remove the clamps and clamp blocks. Sand excess spline material, then rout a 3/4" round-over on all edges of the legs, including their bottoms (to prevent legs from catching on flooring material). Sand the legs smooth and fasten them to the cabinet with #8 x 1 1/2" screws driven from the inside of the cabinet into legs.

Installing the Shelves and Doors

1 Cut the adjustable shelves (J) to size, making sure that you allow clearance for shelf clips. Apply veneer tape to the shelf fronts. Measure and mark the holes for shelf supports or use a strip of perforated hardboard (the type with 3/8"-diameter holes) as a template. Then drill 1/4" holes 3/8" deep in the inside of the left end panel (B) and the left side of the lower divider panel (D). (We spaced the support holes 1" apart and 3" in from the front and back edges. To guard against drilling through the pieces, we wrapped a piece of electrical tape around the drill bit. Drill 1 1/2" holes through C and E for wire access. The wires run behind the shelves (J).

2 Cut the four doors (K) to size, allowing for veneer tape and the necessary 1/8" clearance between the doors. Lay the doors in place to check for a good fit. (It's helpful here to put the cabinet on its back.) Mark location for magnetic door catch hardware and drill pilot holes if necessary. Apply veneer tape to all exposed edges. Using a router fitted with a cove bit, rout a hand pull in the top of the inner two doors. Make the pulls about 1" long and center them. Install invisible hinges between the inside and outside doors per manufacturer's instructions. (See Invisible Hinge Detail.)

To mount the door assemblies to the carcass, mortise the concealed wraparound hinges into the edges of the outer doors as shown in the Hinge Mortise Detail above. Mark and drill pilot holes in the cabinet legs (H) for the wraparound hinges. Remove hardware and set all parts aside.

The Cabinet Top and Drawer

1 Cut the two cabinet top panels (L) to size, then test-fit them. Apply veneer tape to the front and side edges. Glue and clamp the right-hand panel in place. Use counterbalance hinges to install the turntable cavity top as shown in the photo below.

2 Cut the drawer pieces (M, N, O, P) to size. Rout a hand pull in the bottom of the drawer front. Cut the rabbet and groove in the drawer sides (N) as shown in the Cutaway Drawing on page 67, and the rabbet and groove in the drawer front (M) as shown here. Glue, nail, and clamp the drawer together. After the glue has dried, mount the drawer slides to the drawer sides and the cabinet carcass, following the instructions supplied with the slides. Apply veneer tape to all exposed edges of the drawer front.

3 Cut the turntable cavity front (Q) to size. Apply tape to its edges, then glue and clamp it in place, in line with drawer front (M).

4 Sand, then finish the unit as desired. (We used stain and polyurethane varnish.) Install all door hardware, then hang the doors.
SIMPLE cabinet desk

A sturdy laminated work surface and two variations of a basic cabinet produce a versatile desk for home or office.

Carcass Construction

1 Cut cabinet sides (A), cabinet backs (B), and cabinet bottoms (C) to size. (Since we designed our desk to sit against a wall, we chose hardboard for the cabinet backs. If your desk will be placed away from the wall, substitute ¾” oak veneer plywood for the hardboard.) To prevent veneer from chipping on flooring material, rip ¼” strips from ¼” red oak for base strips (D), and glue and clamp D to the bottom edges of A.

2 Cut a ¾” dado ¾” deep and 1 ¾” from the bottom edge of the A-D side assemblies to receive C. Cut a ¼” rabbet ¾” deep in the back of the A parts to receive B. Cut the ledgers (E) and the drawer-slide mounting blocks (F) to size.

3 Glue and clamp parts A, B, and C together to form the two cabinet carcasses. Check for square with a framing square. Nail and glue E in place, flush with the top edge of the cabinet backs (B).

Assembling the Face Frames

1 Cut the face frame rails (G, H) to size. Rip the stiles (I) to size plus ¼” so that the face frames will be slightly wider than the cabinet carcasses at this point. (Later, when you attach the frames to the cabinet carcass, you’ll sand them flush for a perfect fit.) Cut I to length.

2 Doweled butt joints secure the rails to the stiles. First, lay out parts...
G, H, and I on a flat surface in the arrangement in which they will be glued. Then, use pipe clamps to dry-fit the face frame parts. Mark the dowel locations. (We used a try square and pencil to mark reference lines on the end of each rail and adjoining stile. See the Doweling Diagram on page 72.)

3 Drill two \( \frac{3}{8} \)" holes \( \frac{13}{16} \)" deep in each rail end, then drill like-sized

### Bill of Materials

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<td>1/2&quot;</td>
<td>5 3/4&quot;</td>
<td>23&quot;</td>
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<tr>
<td>O</td>
<td>1/2&quot;</td>
<td>16 1/2&quot;</td>
<td>22 1/2&quot;</td>
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<td>P</td>
<td>1 1/16&quot;</td>
<td>25&quot;</td>
<td>72&quot;</td>
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<tr>
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<td>1/16&quot;</td>
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<td>72&quot;</td>
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<tr>
<td>R</td>
<td>3/4&quot;</td>
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<td>72&quot;</td>
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<tr>
<td>S</td>
<td>7/16&quot;</td>
<td>1 1/2&quot;</td>
<td>72 7/8&quot;</td>
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<tr>
<td>T</td>
<td>7/16&quot;</td>
<td>1 1/2&quot;</td>
<td>25 7/8&quot;</td>
</tr>
<tr>
<td>U</td>
<td>3/4&quot;</td>
<td>3&quot;</td>
<td>72&quot;</td>
</tr>
</tbody>
</table>

*Some parts are cut larger initially, then trimmed to finished size. Please read instructions before cutting.

**Supplies:** \( \frac{3}{8} \)" \times 1 1/2" dowels, 6 drawer pulls, 4 pairs 22" drawer slides, 1 pair self-closing overlay door hinges, 56-8 x 1" flathead wood screws, 4d and 8d finishing nails, contact cement, waxed paper, wood putty, finish of your choice.

Continued
NOW YOU CAN BUILD IT

holes in the stiles. (We used a
doweling jig to ensure that our
dowels were in line with the refer-
ence marks and centered on the ⅜" oak edges. Since it is risky to dry-
fit doweled joints—they tend to
break or stick—it is important to
mark and drill the holes accurately.)

4 Once you’ve drilled all the holes,
use a small brush to apply glue to
the dowels, dowel holes, and mat-
ing surfaces. Glue and clamp both
face frames together on a flat sur-
face, and check that the assemblies
are square and flat.

5 After the glue has dried, remove
the clamps and scrape off the excess
glue. Sand the front and back of
each frame flush. (Even the best
laid-out dowel joints seem to come
out a little uneven.)

Assembling the Cabinets

1 Glue, clamp, and nail the cabinet
face frames to the cabinets. (We
used 6d finishing nails to help posi-
tion and attach the frame to the
cabinet.) (See the tip on page 36
for how to avoid splitting the face
frame as you nail.) The outside
dges of each face frame will
extend slightly beyond the carcass.

2 Sand the face frames and base
strips flush with the carcass. Don’t
sand through the veneer!

3 Position the drawer-slide mount-
ing blocks (F) on the cabinet sides.
Make sure the bottom of the blocks
align with the top edge of the face-
frame rails (H). (See the cutaway
portion of the Front View.) The
blocks should also mount flush with
the inside edge of each face-frame
stile (I). If the blocks are too thick,
they can be sanded or jointed to
proper size. We used glue and
three—#8×1″ wood screws to
attach each mounting block to the
cabinet sides.

Constructing the Drawers
and Door

1 To make the 4 drawer fronts and
1 door front, rip the stiles (J, K) to
width, then rabbet a ¼" groove ¼"
deep along one edge of each stile
to accept the rails. (You can cut the
rabbet with a router, table saw, or
radial arm saw.) Cut J and K to
length. Cut the rails (L) to size,
then rout a ¼" rabbet ¼" deep on
each side of each end of L to form
a ¼" tongue.

2 Chamfer all face edges of the
drawer and door front parts (J, K,
L). (A table saw works well for cut-
ting the ends and sides of the
parts.) To chamfer the ends, clamp
a stop to a fence mounted on the
table saw’s miter gauge, and tilt the
saw blade to 45° as shown in the

photo below. (In both the photos
below, we’ve removed the blade
guard for photographic clarity.) To
cut the rip-chamfers, position the
saw’s rip fence away from the blade

---Continued on page 104---

WOOD MAGAZINE | JAN/FEB. 1985
DADO BLADES & SETS
Getting in the Groove

You can spend $25 or pay $300 to equip your radial arm or table saw with a dado accessory. What will you get for your money? What do you need?

Your plans call for a %” groove, %” deep. If you use your normal saw blade, its %” kerf will require you to make at least 6 passes to do the job. And if the groove must be 52” long... well, maybe you should turn on the basketball game and build the cabinet next weekend.

But what if you had a dado accessory, a device for cutting channels in wood that would make quick and safe work of dadoes, grooves, rabbets, and tenons?

Instead of positioning and repositioning your workpiece, you could set the dado head to the proper width, make one pass (or perhaps two if you were making an extra deep cut), finish the cabinet, and still watch the game.

Do You Really Need One?
For a specialized shop accessory, a dado assembly isn’t cheap, so ask yourself if you’d use the device often enough to justify buying it. If most of your projects don’t involve cutting a lot of grooves, you probably can survive by making repeated passes with a standard saw blade, or by making a few passes and then chiseling out the waste. You can also achieve excellent results with a router.

But if you plan to do a substantial amount of work that calls for various types of grooves—a wall of bookshelves, say, or a set of kitchen cabinets—then you’ll certainly appreciate the speed and precision that a good dado accessory offers, and purchasing one probably makes sense.

Continued
The Bottom Line
You'll encounter many variables as you make your choice. There are various types of dado assemblies, composed of different materials. They are constructed with numerous blade grinding techniques and tooth configurations, and sold at a wide range of prices.

But all you're really interested in is how well the thing works and how much it's going to set you back. So those should be the key points to consider as you approach your buying decision.

Stackable Sets vs. Adjustables
Dado tools come in two general types. A stackable dado assembly consists of two outside cutters and from two to five inside chippers. The outside cutters slice the wood, scoring and perforating it to define the edges of the channel. The width of the groove is determined by adding or subtracting the inside chippers, which shear and remove material from the center of the cut, acting much like revolving wood chisels.

An adjustable or "wobble" dado blade is a single blade equipped with offset teeth. The blade revolves on a hub and spins eccentrically. Viewed head-on, its motion creates an hourglass pattern, as the single set of cutting teeth slants from side to side to cut the groove. Adjustable dado blades vary all over the lot.

Because stack sets slice the wood, while adjustable dado blades more or less chop away at it, stackable assemblies tend to make the neatest cuts. The difference may not be as great in solid lumber, but does show up more often in plywood, where adjustable blades exhibit a greater tendency to chip or tear thin face veneers.

Since adjustable blades pivot from side to side, their cutters travel along an arc, and the bottom of the groove they cut isn't perfectly flat. This can cause problems when you try to square a cabinet as you assemble it. You could use a hand router to even things out, but you'd sacrifice speed in the process—one reason you considered buying a dado assembly in the first place.

In addition, since the adjustable blade not only has to move forward, but from one side to the other as well, the rate at which stock can be fed tends to be slower than with stack assemblies.

Before you dismiss adjustable dado blades entirely, however, consider two of their merits: they allow infinite kerf-width settings within their limits, and they're simpler to install and adjust than stack sets.

To set the width on an adjustable blade, you simply turn a dial on the hub. With a stack set, you must disassemble the dado head, add or remove chippers (and paper or cardboard washers for more precise adjustments), and then put the set back together.

Considering Carbide Blades
Any dado assembly must be sharp to work effectively. If the chippers on a stackable set dull before the outside cutters, for example, they may "hammer" the wood rather than pare it away.

Blades with carbide teeth stay sharp substantially longer than regular steel blades, offering smoother cuts in the process. Their extra initial cost may be offset by subsequent savings, since they won't have to be resharpened as frequently.

You'll find both stackable dado sets and adjustable blades offered with carbide teeth. If the carbide tips are long enough, the blade can last a lifetime.

Some manufacturers market chromate-implanted blades, which they say hold an edge better than regular carbon steel, won't scratch, and are less likely to become dogged with pitch. One manufacturer, U.S. Saw Corp./Oldham Saws, even guarantees that the blade body won't rust.

Grinding Makes a Difference
To prevent binding and overheating, a saw blade must cut a kerf wider than its body. Brazed-on carbide teeth accomplish this by being wider than the rest of the blade.
WOOD tests 14 popular dado accessories

We set out to test widely available dado accessories—both adjustable blades and stackable sets. Since dado blades should be at least 2" smaller than other saw blades, and since 10" table saws seem to be the most popular models among home woodworkers, we restricted our choices to dado assemblies with diameters of 8" or less and gathered 14 different models. (Some manufacturers chose not to participate.)

We used a 1.5 hp. Rockwell Model 10 table saw to test each dado tool. We ran stock through the saw at six to eight feet per minute, adjusting this feed rate when it was apparent that slower speeds would produce better cuts.

We selected test cuts to approximate the steps a woodworker might take in constructing a bookcase 8' long × 4' high × 1' deep with a middle divider and two end panels, all joined with dadoes. The cutting sequence was:

Cuts 1 and 2: Dado and then groove 12" of 1/4" birch plywood.
Cuts 3 and 4: Dado and then groove 12" of 1/4" red oak plywood.
Cut 5: Groove 20' of poplar lumber.
Cut 6: Groove 18' of red oak lumber.
Cuts 7–10: Repeat cuts 1–4 for before and after comparisons.

We noted each product's performance in every sequence detailed above, a synopsis of which appears below each test photograph. The photos show the actual cuts each tool produced the second time across and with the grain in red oak plywood.

Black & Decker / Model 73-560
Flat-ground steel, 6" stack set. Interchangeable cutters have 30 teeth, 5 rakers each; 5 chippers have two teeth each. Retail price: $24.99. Micro burrs on teeth had to wear off before good cuts were achieved. On second pass, birch plywood was damaged. Good cuts in oak plywood. No chipped lumber edges. Very slow feed.

Sears / Model 9-32475
Flat-ground steel, 8" stack set. Interchangeable cutters have 40 teeth, 8 rakers each; 5 chippers have 2 teeth each. Retail price: $32.99. Veneers splintered across the grain in plywood, but not with the grain. In all lumber cuts, this tool left saw marks on sides of kerf and ridges in the bottom. Small tear-outs when grooving lumber.

Sears / Model 9-3263
Carbide adjustable, 7" with 16 teeth. Retail price: $34.99. Even at a slow feed rate of 3–4 feet per minute, it chopped and splintered plywood. To get a decent cut, we had to make gradually deeper passes. In grooving lumber, the blade left saw marks in the sides, chipped the edges, and hammered (a vibration that you can hear and feel) the grain.

U.S. Saw Corporation / Oldham
Saws / Model C-800 CPD
Steel flat-ground, 8" stack set. Interchangeable cutters with 48 teeth, 4 rakers each; 4 chippers have 2 teeth each. Retail price: $41.04. Performed well in plywood and lumber, although dadoing had to be done very slowly (2–3 feet per minute). Saw marks on sides of grooves in lumber.
Sears / Model 9-3253
Steel thin-rim, 8” stack set. Interchangeable cutters with 128 teeth (no rakers) each; 5 chippers have 2 teeth each. Retail price: $42.99. Plywood cuts had smooth sidewalls, but some veneer chips. Plywood cut better after assembly did the lumber cuts. Sides and bottoms in lumber were good, but tool started to burn stock during last few feet of feed cycle. Tiny ridges were noticeable in bottom of groove.

Sears / Model 9-3261
Carbide adjustable, 7” with 24 teeth. Retail price: $44.99. Plywood was damaged during across the grain cuts even when fed at a rate slower than 2 to 3 feet per minute. Hammering was evident while cutting lumber, and grooves showed edge chipping, all at 2 to 3 feet per minute feed. More occurred at faster feed rate. Cuts improved with use of repeated pass technique.

Sears / Model 9-3262
Carbide adjustable, 7” with 32 teeth. Retail price: $49.99. Satisfactory cuts in veneer plywood required feed rate of 3 to 4 feet per minute, either with the grain or across it. In the cuts with poplar and red oak lumber, we maintained the above rate and the blade vibrated somewhat, hammered, and left saw marks on sides of cut. Some chips on edges of kerf were produced, but not significant.

U.S. Saw Corporation / Oldham Saws / Model C-800 CCD
Carbide/steel, 8” stack set. Interchangeable cutters have 18 teeth each; 4 chippers have 2 teeth each. Retail price: $96.41. This set produced a very nice cut on the first pass through birch plywood, but the second pass produced chips. It did not cut well in oak plywood either with or across the grain. Cuts in poplar and oak lumber were very good, with only minor grain tears.

Everlast Saw & Carbide, Inc. / Model DS-8 #3
Carbide/steel, 8” stack set. Non-interchangeable cutters have 18 teeth each; 4 chippers have 2 teeth each. Retail price: $162.25. Left tiny chips in birch plywood, very few across the grain in oak plywood. No chipping in cuts with grain of plywood. Nearly perfect cuts in lumber. Cutters run slightly deeper to leave “glue slots” in dadoes to lessen glue squeeze-out.

Freud USA / Model DS-308
Carbide/steel, 8” stack set. Non-interchangeable cutters have 18 teeth each; 4 chippers have 2 teeth each. Retail price: $179.95. Left-side cutter chipped plywood across grain on both passes, left tiny nicks on second pass with grain. Lumber cuts very good, with nice sidewalls. Lots of carbide on tips for extended blade life. Unit cuts well at a faster speed rate than others (6 to 10 feet per minute).
U.S. Saw Corporation / Oldham Saws / Model C-800 CHD
Steel hollow-ground, 8" stack set. Interchangeable cutters have 48 teeth, 4 rakers each; 5 chippers have 2 teeth each. Retail price: $60.48. Vibrated excessively and cut poorly so returned to manufacturer for tests. Replacement received too late to photograph, but cuts showed only slight chipping across grain, smooth cuts with grain in plywood.

Freud USA / Model AD-800
Carbide adjustable, 8" with 26 teeth. Retail price: $62.90. Manufacturer says it's not recommended for plywood, and we agree, as it chipped badly on cross-grain cuts unless fed at 2 to 3 feet per minute. Lumber cuts in poplar and oak, if done slowly, were clean and neat, with only minor side-burning of groove. This blade has a very thick hub which only allowed us a few turns of the nut on the arbor.

Sears / Model 9-3264
Carbide/steel, 8" stack set. Interchangeable cutters have 22 teeth; 6 chippers have 2 teeth each. Retail price: $89.99. Original chippers in set not bored out large enough to fit saw arbor. Replacement chippers cut shallower than outside blades so bottoms were uneven. Set produced very poor cuts in lumber and across grain in plywood even at a severely reduced feed rate of less than 2 feet per minute.

Forrest Manufacturing Co., Inc. / "Mr. Sawdust" Dado King #3
Carbide/steel, 8" stack set. Non-interchangeable cutters have 24 teeth each; three 3/4" chippers have 4 teeth each, one 3/8" chipper has 8 teeth. Retail price: $299. Minor chipping in oak ply across grain. Glass-smooth dado sides. Excellent lumber cuts if feed rate reduced slightly. Multi-toothed chippers produced neat, clean, no-mar dadoes and grooves.

Looking at our test results, you may ask, "Why buy any of these accessories if even the best won't cut perfectly in every situation?" We share your concern. Chips, however small, were left in plywood by even the most expensive dado accessories.

Acting on the advice of Jim Boelling, our Project Builder, we contacted the experts—not dado blade experts but plywood experts—and discovered two good reasons for our test results: plywood veneers are getting thinner, and plywood adhesives are getting stronger. The combination makes it more difficult today than ever before to cut clean, chip-free dadoes. Thinner veneers chip more easily. Improved adhesives that are much more durable than the wood itself make it harder for a dado blade to shear material cleanly.

Here are some tips that may help you combat these problems:
- Never force-feed your dado accessory. Feed stock only as quickly as the blade allows.
- Apply strips of masking tape to the plywood over the area of the dado, then cut through the tape. We've found that this procedure improves our cuts in many situations.
- Because of its rotary cutting action, a router may be less apt to tear thin veneers than a dado accessory under certain conditions. But you're more likely to require successive passes to achieve proper width and depth with a router, a process that increases your chances of making errors. Whenever possible, we think it's best to make cuts with a single pass.

Plywood veneers probably won't be getting any thicker in the future. Learn how to cope with thin-skinned materials now.
FACTORS AFFECTING YOUR CHOICE
When it's time to finish your project, you can narrow your choices somewhat by asking yourself these questions:

1. **How and where will the project be used?** A dining room table, for example, requires a very durable finish to withstand the spills and constant wear it will encounter in use. A picture frame, on the other hand, won't need as much protection.

2. **Should it have a natural-looking, low-sheen finish that accent the texture and grain of the wood, or a finish with depth that can be polished to a very high luster?** Even though appearance is largely a matter of personal preference, the design itself and the type of wood used should help you make the decision.

3. **How much time and effort are you willing to expend applying the finish?** While some finishes are easy to work with, others require more skill and equipment to apply correctly.

**THE TWO CLEAR-FINISH CATEGORIES**
Clear finishes today fall into one of two categories: penetrating finishes and surface (or built-up) finishes. The penetrating ones — tung oil, linseed oil, Danish oil, mineral oil, and salad bowl finishes — soak down into the pores of the wood, forming a finish that resides in the wood itself. You wipe these on with a cloth or the palm of your hand, which makes the application practically mistake-proof.

Not surprisingly, surface finishes — natural varnish, polyurethane varnish, shellac, lacquer, and latex — require some work to apply properly.

Until you have some experience with a finish, it's not possible to know for sure if you'll like what it does to a certain wood species. For this reason, always test the finish you select first on scrap.

Most woodworkers would rather spend their time making sawdust than thinking about which finish to use on their projects. That's understandable, but unfortunate because the finish you apply to your creation is vitally important. A clear finish enhances the appearance of the piece as well as protects the wood against moisture, dust, and wear.

Shopping for wood finishes these days isn't easy. A surprising array of products compete for your attention and your dollar. Therefore, the more you know about clear finishes, and what they'll do, the easier the selection process will become.
FINISHING AND REFINISHING

finishes — lay on top of the wood surface, and build up with successive coats. These either brush or spray on and usually require the use of abrasives to rub out and polish the final surface.

TYPES OF SURFACE FINISHES

Natural Varnish. This product, made from natural resins (secretions), has been used by woodworkers for years. In fact, much of the furniture you see in antique shops was probably originally finished with natural varnish because of its ability to render a durable finish capable of resisting water, alcohol, and wear. Varnish is also easily brushed on and rubbed out. Because of its amber color, it gives wood a deep, rich-looking tone.

Unfortunately, natural varnishes dry very slowly (24–48 hours). Dust problems and the faster-drying synthetic varnishes have nearly eliminated natural varnishes. Except for marine and spar varnishes, which are for exterior use, you may even have a difficult time finding a supplier that carries one.

Synthetic Varnish. Most varnishes today contain the newer synthetic resins and are known as polyurethane varnishes. These finishes have become quite popular with professional woodworkers and home hobbyists because they’re durable, moisture-resistant, and fast-drying. They also give wood the same warm tone and depth as natural varnishes. Keep in mind, though, that these extremely hard surfaces require more effort to rub out and to polish than some of the other finishes. Varathane (Pefecto), Defthane (Deft), and Zar Polyurethane (Beverlee’s) are three commonly available products in this category.

Paste Varnishes. Varnishes such as Velvit Poly Gel, Heritage Paste Varnish, and Bartley Paste Varnish offer another option when choosing a polyurethane finish. These finishes resemble petroleum jelly in consistency and are easy to apply with a rag. They share all the advantages of polyurethane finishes, without the brush mark and settling dust problems normally associated with brushed or spray-on types. Because they form a thin finish with little surface buildup, poly paste varnishes create a natural-looking, low-sheen finish.

Shellac. This finish has been used for centuries, but since it produces a relatively brittle surface with low resistance to heat, moisture, alcohol, and abrasion, you should apply it only to items that will receive little wear and exposure.

At one time, it was a favorite finish for fine furniture because it was fast-drying, easy to apply, and polished to a high luster. Its numerous disadvantages make it a less popular choice today.

Even though shellac has been replaced largely as a wood finish, it’s still used as a sealer over resins and knots to prevent stain and paste fillers from bleeding into certain finishes, such as lacquer. Parks Pure Shellac and Bull’s Eye Shellac are two brands available.

Lacquer. The fast-drying champion of finishes, lacquer is used extensively in the furniture manufacturing industry. Many companies manufacture lacquer, but those most commonly available include Deft, Parks, and Behlen. Though not quite as durable as varnish, lacquer does produce a moisture and weather-resistant finish that polishes easily to a lustrous sheen. Because of the rapid drying times (approximately 30 minutes), you’ll find spraying the most effective way to apply lacquer. Slower-drying, brushing lacquers such as Deft Clear Wood Finish and Pratt and Lambert’s Wisk On make lacquer more practical for the home craftsman. Brushing lacquers still dry quickly, so restrict their use to small projects in which you can cover the entire surface in a short time.

Because lacquer is incompatible with most other finishing materials, you must use a sealer before applying lacquer to keep oil-based stains and fillers from bleeding through the finish.

Latex Finish. Finishes such as Wood Armor (Deft) and Benjamin Moore’s Vaqua Kleer represent a new development in wood finishing. Though water-based, latex finishes form a surprisingly durable and water-resistant finish when cured. The absence of noxious odors and the convenience of water clean-up make them a joy to use.

Straight from the can, these products have a milky-white appearance that transforms into a clear film when dry. Because of this clarity, they lack the rich-looking tone produced by varnish, but the finish is appropriate where minimal color change is desired. You can brush latex finishes on easily, but they don’t respond well to polishing or hand rubbing, so removing imperfections will be more difficult. Despite these shortcomings, in situations where ventilation or the use of traditional solvent-based products presents a problem, latex finishes provide you with a viable alternative.

PENETRATING OIL FINISHES

Tung Oil. A centuries-old finish, that’s enjoying great popularity today, tung oil comes in two forms — pure tung oil and polymerized tung oil. Of the two, polymerized dries much faster and has more luster. Both have a light golden color that imparts just the right amount of tone to accent the grain and texture of wood surfaces. And both form a moisture-resistant, durable coating that dries to a hard, solid film.

To apply tung oil, simply wipe it on with a cloth, let it set for several minutes, then remove the excess.

Several companies manufacture tung oil finishes — Southerland Welles, Formby, Parks, and the Hope Company.

Linseed Oil. Even though this old-time favorite yields a finish that looks “hand-rubbed,” it has some shortcomings that limit its use. In addition to its tendency to deepen

Continued
## WHEN TO USE WHICH CLEAR FINISH

<table>
<thead>
<tr>
<th>Item type</th>
<th>Brand or Type Finish</th>
<th>Finish Category</th>
<th>Qualities</th>
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<tbody>
<tr>
<td><strong>Toys</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Watco Danish Oil</td>
<td>Penetrating</td>
<td>Nontoxic (after 30 days), durable and easily repaired, natural-looking, low sheen</td>
</tr>
<tr>
<td></td>
<td>Behlen's Salad Bowl Finish</td>
<td>Penetrating</td>
<td>Durable, natural-looking, satin sheen</td>
</tr>
<tr>
<td></td>
<td>Numerous Latex Finishes</td>
<td>Surface</td>
<td>Hard, durable, good depth, dries very clear</td>
</tr>
<tr>
<td><strong>Food Contact Items</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Behlen's Salad Bowl Finish</td>
<td>Penetrating</td>
<td>Highly resistant to moisture and food substances, natural-looking satin sheen, easily renewed</td>
</tr>
<tr>
<td></td>
<td>Watco Danish Oil</td>
<td>Penetrating</td>
<td>Nontoxic (in 30 days), durable, easily renewed, natural-looking, low sheen</td>
</tr>
<tr>
<td></td>
<td>Mineral Oil</td>
<td>Penetrating</td>
<td>Some moisture resistance, little wear protection, easily renewed, very low luster</td>
</tr>
<tr>
<td><strong>Low-Use Furniture</strong></td>
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<td></td>
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<tr>
<td></td>
<td>Lacquer</td>
<td>Surface</td>
<td>Moderately durable, rich-looking, easily polished to luster</td>
</tr>
<tr>
<td></td>
<td>Latex</td>
<td>Surface</td>
<td>Good depth and durability, adds no tone</td>
</tr>
<tr>
<td></td>
<td>Paste Varnish</td>
<td>Surface</td>
<td>Good durability, tones wood lightly, low build-up, hand-rubbed look, easily applied and repaired</td>
</tr>
<tr>
<td></td>
<td>Tung Oil</td>
<td>Penetrating</td>
<td>Durable, moisture-resistant, non-darkening, low luster natural appearance, easily applied/renewed</td>
</tr>
<tr>
<td></td>
<td>Danish Oil</td>
<td>Penetrating</td>
<td>Durable, easily repaired, warm tone, natural-looking, slightly more sheen than tung oil</td>
</tr>
<tr>
<td></td>
<td>Oil/Varnish Mix</td>
<td>Penetrating</td>
<td>Extremely durable, natural appearance, easily, more protection and sheen than oil alone</td>
</tr>
<tr>
<td><strong>Hard-Use Furniture</strong></td>
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<tr>
<td></td>
<td>Polyurethane Varnish</td>
<td>Surface</td>
<td>Excellent durability, high moisture and wear resistance, good depth, various lusters, lightly tones wood</td>
</tr>
<tr>
<td></td>
<td>Paste Varnish</td>
<td>Surface</td>
<td>Comparable to above in durability, less surface build-up, natural-looking, easily applied/repaired</td>
</tr>
<tr>
<td></td>
<td>Oil/Varnish</td>
<td>Penetrating</td>
<td>Good durability, moisture resistance, satin luster, natural-looking, easily applied/repaired</td>
</tr>
<tr>
<td><strong>Antiques</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oil/Varnish Mix</td>
<td>Penetrating</td>
<td>Good durability, hand-rubbed look, natural, satin luster, lightly tones wood, easily applied/repaired</td>
</tr>
<tr>
<td></td>
<td>Paste Varnish</td>
<td>Surface</td>
<td>Hand-rubbed look with slight surface build-up, good durability, adds warm tone, easily applied and repaired</td>
</tr>
<tr>
<td></td>
<td>Tung Oil</td>
<td>Penetrating</td>
<td>Durable, adds light tone, low luster, hand-rubbed look</td>
</tr>
<tr>
<td></td>
<td>Linseed Oil</td>
<td>Penetrating</td>
<td>Some durability, deepens wood tone, very low luster, hand-rubbed look</td>
</tr>
<tr>
<td><strong>Outdoor Projects</strong></td>
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</tr>
<tr>
<td></td>
<td>Spar or Marine Varnish</td>
<td>Surface</td>
<td>Exceptionally durable, highly moisture resistant, deepens wood tone, builds depth, high gloss</td>
</tr>
<tr>
<td></td>
<td>Exterior Polyurethane</td>
<td>Surface</td>
<td>Durable and long-lasting, highly moisture-resistant, looks very similar to natural varnish</td>
</tr>
<tr>
<td></td>
<td>Varathane Plastic Oil</td>
<td>Penetrating</td>
<td>Durable and long-lasting, easily renewed, satin sheen, natural-looking</td>
</tr>
</tbody>
</table>

*Continued on page 121*
Old-fashioned elegance with lots of appeal.

Building the Mirror Frame
1 Rip the oak and walnut stock to width for parts A, B, C, and D. Cut the parts to length plus 1". Lay the pieces together on a flat surface in the arrangement that they will be glued and check for a good fit.

2 Glue and clamp the A-B and the C-D assemblies together sandwich-fashion. Space the clamps evenly about 4" to 5" apart to ensure an even, invisible glue line. (We spread the glue with an old playing card. Then we used bar clamps, alternating the clamps on the top and bottom of the pieces to prevent warping.) After the glue has dried, remove excess and trim the assemblies to their finished length.

3 Cut the corner blocks (E) to 3" square, with the grain running diagonally as shown in the Cutting Diagram. On a flat surface, fit all the frame parts together, then mark the location of the dowels that will join the corner blocks to the A-B and C-D assemblies. Drill ⅛" holes ½" deep.

4 Mark and cut the ⅛" inside radius on the E parts (See Detail 1). Sand this arc smooth, then glue and clamp the mirror frame together. After the glue has dried, remove the excess.

5 Mark and cut the outside radius on the E parts. Sand all surfaces and edges smooth.

6 Rout a ⅜" rabbet ⅜" deep on the backside of the frame for the mirror and backing. Square the corners with a chisel. Rout a ¼" round-over on all outside edges, then rout a ⅛" Roman ogee on the front inside edge. (See the Frame Corner Section.)
7 Cut the hardboard backing (F) and the mirror stops (G, H) to size. Drill \( \frac{1}{8} \)" pilot holes through the walnut pieces (G, H) (see the drawing for positioning). Form I, using either a walnut dowel or a walnut plug, then drill a \( \frac{3}{16} \)" hole through the center.

**How to Make the Stand**

1 Rip parts J, K, L, and M to width. Laminate the vertical supports (J, K) and the cross support (L, M) as you did the frame parts in step 2 earlier. After the glue has dried, trim to the finished length.

2 Mark and cut a 1\( \frac{1}{2} \)" radius on one end of each vertical support (J, K), and drill two \( \frac{3}{8} \)" dowel holes 1\( \frac{5}{8} \)" deep in the opposite end of each. Drill a \( \frac{3}{16} \)" hole through each upright at the center point of the radius. Center and dry-clamp the cross support between the uprights. Mark the location of the dowel holes on the uprights and cross support. Drill two \( \frac{3}{8} \)" dowel holes 1\( \frac{5}{8} \)" deep in each end of the cross support and corresponding holes in one side each of the vertical supports.

3 Cut the mirror's legs (N) to 5" x 23\( \frac{1}{2} \). Then, while the pieces still have a flat bottom and top, center an upright on each leg and mark
and drill two ⅜" dowel holes 1⅛" deep, corresponding to those in the vertical uprights. Cut N to shape.

4 Sand the stand parts smooth and rout the legs, cross support, and vertical supports, using a ¼" round-over bit.

5 Glue and clamp the stand pieces together, being careful to maintain squareness. Finish-sand the frame and stand assemblies. Finish as desired.

6 Install the mirror and the hardboard backing. (We placed red rosin paper between the mirror and hardboard to prevent the mirror silver from scratching. Heavy brown wrapping paper will also work.) Mount the mirror frame to the stand, using the 2½" brass screws, finishing washers, and the walnut pieces (I).
HOMEMADE TOOL

QUICK-

A $10 pipe clamp fixture makes this workbench vise inexpensive, easy to build, and even easier to use.

NOTE: We dimensioned this vise for a bench top that measures 2" thick x 30" wide (25" table with a 5" tool tray). If your workbench has a different thickness and width, you’ll have to adjust the figures accordingly.

<table>
<thead>
<tr>
<th>Part</th>
<th>Finished Size*</th>
<th>Material</th>
<th>Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2½&quot; x 4&quot; x 25&quot;</td>
<td>maple, laminated</td>
<td>1</td>
</tr>
<tr>
<td>B</td>
<td>1½&quot; x 4&quot; x 30&quot;</td>
<td>maple</td>
<td>1</td>
</tr>
<tr>
<td>C</td>
<td>1½&quot; x 1½&quot; x 11½&quot;</td>
<td>maple</td>
<td>1</td>
</tr>
</tbody>
</table>

*Some parts are cut larger initially, then trimmed to finished size. Please read instructions before cutting.

Supplies: 2—3¼" x 24" steel bars, 1—650 Jorgensen clamp fixture, 1—¾" x 26" black pipe (threaded at both ends), 2—#8 x 1" flathead wood screws, 5—#12 x 3" flathead wood screws, 2—#8 x 2½" flathead wood screws, ½" dowel ¾" long, 1" dowel 14" long (enough for 6 bench dogs), ¼" pipe cap.
Building and Installing the Vise

1. Rip the 1\(\frac{3}{8}\)"-thick maple to 4" for parts A and B. Crosscut two 26" pieces for A and one 30" piece for B. Glue and clamp the two 26" lengths together to form A.

2. Bore two 7/8" holes for the guide rods and one 1\(\frac{3}{4}\)" hole for the black pipe through B (see the dimensioned Rear Jaw in the drawing on the opposite page for positioning).

3. After the glue has dried and you've removed any excess, trim A to 25". Scribe a 1" radius on the two front corners, and cut on the bandsaw. Clamp A to B and, using the previously drilled holes in B as a positioning template, mark the corresponding holes on A. Bore a 1\(\frac{3}{4}\)" hole completely through A for the 3/4" black pipe. Bore two 7/8"-diameter holes 1\(\frac{3}{4}\)" deep for the guide rods.

4. Screw mount the pipe clamp hardware onto parts A and B. (We used the pipe clamp itself to align and hold A and B together. Then, using a 7/8" metal-cutting bit, we drilled one hole through each piece of hardware and installed the \#8 x 1" wood screws.)

5. Cut a guide block to size (see the Guide Block in the drawing on the opposite page) and drill holes as dimensioned. The guide block should be mounted about 6" from B on the underside of the workbench. These holes must line up with the ones in A and B to prevent the rods and pipe from binding. (As it turned out, the upper leg rail on our bench was positioned perfectly for this purpose, eliminating the need for constructing a guide block.)

6. Glue and screw mount B to the bench. (We countersunk 5 equally spaced 12 x 3" wood screws through B into the workbench end.)

7. Using a router and a 1/2" round-over bit, rout the outside edges of A. Sand A and B smooth.

8. Fit the guide rods into A, then use a 7/8" metal-cutting bit to drill a hole into A and just through each guide rod (approximately 1\(\frac{3}{4}\)" deep). Now, using a 3/4" bit, drill a 2\(\frac{3}{4}\)"-deep hole in A through the 3/4" hole. Install \#8 x 21/2" screws to hold the guide rods in place.

The Quick-Release Lever

1. Cut part C to size. Transfer the pattern at left to 1" graph paper, then onto part C. Drill a \(\frac{1}{8}\) hole through it and cut the lever to its finished shape.

2. Screw the black pipe into the clamp fixture on A. Install the black pipe and guide rods through the holes in B, the release lever, and through the guide block.

3. Position and bore a \(\frac{1}{4}\)" hole 1" deep in the table bottom and install a \(\frac{1}{4}\)" dowel 3/4" long to prevent the release lever from sliding along the guide rod. Screw the pipe cap to the black pipe. Choose and apply finish. (We finished all the parts with tung oil.)

Note: To use the vise, pull the release lever toward part B and pull out on the vise. Once you have reached the length needed for clamping, release the lever and give the clamp a quick jerk to set the tailstop on the 3/4" black pipe. Insert the project to be clamped and tighten the screw handle.

Bench Dogs and Dogholes

1. To clamp large projects easily, cut 1"-diameter dogholes 1/4" deep in part A as shown in the drawing, then drill corresponding holes at regular intervals along the bench top. (We placed our first bench-top doghole 4" in from B and cut the others at 10" intervals.)

2. Cut the bench dogs 2\(\frac{3}{8}\)" long and then cut a 1/4"-long notch 1/4" deep in one end of each. We clamped each dowel in a handscrew and cut notches on a band saw.
This drill-press stand measures 38" high, 19¾" deep, and 15" wide. If you prefer a different height, change the width of pedestal pieces O and P to raise or lower the pedestal top.

To construct the stand, assemble the cabinet carcass (A–F) as shown. Use dowel joints to build the face frame (G–I). Glue and nail the face frame to the cabinet. Build and fit the door (I) and drawer (K–N).

Construct the pedestal (O, P) and top (Q–S). Countersink and screw the top to the pedestal, and the pedestal to the cabinet. Cover the top with laminate. Use carriage bolts to bolt your drill press through the top (Q) and through the cabinet top (A) for a sturdy support. Paint, let dry, and attach pulls and hardware.
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A thread box is the craftsman's tool for cutting external threads on a wooden dowel. The corresponding size tap cuts the matching internal thread.

The beautiful Conover thread box combines contemporary technology and metallurgy with fine wood, polished brass and a time-tested design that is easy to use. And it really works. The original tool from which this design was adapted has been in regular use for more than a century.

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The Conover Thread Box Kit comes with all parts fully machined. Holes are drilled, slots are milled and the thread aluminum insert, which extends the wear life of the thread box indefinitely, is placed in the center hole. The kit includes the sharpened cutter blade, cutter holder and all other metal parts plus the tap, sharpened, and ready to use.

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Print this article
buying wood by mail

Finding the right materials is a predictable problem whenever you start an unusual woodworking project. The farther you live from big-city specialty stores, the bigger the problem, because most lumberyards can't afford to stock seldom-requested hardwoods or veneers.

You face a difficult choice: seek out and visit the nearest supplier, whose store may be hundreds of miles away, or send for catalogs published by mail-order wood merchants and let them come to you.

Mail-Order Advantages
Because they sell to customers throughout the nation and even around the world, the dozen or so companies marketing wood products by mail in the United States can offer selections that far exceed local suppliers. Constantine's in New York stocks the largest selection of veneers in the world, according to Glenn Docherty, vice president of the 172-year-old company. "We are very competitively priced because we buy our veneers from long-term sources all over the world," he adds.

Buying by mail is convenient. Drop your order in the mail (or place it by phone, if you're in a hurry) and your materials will usually arrive within a week or ten days. If you're willing to pay extra for air freight, your order will reach you in a day or two. Most dealers accept payment by charge card.

Because their success depends on repeat business, dealers in the field emphasize high-quality products, reliable, prompt service, and satisfaction guaranteed.

Says Ann Rockler Jackson, president of The Rockler Woodworkers' Store in Rogers, Minnesota, "If a customer is unhappy with our merchandise, he returns it and we refund his money. We just take everything back."

Disadvantages
When you're ready to buy, you probably want the product right now. So one drawback to buying by mail is having to wait to receive your purchases. And before you can even place an order, you need to locate a wood-by-mail source. To help you with this not-overly-easy chore, we've compiled a listing of over 20 such firms, beginning on page 95. You may also be able to uncover other outlets by looking in the various other woodworking publications.

Also, there's nothing quite like holding one piece of wood to compare it with other boards. Naturally this isn't possible by mail order. Instead, you're limited to thumbing through a catalog.

Moreover, you usually have to send for the catalog first, and include a dollar or two to cover postage and handling. But in most cases, the dealer will refund the charge with your first order.

Some mail-order merchants require their customers to meet minimums—50 board feet of each type of wood bought, perhaps, or a minimum dollar amount. (Others will sell wood by the linear inch.)

Continued on page 94
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LUMBER BUYMANSHIP

Continued from page 92

buying wood by mail

Other things you should know

Even the most clearly written, best-illustrated catalog may not answer all your questions about a product. To avoid misunderstandings, it's important to be knowledgeable about the product.

"The worst thing we run into is the occasional novice who does not understand what a board foot is or that hardwoods come in random widths and lengths," comments Bob Carr, president of Educational Lumber Company, Inc., Asheville, North Carolina.

"We kind of screen the customers. If they don't understand how things work, we suggest books they can buy and read to get started," he adds.

Plan your materials needs carefully so you will order enough but not too much. "When you contact the supplier, include a brief description of what you're going to build, including major dimensions," suggests Jay McBride, owner of World Timbers, in Los Angeles, which specializes in exotic woods.

"If you call in and say you want a piece of rosewood 2 inches thick by 12 inches wide by 8 feet long, I'll want to know how you will use it. Perhaps you'd end up cutting it down into pieces 12 inches long, 3 inches wide and so on. I may be able to suggest alternatives that better fit the use and save you money," McBride says.

When your order arrives, check it immediately to make sure you received everything you ordered and in good condition. If part of the order is missing or damaged, contact both the merchant and the post office or delivery service immediately so the supplier can make up the difference or retrieve the damaged goods and replace them with sound ones.

"Buying by mail order is fast, safe, and convenient," Ann Rockler Jackson points out. "And for out-of-the-ordinary items, it's often practical, too."
LUMBER BUYNMANKSHIP

Continued from page 94

Mail-Order Lumber Outlets
Here are a number of direct-mail outlets for lumber supplies of all kinds. The letters at the end of each listing relate to the legend below and indicate the company's specialties.

LEGEND:
V = Veneers
P = Plywood
T = Turning stock
H = Hardwoods
S = Softwoods
TS = Thin stock

American Woodcrafters
1025 South Roosevelt, Dept. W
Fiqua, OH 45356
515/773-7414 X291
Free Catalog
V, T, H.

Black Mountain Wood Co.
P.O. Box 3525, Dept. W
Portland, ME 04104
207/772-3332
Price list: $1
P, T, H, S.

Boulter Plywood
24 Broadway, Dept. W
Sonderville, MA 02145
617/666-1340
V, P, H, S.

Certainly Wood
1261 Centerline Rd., Dept. W
South Wales, NY 14139
716/655-0206
Free Catalog
V, P, H, TS.

Condon, Maurice L., Co., Inc.
248 Ferris Avenue, Dept. W
White Plains, NY 10603
914/946-4111
P, T, H, S.

Craftsman Wood Service Co.
1735 W. Cortland Ct., Dept. W
Addison, IL 60101
312/629-3100
Catalog: $1
V, P, T, H, TS.

Craftwoods
10921 York Road, Dept. W
Cockeysville, MD 21030
301/667-9663
Catalog: $2

Free price list
V, P, T, H, S, TS.

Cryder Creek Wood Shoppe Inc.
101 Commercial Avenue, Dept. W
Whitesville, NY 14897
607/356-3303
Free catalog
T, H

Educational Lumber Co., Inc.
P.O. Box 5373, Dept. W
Asheville, NC 28813
704/255-8765
Catalog: $1
V, P, T, H, S.

General Woodcraft
100C Blinman Street, Dept. W
New London, CT 06320
203/442-5301
V, P, H, S, TS.

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3. Iron hooves, fitted to the handle ends, inhibit splitting.
4. Japanese red oak handles are long lasting and aesthetically pleasing.

What are the specs?
Overall length: 9" Blade length: 2 1/4" Sizes (converted from mm) 1/8", 1/4", 3/8", 1/2", 9/16", 3/4", 7/8", 1", 1 1/4", 1 1/2"

Our regular, low everyday price is $94.95 per set. Now, you can benefit from our goof and own these magnificent tools for only $74.95. This offer expires when present stock has been depleted or 31 Dec. 1984, whichever comes first.

Why the big discount?
We keypunched the wrong item number on the telex and received thousands of 10-piece laminated steel sets instead of the sets we wanted. Even for us, that's way too much.

What are laminated steel chisels?
During the forging of these chisels, a very hard (Rockwell 64-66C) high carbon, alloy steel (the blade) is fused to a very soft steel (the upper body).

What are the advantages of this production method?
What emerges is a tool capable of receiving and holding an extremely hard edge. Without the soft, upper body's ability to absorb the shock of mallet blows, the extraordinarily hard edge would be impractical.

Does your regular 90-day guarantee apply to the special offer?
Definitely! Everything we sell at The Fine Tool Shops is unequivocally covered by our 90-day guarantee of satisfaction. If you are anything less than delighted, return the product to us for a full and immediate refund, including the return postage.

For your entire order, add Shipping & Handling only $2.10 Connecticut residents add 7% sales tax

OK, Fine Tool Shops, I'm sold. Ship the following chisel sets at the special price of $74.95 — a 20% saving.
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- 100-0140 Pecilat Honing Guide, Reg. $11.95 only $7.95
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or MAIL TO:
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Danbury, CT 06810
NAME
ADDRESS
CITY STATE ZIP
SIGNATURE
For your entire order, add Shipping & Handling only $2.10 Connecticut residents add 7% tax
LUMBER BUYNASHIP

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W O O D  B Y  M A I L

Hardwoods of Memphis
P.O. Box 12449, Dept. W
Memphis, TN 38112-0449
TN, call collect
901/452-9663
800/452-5339
V, P, T, H, TS.

Henegan's Wood Shed
7760 Southern Blvd., Dept. W
West Palm Beach, FL 33411
305/793-1557
Free price list — send SASE
V, T, H, S, TS.

Iaccarino & Son
200 Shrewsbury St., Dept. W
Boylston, MA 01505
617/869-2791
800/222-1420 (New England only)
Free catalog
V, P, T, H, S, TS.

Kaymar Wood Products, Inc.
4603-35th S.W., Dept. W
Seattle, WA 98126
206/932-3584
Free price list
V, T, H, S, TS.

Morgan Woodworking Supplies
1123 Bardstown Road, Dept. W
Louisville, KY 40204
502/456-2545
Free catalog
V, H.

Native American Hardwoods Ltd.
R 1, Dept. W
West Valley, NY 14171
716/942-6631
Price list: $1 (refundable)
T, H, TS.

Real Woods
215 Forrest St.
P.O. Box 908, Dept. W
Metuchen, NJ 08840
201/494-3730
V.

Talarico Hardwoods
Box 303, RD 3, Dept. W
Mohnston, PA 19540
215/775-0400
V, T, H, TS.

Tropical Timber Corp.
3125 Van Water, Dept. W
Portland, OR 97222
503/684-5349
Free price list
T, H.

Weird Wood
Box 190WBH, Dept. W
Chester, VT 05143
802/875-3535
Catalog: $1
T, H, S.

Willard Brothers Woodcutters
300 Basin Road, Dept. W
Trenton, NJ 08619
609/890-1990
Free price list
V, P, T, H, S, TS.

Woodcrafters' Supply
7703 Perry Hwy. (Rt 19), Dept. W
Pittsburgh, PA 15237
412/367-4330
Catalog available 1st of year
V, T, H, TS.

Wood Shed
1807 Elmwood Avenue,
Dept. W
Buffalo, NY 14207
716/876-4719/20
Catalog: $1
V, P, H.

(A) Woodworker's Dream
10 W. North St.
P.O. Box 329, Dept. W
Nazareth, PA 18064
800/345-3103
Free price list
V, T, H, S, TS.

Yukon Lumber Co.
520 W. 22nd Street,
Dept. W
Norfolk, VA 23517
804/625-7131
Free Catalog
V, P, T, H, S, TS.

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<table>
<thead>
<tr>
<th>BEST CUT</th>
<th>ITEM NO.</th>
<th>DESCRIPTION</th>
<th>RADIUS</th>
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<th>PRICE</th>
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<td>1&quot;</td>
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<td>#02</td>
<td>3/8&quot; R</td>
<td>3/8&quot;</td>
<td>1 1/8&quot;</td>
<td>9/16&quot;</td>
<td>14.00</td>
</tr>
<tr>
<td></td>
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Today, through increased world trade and an international hardwood lumber industry, exotic woods are more commonly available to the home woodworker. One, however, is still so rare that when offered for sale its price is by the ounce. And that wood is pink ivory.

Noted for its color and pearl-like luster, pink ivory remains a real treasure among wood connoisseurs. Growing on rocky soil in the arid, remote areas of Transvaal and Natal, two provinces in South Africa, this tree for centuries has been sacred to the Zulu tribe. By tradition, only a chief can fell a pink ivory tree, and then only when his son reaches manhood. To mark the occasion, the young Zulu fashions a spear from the wood. The pink ivory remaining decays or is burnt. Anyone of lesser stature possessing the sacred wood may be killed.

According to the South African government, only about 50 pink ivory trees remain in native areas. This rarity, plus the conditions of its harvesting and the penalties attached to its possession, make pink ivory's high value easy to understand.

Some pink ivory does find its way into the outside world through clandestine means, but never in commercial quantities. A traveler to Johannesburg may be lucky enough to purchase a pair of small earrings, or a chunk of pink ivory from an international collector. But even in this trading center, it's easier to locate quality diamonds than this precious wood, which currently sells for about $1.50 an ounce.

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tools and tool collecting

Saws have cut their way through recorded history, even as far back as the Stone Age, when tool builders chipped crude saws from stone. As new technologies emerged, craftsmen gained greater control over their work, producing successive generations of improved saws from copper, bronze, and then iron. None of these saws was very efficient; however, and all required frequent sharpening.

Iron-working methods continued to improve, and saw plates were made thinner and stronger. But as the plates got thinner, the saws tended to kink on the push stroke. So, from the sixteenth to the mid-eighteenth century, the teeth on most saws were arranged to cut on the pull stroke only, a design still used by Oriental saw makers.

When steel was introduced to toolmakers, it finally became possible to manufacture extremely strong and resilient saws. Because the English led the world in early steel technology, they manufactured the finest saws.

But when U.S. manufacturers set their sights on challenging Britain’s industrial supremacy in the nineteen century, several American saw makers set out to make superior products. Henry Disston, a member of this group, was so successful that his Disston “London Spring” saws continue to sell for premium prices ($65-$85) today—both in the U.S. and England!

As you can see in the photo, you can bend one of these beauties into a complete circle, then release it, and it will snap back straight as a die. Try that with any other saw, if you dare.

Several years ago, a carpenter in northern Vermont was asked to comment on his “London Spring” saw. “The best saw I’ve ever used,” he said. “It doesn’t even leave any sawdust.”
Continued from page 78

dado blades

but other blade types require different solutions.

With the least expensive method, called flat-grinding, manufacturers machine the blade to a constant thickness, then bend or “set” its teeth alternately—first to one side and then to the other—so that when the blade is in motion, the saw kerf is effectively wider than the blade’s body.

Another option is hollow or taper grinding. Teeth are left at the original blade thickness, and the steel between them and the arbor hole is ground away to make a thin body. The process produces smooth-sawing blades that, in some instances, perform as well as more expensive carbide-tipped blades.

On a thin-rim blade only a portion of the blade body is ground away. This limits the blade’s maximum depth of cut.

Tooth Numbers and Configuration

Up to a point, the odds for producing sharp, no-fuzz, no-splinter dado cuts increase with the number of teeth on the dado assembly. The best (and most expensive) dado head we tested was a stack set with 24 teeth on each outside cutter. It came equipped with star-shaped inside chippers with as many as eight teeth.

You shouldn’t choose a dado assembly by focusing on a single variable, however. The configuration of the teeth can be just as important as their number.

On adjustable blades, the two work in tandem. To cut the entire groove, the tops of some teeth need to be beveled in one direction, and others must be angled the opposite way. The angle of the bevel shifts slightly from one tooth to the next. The more teeth, the subtler the shift, and the smoother the cut.

On stackable sets, the inside chippers have square or flat-topped teeth. If the outside cutting blades can be used on either side of the set, they are top beveled in alternate directions. On the best stack set we tested, each cutter is designed for a specific side of the assembly and is top beveled in one direction only. Top-performing cutting blades also have flat-topped rakers interspersed between the cutting teeth for sawdust removal.

With carbide-tipped blades, we found that the sharper the bevel’s angle, the cleaner the kerf. A very steep angle may dull comparatively quickly, however.

Additional Purchase Points

Dado assemblies put a great deal of strain on saws. To avoid overloading or possibly damaging your saw’s motor, choose a product that is at least 2” smaller in diameter than your normal saw blade.

Make sure that the assembly fits your saw’s arbor—and not just its diameter. Dado blades should be securely fastened to the arbor. The assembly shouldn’t be so wide that you can only tighten the arbor nut a few turns.

Finally, remember that an adjustable blade or stackable set won’t work with a normal table saw insert. You’ll need to construct or purchase an insert to fit your assembly.
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simple cabinet desk

shown on page 76. Test all cuts on scrap lumber before cutting the oak fronts.

3 After sanding all parts, glue and clamp the drawer fronts and the door front together. Work on a flat surface to keep the fronts flat and square when clamping.

4 Cut the drawer ends (M) and sides (N) from the pine drawer-side material. Cut a 1/2-inch rebate 1/4-inch deep in the sides (M) to receive the ends. Cut the drawer bottoms (O) and dry-clamp the drawers together to check for proper fit. Adjust if necessary, then glue and nail M, N, and O together. (We used three 4d finishing nails at each corner.)

5 Attach drawer-slide hardware to the drawer-slide mounting blocks and to the drawer sides, following the directions supplied with the slides. After installing the drawers, center the drawer fronts on the face-frame openings and attach to the drawers. (We drove four #8 x 1" wood screws into each drawer front.

6 Mark and drill pilot holes for mounting the hinges on the door and face frame. (You'll attach the hinges after varnishing). Mark and drill holes for the drawer pulls on the front of each drawer. Drill holes for two door pulls to match those on the two lower drawers opposite. (Pulls should be mounted after finishing.)

Laminating the Top

1 Cut the particleboard (P) to size. Cut both the plastic laminate top (Q) and the balance sheet bottom (R) to size plus 1" on all four sides to allow for edge trimming and positioning error. (Balance sheet, a plastic sheet goods, stabilizes laminated assemblies to prevent warping or bowing.)

2 Following the manufacturer's instructions, apply two coats of contact cement to the laminate and the particleboard.

3 Position and apply laminate with extreme care: once the two surfaces touch, they can't easily be repositioned. (We called on two people for this operation. We placed waxed paper between the surfaces until they were properly aligned, and then, starting at one end and working toward the other, removed the waxed paper. To ensure good adhesion between the particleboard and laminate, we used a mallet and block of wood, and working from one end to the other, hammered the surfaces.)

4 Follow the same procedure to apply the balance sheet to the bottom of the particleboard.

5 Use a router equipped with a laminate trimmer to trim the laminate and balance sheet flush with the particleboard. Glue and nail decorative molding (Q, R) to the front and sides. (If you plan to position the desk away from a wall, you'll want to trim the back edge with molding, too.)

6 With the desk top facedown on a flat surface, set the cabinets (without drawers), also upside down, on it. Position the cabinets so they are flush with the back of the top and about the molding at each end. Cut positioning blocks (U) and set one block in place at the four inside corners of each cabinet. Glue and screw-mount the blocks to the underside of the desk top. Turn the cabinets and desk top right side up. The blocks act as guides so that the top sits in place on the cabinets.

7 Set all nails and fill nail holes with wood putty. Sand the wood surfaces smooth and finish as desired. After the finish has dried, attach hinges and the door pulls. Hang the door.
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To construct the holder, cut the front and back pieces to length and width, ripping one edge of the front piece at a 25° angle.

Then, mark the hole locations. (We laid out four rows and spaced 14 holes 1" apart in each row. We chose ¼" holes ½" deep for the first two rows; ½" holes ¾" deep for the third row; and ¾" holes 1" deep for the last row. Check your inventory of drill bits to see if these dimensions will work for you.)

When you drill the holes, also drill a ½" hole in each corner of the back piece for wall mounting. Glue the angled edge of the front piece to the back. (We beefed up our holder by gluing a block against the back, under the angled front piece.) Mount the drill bit holder using four #10×1½" wood screws with finishing washers.

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ASSOCIATIONS YOU SHOULD KNOW ABOUT

THE WARD FOUNDATION

Woodworkers form a vast network of individuals who are eager to share knowledge, skills and experience with one another. This desire to trade information has spawned a variety of membership organizations devoted to woodworking specialties of all kinds.

Some people consider wildfowl carving and painting a craft, but to the members and staff of The Ward Foundation, it's an art—the only art form, they say, that is native to North America.

Named in honor of Steve and Lem Ward, brothers considered to be pioneers of decorative bird carving, the nonprofit organization is dedicated to wildfowl carving and painting, and to the historical, educational, and environmental aspects of the art.

According to organization officials, decoy carving had reached a plateau by 1968. There were good carvers around, but they were widely scattered across the nation, and new carvers weren't being attracted to their ranks. To remedy the situation, a group of carvers started The Ward Foundation and set out to establish a museum and programs for wildfowl artists.

Today, through international competitions, exhibitions, seminars, workshops, and a museum program, the association has fostered a resurgence of interest in wildfowl carving and painting. New carvers—who design their work "to be a bird"—have picked up the skills of older masters, whose sole purpose was to create a decoy that would "catch a bird."

The Ward Foundation supports the North American Waterfowl Art Museum, a Salisbury, Maryland, institution that tells the story of decoy and wildfowl carving through displays of classic hunting decoys and works by today's carvers. Dioramas, video presentations, and interpretive exhibits re-create the world of wildfowl at the museum.

The foundation's 16th Annual World Championship Wildfowl Carving Competition will be held in Ocean City, Maryland, April 25-28, 1985. Hundreds of carvers and painters will compete for cash prizes and international recognition in a number of categories. Techniques will be studied, works will be sold, and information will be traded at the annual event, which, in addition to carvers, attracts collectors and people who are simply interested in wildlife art.

Individual membership in The Ward Foundation is $20 a year. Family memberships cost $30. Members receive a free quarterly magazine, free museum admission, discounts on museum purchases, and window decals.

For information and membership application, contact:
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WOOD MAGAZINE JAN./FEB. 1985

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Continued from page 56

**color me safe**

hole in the center of each dial, using the center point as a drilling guide. We made the jig shown below to hold the dials for drilling. First, we bored a 1½" hole ½" deep into a scrap of wood clamped to the drill press table. Without moving the clamped jig, we removed the 1½" bit and inserted a ½" bit in its place. (If the dials turn during drilling, line the ½" hole with sandpaper and tap the dials into it.)

3 Move the jig slightly and drill a ⅜" hole through the dials alongside the ½" hole. Chisel the edges between the ½" and the ⅜" holes to clean the notches.

4 Using the color-dot guide marks for reference, drill ⅜" holes around the perimeter of each dial. (We used the jig shown below and a depth stop to drill the holes ⅜" deep.)

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**5 Mark the location of the lockbolt sliding pin (G). Do the same for the lock pins (I). To do this we slid the lock bolt through the holes in parts D and E, so that the bolt protruded ½" beyond the edge of**
D. Then, working from the back side of the safe door, we marked the position of the lock pins on the dowel, centering the marks over the tongues separating the dial notches. Finally, working from the door's front side, we made a mark at the far right-hand side of the slot to position the knob shaft (G).

6 Remove the lock bolt from the door and drill %" holes %" deep to accept all the lock pins. The pins must be in a straight line that is offset 180° from the knob shaft. (We clamped the lock-bolt dowel in a handscrew and drilled the hole on a drill press, again using the depth stop for consistent depths.)

7 Paint the color codes on the dials (I), keeping in mind that the color that opens the lock is opposite the notch in the dial. (We used model car paints in eight distinct colors.)

8 Dry-fit the lock mechanism, checking for smooth operation. You may have to sand or file the parts to achieve the proper movement.

9 Spread a small amount of paraffin on the lock bolt, the holes and notches in the dials, and the holes in parts D and E to ensure a smooth sliding action. Then, reinstall all the lock parts, and carefully glue parts G and I into the lock bolt. Form the wooden knob (K) from a %" dowel. Drill a %" hole %" deep in the knob; glue onto G.

10 Cut the faceplate (L) and check its fit over the tumblers. Make sure the dials turn freely before screwing the plate to the door.

11 Install the door. Glue the door stop (M) in place so door closes flush with the front of the safe.

12 Sand and varnish the safe. (Be careful to keep finish off the moving parts.) Attach rubber feet to the bottom of the safe.

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Continued from page 54

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1. Math mistakes. Reading rules and tapes incorrectly may be the most common mistake. To save wood and temper, "Measure twice, cut once."

A related math problem concerns fractions. Some people become error-prone when they have to add 1 1/2" plus 3 3/4" plus 6 1/4". If you're a member of that group, you might try using metric measurements when you design your own projects.

2. Poor planning. We like to "hit the ground running" when we begin a project, but sometimes we're not quite sure of our destination. When we really think a project through at the outset, and draw plans, measured drawings, or at least sketches before we turn on a saw or pick up a tool, we tend to avoid a lot of mistakes. We also develop our projects according to a set sequence: starting with outside dimensions, we work from the outside in.

3. Mixed-up pieces. It's about as easy to mistakenly interchange project parts as it is to mark them clearly. If you label all parts and mark their face surfaces, you'll avoid this common trap.

4. Tool accuracy. "It says 90°, so it must be 90°" is a dangerous thought. Drop a try square, and who knows if it will still measure a true right angle? If you automatically assume that your table saw will cut a true 45° today because it did last week, you run a considerable risk. Check all tool setups carefully before cutting.
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Continued from page 58

old hand ways

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WOOD MAGAZINE JAN/FEB. 1985 119
**WOOD WORDS**

**Adhesive:** A substance that bonds two other materials together.

**Arbor:** A rotating shaft on a woodworking machine to which another rotating part is secured.

**Bird's eye:** Small, circular areas on wood surfaces caused by indented wood fibers.

**Burl:** A swirling, twisted figure in wood grain caused by growths on the outside of the tree.

**Checks:** Splits running along the grain in wood that occur most frequently in end grain.

**Core:** In sheet goods, the layer or layers of material between the face and back veneers.

**Feather board:** A safety device, with a series of kerfs cut into one end, that holds wood securely against a table saw fence.

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**Hardboard:** Sheet goods produced by applying heat and pressure to wood fibers. Lignin, the substance that bonds wood cells together in trees, acts as a natural adhesive to form the fibers into hardboard.

**Heartwood:** The mature wood at the center of a tree. (See Sapwood.)

**Kerf:** The slot made by a saw blade as it cuts through material.

**Mullion:** In frame-and-panel construction, an intermediate vertical divider.
Continued from page 84

choosing the right clear finish

the color of most woods, linseed oil never thoroughly cures, and therefore lacks durability, darkens and deteriorates with age. Some furniture craftsmen still stand by boiled linseed oil, but with few exceptions, other penetrating oils are superior.

Danish Oil. A blend of natural oils, such as tung and linseed, and small amounts of resins, Danish oils create a natural-looking finish superior to pure natural oils alone. Danish oils greatly enhance the grain pattern and texture of the wood and, at the same time, provide a durable finish that’s easy to apply and maintain. Some blends, because they contain a few resins, give wood a very natural look. Others, containing more resins, impart more sheen.

Oil/Varnish Mixtures. For people who prefer a natural-looking, wipe-on finish with more surface protection than pure Danish oils, a mixture of oil and varnish can be the answer. Finishes such as Deftoil (Defl) and Varathane Plastic Oil (Flect) are blends of tung oil and polyurethane, which make them extremely durable and moisture-resistant. Hope, Beverlee’s, Formby, Parks, and Southender Welles also manufacture oil/varnish mixtures. Apply these like penetrating oils.

Nontoxic Finishes. Many wooden items that contact food or the mouth — toys, cutting boards, salad bowls, and the like — require a nontoxic finish. With Behlen’s Salad-Bowl Finish, a penetrating finish made specifically for these items, you simply wipe on the product and buff out the surface for a protective satin sheen that increases luster with additional applications. You can easily renew the finish when necessary.

The manufacturers of Watco Danish Oil also market their product as nontoxic (after it has cured for 30 days).

Mineral oil, a common household item, also works as a nontoxic finish. This oil provides wood with some degree of protection, but it never really hardens.

Note: Before applying any finish, be sure to read the container's label directions carefully. Also keep in mind that these products are toxic so you need to keep them out of reach of children. When applying finishes, work in a well-ventilated area that’s well lit. Make sure, too, to work well away from any heat source because some of these finishes contain thinners, which can ignite easily.
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Before you leave home
• Determine whether you can haul your load of lumber safely. An overloaded vehicle—whether it’s a VW bug or a ½-ton pickup—is an invitation to disaster. If you plan to buy more material than you can handle safely, consider renting a trailer or van. Can you borrow a truck?
• If you’re buying something like a bulky object, bring a friend along to help you load, secure, unload, and store your purchases.
• Don’t leave home without rope, cord, twine, or elastic tie-downs if you’ll need to lash material to the top of your car; a roof rack, cartop carrier, or even just a blanket to protect your car roof; cardboard or masking tape for the edges of sheet goods; and a red flag if you’ll be hauling a long load. (The definition of a long load can vary from state to state; you’ll be safe if you flag anything that extends past your bumper.) Don’t automatically assume that your wood dealer will supply such materials.

At the building materials outlet
• Protect your purchases. Use masking tape or cardboard to cover delicate edges of expensive plywood or other sheet goods. Take special care where tie-downs intersect the edges of your lumber, particularly if you’ve bought softwoods.
• Secure plywood panels front-to-back and side-to-side on the top of your car. If you’re hauling thin sheets, sandwich them between thicker pieces (or between lengths of lumber) for the trip home.

The road home
• Whenever possible, choose lightly traveled streets for the trip home. You’ll be able to drive slowly, and if your load should shift or come loose, you can stop and fix things without dodging traffic.
• No matter how short the distance, don’t even think about the “Of Human Bondage” transport method: one arm on the steering wheel and the other out the window clutching a board to the side or top of your car. You risk losing your wood and your arm.

Storing your purchases
• Store all materials off the floor in a cool, dry place.
• Wherever possible, store lumber and sheet goods flat. (If you can’t do this in your shop, store materials as close to vertical as possible to avoid warping or bowing.)
• If you have room for flat storage, “stick” each board or sheet. As you stack your wood, place stickers—long, stick-like wood scraps—at both ends and at regular intervals along the length of the piece. Sticking allows air to circulate freely around your wood and provides adequate support for the material. Use stickers of the same species as the wood you are stacking to prevent leaching of unwanted color onto expensive lumber.
• If you are stacking irregular lengths of lumber, place the longest boards on the bottom of the pile and build succeeding layers with progressively shorter pieces to construct a stable structure and to provide the greatest possible support for each board.
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