

Fine Woodworking

Jan./Feb. 1985, No. 50, \$3.50

Carving Panels

Corner Cupboard Plans

Making Router Bits

Lumber Grading

Designing With Veneer

David Pye's Work



Kerf-Bent Seats

SUPERSALE



ITEM	DESCRIPTION	LIST	SALE
A	LU73M010 10" x 60 Teeth Gen. Purpose ATB	\$ 79.65	\$ 44.90
B	LU72M010 10" x 40 Teeth Gen. Purpose ATB	68.58	39.90
C	LU85M010 10" x 80 Teeth Super Saw ATB	110.88	73.90
D	LU84M011 10" x 50 Teeth Combination 4 & R	74.51	44.90
E	LU85M009 9" x 72 Teeth Super Saw ATB	101.98	64.90
F	PS203 7 1/4" x 24 Teeth Gen. Purpose ATB	27.45	18.90
G	PS303 7 1/4" x 40 Teeth Gen. Purpose ATB	32.97	24.90
H	DS308 #3 Dado 8" Max. Width of Cut 1 3/4"	170.25	119.50
I	04-106 1/4" Diam. 3/4" Cut. Length Solid Carbide	11.05	8.80
J	16-100 1/2" Diam. Mortising Bit C.T.	12.73	10.10
K	30-106 1/2" Radius Cove Bit C.T.	33.64	25.90

ITEM	DESCRIPTION	LIST	SALE
L	32-100 1 1/4" Diam. Rabbeting Bit C.T.	\$ 27.62	\$ 22.10
M	34-110 1/4" Radius Rounding Bit C.T.	27.62	22.10
N	38-100 5/32" Radius Ogee Bit C.T.	32.90	26.30
O	42-106 1/2" Diam. 1/2" Cut. Length Flush Trimming Bit	15.62	12.50
P	64-100 Solid Carbide Flush Trim Bit	7.64	6.10
Q	66-100 Solid Carbide 7° Bevel Bit	8.30	6.64
R	3557R 35MM Diam. 10MM Shank Boring Bit	31.90	25.50
S	06218 2 1/8" Diam. 1/2" Shank Boring Bit	89.00	69.80
T	C310 Set of 3 4" x 5/8" x 1/8" Jointer Knives	18.29	13.40
U	C350 Set of 3 6" x 5/8" x 1/8" Jointer Knives	27.45	19.90
V	C441 Set of 3 8" x 5/8" x 1/8" Jointer Knives	36.58	28.90

Sales Ends April 30, 1985

Note: All Saws & Dado have 5/8" Bore
All Router Bits have 1/4" Shank
ATB = Alternate Top Bevel

4 & R = 4 Teeth & 1 Raker Tooth
C.T. = Carbide Tipped

freud usa

218 Feld Ave., High Point, NC 27264
(919) 434-3171
1570 Corporate Dr., Suite G
Costa Mesa, Cal. 92626 (714) 751-8866

☐ In California
Call Toll Free:
1-800-824-0141

☐ If You Live
In This Area:
Call Toll Free:
1-800-824-8045

☐ If You Live
In This Area:
Call Toll Free
(Outside NC)
1-800-334-4107



Editor

Paul Bertorelli

Art Director

Deborah Fillion

Associate Editors

Jim Cummins

Roger Holmes

Assistant Editors

Dick Burrows

David Sloan

Copy Editor

Nancy Stabile

Assistant Art Director

Roland Wolf

Editorial Secretary

Nina Perry

Senior Editor

John Kelsey

Contributing Editors

Tage Frid

R. Bruce Hoadley

Richard Starr

Simon Watts

Consulting Editors

George Frank

Otto Heuer

Ian J. Kirby

Don Newell

Richard E. Preiss

Norman Vandal

Methods of Work

Jim Richey

The Taunton Press

Paul Roman, publisher; Janice A. Roman, associate publisher; Dale Brown, director of marketing; JoAnn Muir, director of administration; Tom Luxeder, business manager; Lois Beck, office services coordinator; Liz Crosby, personnel administrator; Pauline Fazio, executive secretary; Patricia Rice, receptionist. **Accounting:** Irene Arfaras, manager; Madeline Colby, Catherine Sullivan, Elaine Yamin. **Art:** Roger Barnes, design director; Lisa Long, staff artist. **Books:** Laura Cehanowicz Tringali, editor; Heather Brine Lambert, assistant art director; Deborah Cannarella and Scott Landis, assistant editors. **Fulfillment:** Carole E. Ando, subscription manager; Terry Thomas, assistant manager; Gloria Carson, Dorothy Dreher, Claudia Inness, Cathy Koolis, Donna Leavitt, Peggy LeBlanc, Denise Pascal, Nancy Schoch; Ben Warner, mail-services clerk. **Robert Bruschi**, distribution supervisor; David Blasko, John Daly, Bob Garvin, Linnea Ingram, Marchelle Sperling. **Production:** Mary Galpin, manager; Barbara Bahr, secretary. **Production Services:** Gary Mancini, manager; David DeFeo, coordinator; Nancy Knapp, system operator; Claudia Blake Applegate and Deborah Cooper, assistants. **Promotion:** Jon Miller, manager; Dennis Danaher, publicist; Anne Feinstein, assistant art director. **Video:** Rick Mastelli.

Advertising and Sales: Richard Mulligan and James P. Chiavelli, national accounts managers; Vivian E. Dorman and Carole Weckesser, sales coordinators; Rosemarie Dowd, coordinator of indirect sales; Laura Lesando, secretary. Tel. (203) 426-8171.

Cover: Long wedges bend a kerfed blank into a voluptuously curved chair seat. Jeremy Singley makes Windsor chairs on p. 30. Photo: Erik Borg.



Combining machine and hand tools, David Pye carved this richly detailed walnut dish. Examples of his 'craftsmanship of risk' are on p. 40. Photo: David Cripps.



Modern sculptors like Terry Karpowicz find expressiveness in monumental wooden constructions. See p. 66. Photo: Cheri Eisenberg.

Fine Woodworking (ISSN 0361-3453) is published bimonthly, January, March, May, July, September and November, by The Taunton Press, Inc., Newtown, CT 06470. Telephone (203) 426-8171. Second-class postage paid at Newtown, CT 06470, and additional mailing offices. Copyright 1985 by The Taunton Press, Inc. No reproduction without permission of The Taunton Press, Inc. *Fine Woodworking*® is a registered trademark of The Taunton Press, Inc. **Subscription rates:** United States and possessions, \$16 for one year, \$30 for two years; Canada, \$19 for one year, \$36 for two years (in U.S. dollars, please); other countries, \$20 for one year, \$38 for two years (in U.S. dollars, please). Single copy, \$3.50. Single copies outside U.S. and possessions, \$4.00. Send to Subscription Dept., The Taunton Press, PO Box 355, Newtown, CT 06470. Address all correspondence to the appropriate department (Subscription, Editorial, or Advertising), The Taunton Press, 52 Church Hill Road, PO Box 355, Newtown, CT 06470. U.S. newsstand distribution by Eastern News Distributors, Inc., 111 Eighth Ave., New York, N.Y. 10011.

Departments

4 Letters

10 Methods of Work

Bowl chuck; accurate threads; lathe extension

16 Questions & Answers

Curved handrail; plywood staining; metal inlay

22 Books

Art and furniture; hardwood finishing; dinghy designs

102 Events

108 Notes and Comment

Jurying; making your own plans; thoughts on Thonet; woodwork at a Dallas mall

Articles

30 Kerf-Bent Seats by Jeremy Singley

A tablesawn alternative to scooping

37 Hardwood Lumber Grades by David Sloan

There's a method to the madness

40 David Pye

Master of wood and words

44 Decorative Turning by Tom Alexander

Plunging right into a bowl's personality

46 Provincial Corner Cupboard by Carlyle Lynch

No-frills country joinery

49 Fancy Raised Panels by Roger Schroeder

Woodcarver has a field day

52 Wood Type by Simon Watts

Minding your p's and q's

54 Starting Out by Roger Holmes

Simple bookcase joints

60 Tips From a London Carving Shop by Ben Bacon

A sharp pencil cuts through the problems

64 Driftwood Finishes by Jim Cummins

Weathered wood in an hour or two

66 Monumental Sculpture by Stephen Luecking

Speaking the language of wood

70 Two Small Projects

Laminated bracelets by Lawrence Trombly
Kaleidoscope by Robin Kelsey

73 Making and Modifying Small Tools

by Howard C. Lawrence
Small-shop methods for those special cuts

77 Designing With Veneers by Ian J. Kirby

Illusion can be as strong as structure

116 Gutenberg Revived

Re all the commentary on the new *FWW* look. Your covers need not be black-and-white, or stodgy in any way, to achieve dignity and class. As in people, these attributes are judged on the basis of character and content, not the cover. I like the look.
—Jim Taylor, Lancaster, Tex.

Just a quick note about your new color format. . . . One of the truly elegant features of all past issues was the careful use of excellent black-and-white drawings and sketches in articles, Methods of Work, etc. I think the addition of color photographs adds a lot to your format. The color-rendered sketches beginning in issue #48, however, seem to me to greatly reduce clarity and simplicity. The main point to these sketches is generally technical or mechanical in nature, not artistic. The color is quite a distraction.
—Mark P. Miller, Madison, Wis.

In his article "Clearing the Air" in *FWW* #47, David Carnell mentions the dangers of fumes. Perhaps you will be interested in the unfortunate experience of a friend of mine. He cleaned his paintbrushes in gasoline in the kitchen sink and carefully flushed the gasoline down the drain. A minute later there was a loud bang and his basement was a mass of flames. Before the fire trucks arrived, the whole basement was gutted.

The gasoline had gone down the drainpipe, escaped into the basement through an uncapped sewer drain, and reached a pilot light. Fortunately no one was hurt, but my friend is a very embarrassed and wiser man.

—John O. Walter, Regina, Sask.

I finished reading H. Ivan Hentschel's letter (*FWW* #48) with mixed feelings. While I agree that *Fine Woodworking* has set a standard of quality and should uphold that, I thought his letter overwrought.

I started reading Ann Taylor's article "Plywood Basics" (*FWW* #46) with a jaundiced eye, thinking to myself, "What's this, an article on how to build a birdhouse from scraps around the garage?" She did, however, make some good points. It was refreshing to read an article on something almost all woodworkers use with little thought—plywood. Like it or not, plywood is here to stay.

If someone comes to me and wants me to build the finest



'I made this walnut cradle, with carved characters from Walt Disney movies, for my first grandchild.'

—James Klopfenstein, Crestline, Ohio

quality piece I can, and if they can pay me to do it, I will. If someone wants a home entertainment center but doesn't have an unlimited budget, I'll design and build the best piece I'm able to within their budget. Odds are, it will have oak plywood sides and shelves, and a solid face frame with frame-and-panel doors. My point is that as a woodworker/businessman, if someone wants something out of wood, I'll build it. As for "Cleopatra's Mirror," I loved it. Levity is good for the soul.
—Ross Fulmer, Atascadero, Calif.

As for myself and other working cabinetmakers I know, we would like to see more articles like Jeff O'Hearn's "High-Rise Millwork" (*FWW* #47). We desperately need more technical articles about the materials we are using. Yet I can sympathize with Mr. Hentschel's sentiments. I have struggled for years cutting dovetails for free because no one is willing to pay for them. ("I can buy this at an antiques store for fifteen hundred dollars." Sound familiar?) I now do my "fine" woodworking my way for myself, family and friends as the sort of amateur that Krenov suggests. Because of the sweet smell of money under the saw at work, I can finally luxuriate in the sweet smell of walnut under my sharp saw at home.

I don't find any contradiction. One type of woodworking is traditional and pleasing; the other is more in balance with the realities of finite resources and budgetary limitations. Everyone I know has come to some kind of agreement with these two sides of the same broad issue. To devote your publication to only one side would leave a lot of people looking somewhere else for the rest of their information, and nobody does it better than *FWW*.
—Roger Slagle, San Rafael, Calif.

I thoroughly enjoyed Robin Kelsey's article on Cleopatra's mirror in *FWW* #46. Here is an alternative method that has worked very well for me for holding a 5-in. dia. mirror.

I use a fly-cutter, set to 5/8 in., to cut a 1/8-in. deep round groove on the inside face of the front piece. I then reset the fly-cutter to 4 1/2 in., turn the blank over and cut completely through. This second cut creates a window, and leaves the groove from the first cut as a concentric rabbet to receive the mirror. The technique is much faster than routing out the entire back piece.

I purchase 5-in. dia. mirrors from a local supply house at a cost so low that I don't even try to cut my own. I have found that resawn 3/4-in. blanks will match perfectly on the glue line without surface-planing prior to gluing.

—James Vasi, Williamsville, N.Y.

The closing of the Berkeley Cutting Edge store (Notes and Comment, *FWW* #48) came as a blow to many woodworkers, but former employees of the store have put together a new store at the same location. We are calling ourselves Rosewood Tool Supply. For a schedule of our planned classes and events, call us at (415) 540-6247.
—Tad Laird, Berkeley, Calif.

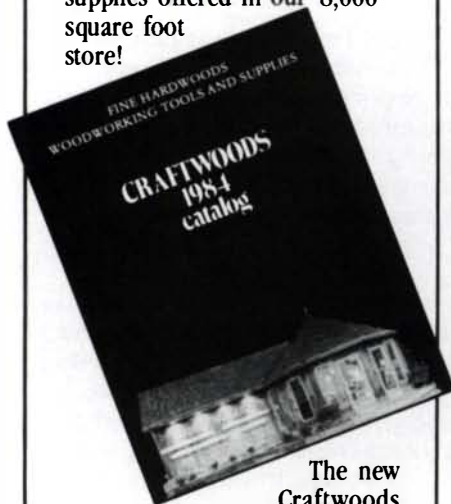
I'd like to join the discussion about Taiwanese electric motors (*FWW* #46) with an experience that I hope is unique.

Three months ago I bought a drill press powered by a 1/3-HP small-frame induction motor. The first hole I drilled (1/4-in. dia., in wood) burned the motor out. I took it back and the company gave me another. This drilled three holes and quit. I took it back again, and the third motor they gave me ran backwards and could not be reversed.

A fourth trip, and this time I insisted on testing the motor in the store. Since the drill press came dismantled in a box, I agreed to test the motor only, putting a light load on it by hand-holding a broken yardstick on each side of the motor shaft. Result? Two new motors would not run, another ran

FOR THE DISCERNING CRAFTSMAN —

Craftwoods has compiled a unique 8½" x 11" catalog which includes all the fine hardwoods, carving and woodworking supplies offered in our 8,000 square foot store!



The new Craftwoods mail order catalog is yours for \$2 (refundable on first order).



CRAFTWOODS
10921 York Road
Cockeysville, MD 21030
301-667-9663

Announcing EXCALIBUR II

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.

Excalibur II provides three cutting speeds with a single-speed motor. Optional variable-speed motor provides an infinite range.

Excalibur II's table and hold-down tilt 45° right and left. It easily accepts all 5" blades to cut material up to 2" thick. Throat depth is 18".

There is a host of construction and performance features unparalleled in a scroll saw of this price.

*As shown. Motor extra.

For more information on the Excalibur II, the next generation in precision saws, call toll-free 1-800-387-9789.

Or, mail this convenient coupon.

Excalibur II. Designed and manufactured for the woodworking craftsman who demands the best.

*Introductory price. US funds.

J. Philip Humfrey International Inc.

3241 Kennedy Road, Unit 7 (Dept. FW 50), Scarborough, Ontario, Canada M1V 2J9 Telephone (416) 293-8624

☐ Please rush complete information on the exciting new Excalibur II.

Name

Address

City State Zip

POWERMATIC



MODEL 60

8" JOINTER

The Model 60 8" Jointer is one of the many new Powermatics now in stock. We also offer the complete line of Rockwell and Powermatic Shaper Cutters (including Carbide), as well as Carborundum Abrasives.



WOODSHOP SPECIALTIES
Cold River Industrial Park
Quality Lane
Rutland, VT 05701
(802) 773-3240

FREE SANDING BELTS DIRECT FROM THE MANUFACTURER

GET SIX FREE BELTS FOR EACH DOZEN ORDERED. All belts are aluminum oxide first quality. Our electronic presses make smooth bump-free splices.

Check your size and how many dozen. We will ship assorted grits unless otherwise specified.

- ☐ 1" x 30" — \$12.70/doz.
- ☐ 1" x 42" — 12.75/doz.
- ☐ 1" x 44" — 12.80/doz.
- ☐ 3" x 18" — 13.75/doz.
- ☐ 3" x 21" — 14.25/doz.
- ☐ 3" x 23¼" — 14.70/doz.
- ☐ 3" x 24" — 14.75/doz.
- ☐ 3" x 27" — 15.25/doz.
- ☐ 4" x 21¼" — 16.75/doz.
- ☐ 4" x 24" — 17.25/doz.
- ☐ 4" x 36" — 20.95/doz.
- ☐ 6" x 48" — 26.95/½ doz. (3 FREE)

Other size belts on request.

9" x 11" Paper Sheets

A/O Cabinet Paper

- | | |
|--|-----------------------------------|
| 50/pk. | 100/pk. |
| ☐ 40-D — \$17/pk. | ☐ \$31/pk. |
| ☐ 50-D — 16/pk. | ☐ 28/pk. |
| ☐ 60-D — 15/pk. | ☐ 26/pk. |
| ☐ 80-D — 14/pk. | ☐ 24/pk. |
| ☐ 100-C — 13/pk. | ☐ 22/pk. |
| ☐ 120-C — 13/pk. | ☐ 22/pk. |
| ☐ 150-C — 13/pk. | ☐ 22/pk. |

No Load Finishing Paper

- | | |
|---|-----------------------------------|
| 50/pk. | 100/pk. |
| ☐ 180-A — \$11/pk. | ☐ \$19/pk. |
| ☐ 220-A — 11/pk. | ☐ 19/pk. |
| ☐ 280-A — 11/pk. | ☐ 19/pk. |
| ☐ 320-A — 11/pk. | ☐ 19/pk. |
| ☐ 400-A — 11/pk. | ☐ 19/pk. |

Wet or Dry S/C Paper

- | | |
|---|-----------------------------------|
| 50/pk. | 100/pk. |
| ☐ 220-A — \$15/pk. | ☐ \$25/pk. |
| ☐ 320-A — 15/pk. | ☐ 25/pk. |
| ☐ 400-A — 15/pk. | ☐ 25/pk. |
| ☐ 600-A — 15/pk. | ☐ 25/pk. |

NEW ITEM!

☐ BELT CLEANING STICK - \$6.95

Prompt delivery from stock.
MONEY-BACK GUARANTEE

Shipping Charges - Under \$35 add \$2.50; \$35 or more add \$4.00—PA residents add 6% sales tax.

☐ Check or Money Order.

☐ MasterCard ☐ VISA Exp. Date

Acct. #

Name

Address

City, State & Zip

CALL TOLL FREE

1-800-428-2222

PA Only - 1-800-222-2292

INDUSTRIAL ABRASIVES CO.

644 North Eighth Street
Reading, PA 19603

backwards, and one burned out in less than a minute. Finally I found one that ran and I accepted it, since the store refused to refund my money. I still have it, still in the box, and am looking for someone to buy it at half-price. Meanwhile I bought a 40-year-old Craftsman that's a little loose in the quill, but will drill any size hole in anything.

The other side of the picture is a 1/3-HP capacitor bench grinder, which I tested in the store. In a month of heavy-duty grinding, it's never even slowed down. So I guess with Taiwanese motors, you pay your money and you take your chances.

—Stockton Webb, Honolulu, Hawaii

I've had a few laughs as I followed the letters concerning the preservation of hide glue. The whole premise is wrong. Hide glue is meant to be made up as needed—fresh, dependable, and in the amount needed for the job. I wouldn't want to contaminate my work with glue that should have been thrown out months ago.

I use a small stainless-steel cup and I wash it out frequently. This way, I can have some confidence that my work will stay together and that the joints won't be discolored.

—Jonathan Cooper, Portland, Maine

In Silas Kopf's article on scroll saws (FWW #47), he notes that the saw table on the Hegner saw tilts only to the left, and he concludes that one cannot saw bevels and double bevels in both directions. However, the Hegner blade suspension allows quick 180° turning of the blade without removing the blade from the clamps (and, if necessary, without removing the blade assembly from the workpiece). The work is then simply fed away from the throat rather than into it. This method is faster and more accurate than reversing a tilting table.

—Wolfgang Derke, New Castle, Del.

Re "Shipping Furniture" (FWW #49). A shipper is not a common carrier, as stated. A *shipper* is the one who tends the shipment to a carrier, as in *consignor*. A *carrier* is the transporter of the shipment, and I would not advise using a carrier who is not registered and approved with the Interstate Commerce Commission.

All carriers must, by law, provide insurance, and the cost of that insurance is reflected in the rates charged. The biggest error Mr. Erickson made was stating "the 'shipper' should allow you to pay the shipping costs after the goods have been

delivered and inspected." Wrong. If you are not a large established company, the carrier will not extend credit to you. He has the right to demand payment on delivery. A carrier also won't allow a driver to wait while you inspect the goods for damage. Finally, the carrier can, by law, refuse to honor a claim until the freight charges have been paid in full.

—Jim Sowell, Granby, Mass.

Re "Freight Facts" (FWW #49). Freight charges have nothing to do with FOB terms. "FOB destination" simply means the shipper (consignor) takes responsibility for the item being shipped until it reaches its destination. "FOB shipping point" means the receiver (consignee) has the responsibility. If freight is the responsibility of the receiver, ICC regulations require that payment be made within seven days.

—Scott Soncrant, Roswell, Ga.

George Frank offers an excellent recipe for bleaching stains (Q&A, FWW #48), but novice chemists might add too much lye too quickly, whereby a violent reaction could occur from the heat generated. The smallest particle of lye (sodium hydroxide) will cause severe damage to soft membrane tissues, such as one's eye. I strongly recommend that you start with ice water and add lye crystals very slowly, stirring constantly and stopping if the water becomes too hot. Safety glasses are the minimum protection required. A 5% solution (1.6 oz. of lye to a quart of water) should be strong enough to bleach, especially when heated.

—Richard D. Poirier, Columbus, Ohio

In his letter in issue #49, Michael O'Banion makes the point that "Kirby... is incorrect in checking for overtightness with a straightedge on the top edge of the caul." Actually, O'Banion is confusing the caul—which is quite flat—with the crowned batten. My article in FWW #47 clearly states that in checking for overtightness, a straightedge should be used on the caul, not the batten.

—Ian Kirby, Cumming, Ga.

I was attempting to turn a laminated cylinder, 8 in. in diameter and 24 in. long. The instant I flipped the switch on the lathe, I heard a BANG. My glasses were knocked off, my nose was bleeding and I had a terrible pain on the left side of my nose. I found my glasses on the floor some 5 ft. away and realized then that there could have been a tragedy. The lathe had been left to turn at 1,000 RPM by the previous user. The

Belt-tracking solutions, case closed?

EDITOR'S NOTE: Brian De Marcus (FWW #47) asked readers for advice about how to keep his belt sander's belt on track. Readers responded by sending us solutions that had worked for them, on their particular machines. Some of the advice is contradictory, so if your belt sander is troublesome, you'll have to experiment. The solution that actually worked for De Marcus is the last one.

For a flat belt to track right, the pulleys must be barrel-shaped, not cylindrical. Bevel the sides of the drive roller—so that the edges of the belt don't touch—leaving a 1/16-in. ridge in the middle. This can easily be done by running the sander without a belt and using coarse sandpaper on the roller as it turns. You could wrap the rollers with electricians' tape instead, to build up the middle.

—Hugh Blogg, Kent, England

My machine wouldn't track because vibration kept loosening the adjusting knob. I removed the nut and hacksawed a horizontal slot through the side of the nut to the center, then compressed the nut in my vise, so that it would bind on its threads. It's a little too tight now to turn by hand, but once

I've set it with pliers it holds its adjustment. I go through many belts without having to touch the knob.

—Harvey Freeman, Halifax, N.S.

I tried the usual trick of making the rollers convex, with no success. I finally tried just the opposite—I applied one or two thicknesses of black plastic tape to the outside edges of the rollers, and it worked.

—K.E. Bloom, Oakland, Calif.

I had the same problem and cured it by adding a small wooden wedge between the yoke and its pressure spring to increase the tension.

—Kenneth Schumacher, Clearwater, Fla.

Try storing the machine with no tension on the belt, and if your shop is damp, store your belts in a plastic bag.

—Lou Buda, Syracuse, N.Y.

I had the same trouble because I once dropped my sander and bent the yoke that holds the idler pulley. By eye, nothing seemed wrong, but after replacing the yoke, no more trouble.

—S.C. Edwards, St. Simons Island, Ga.



HARPSICHORDS & FORTEPIANOS

Build it yourself from one of our kits or let our experienced craftsmen build it for you.

Three Centuries of Harpsichord Making by Frank Hubbard (\$25 postpaid)

For brochure send \$1.00 to
HUBBARD HARPSICHORDS INCORPORATED
144-W Moody Street,
Waltham, MA 02154
(617) 894-3238

3" or 4" SANDING BELTS
21" or 24" .99 ea. Your Choice
9" X 11" - SHEETS .18 ea.
5" - DISCS .12 ea.

Specify Coarse-Medium-Fine
THICK-STOCK QUALITY ALOXI!
NO MINIMUM!
MONEY BACK GUARANTEE!

Send check including \$1.50 for postage.
Be sure to print your full name and address.
CT. residents please add 7½% sales tax.

NORD ABRASIVES
P.O. BOX 123,
CORNWALL BRIDGE, CT. 06754

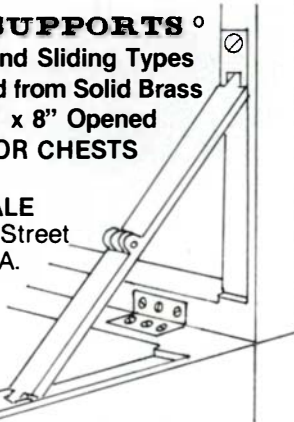
Porch Swing & Glider



Complete plan with full scale templates \$8
Catalog \$1

(IL res. add sales tax)
Cornerstone Design Inc., Dept. A1
P.O. Box 300, Elmhurst, IL, 60126

° **LID SUPPORTS** °
Hinged and Sliding Types
Machined from Solid Brass
1/2" x 5/16" x 8" Opened
IDEAL FOR CHESTS



JACK DALE
284 Pine Street
Willits, CA.
95490

EXOTIC AND DOMESTIC HARDWOODS

Rosewoods	Walnut	Shedua
Bubinga	Maple	Morado
Padauk	Cherry	Purpleheart
Ebonies	Wenge	Kingwood
Zebra	Ziricote	

(Additional Species Available)
Logs, lumber and musical instrument components.
Our specialty: sawn veneer
S2S 1/8", 1/4", 1/2",
Walnut, Cherry, Maple,
Bubinga, Zebra, and Padauk.

Wholesale inquiries (\$500 or more) contact:

The Sawmill

Retail inquiries contact:

A Woodworker's Dream

C.F. MARTIN & CO., INC.
P.O. Box 329 Nazareth, PA 18064
(215) 759-2837 in PA
1-800-345-3103

QUARTZ CLOCK MOVEMENT

\$1.00

Our way of saying Welcome to Clockmaking!

Made in America, this Q80 quartz movement is our most popular series. It regularly sells for \$6.50... but now is just \$1.00! That's much below our cost and includes shipping and handling. You'll also get two brass hands, our 72-page full color catalog plus a "Clockmaking Ideas" pamphlet. This offer is so special, we request one-to-a-customer please. It's our way of introducing you to the wonderful do-it-yourself world of clockmaking!

Limited Offer... Call or Write Today!

Name _____
Address _____
City, State, Zip _____
Credit Card No. _____ Exp. Date _____

KLOCKIT DEPT. FW15
LAKE GENEVA, WI 53147
1-800-KLOCKIT VISA
In Wisconsin Call... 414-248-1150

SUNHILL

Machinery for cabinet shops and serious woodworkers. Industrial quality at an affordable price.
*Price Includes Freight

SP-101 CABINET SHOP SHAPER
3/4" & 1" Changeable Spindles
1/2" & 1 1/4" Spindles Optional
2 Speed Reversible Rotation
List: \$1,600 **SPECIAL: \$981***



MP-21 TILTING SPINDLE SHAPER
Spindle Tilts to 45°
3/4" & 1" Changeable Spindles
3 Speed Spindle
List: \$3,050 **SPECIAL: \$2,565***



RT-601 MINI PIN ROUTER WITH FOOT CONTROL
List: \$1,655 **SPECIAL: \$998***



TS-412 TILTING ARBOR SAW
List: \$1,850 **SPECIAL: \$1,257***



SD-136 SINGLE BELT WIDE BELT SANDER
List: \$16,840 **SPECIAL: \$13,850***

SD-236 DOUBLE BELT WIDE BELT SANDER
List: \$27,850 **SPECIAL: \$21,350***

SD-170 OSCILLATING EDGE BELT SANDER
10" x 170" Belt
List: \$5,120 **SPECIAL: \$3,950**

OTHER SPECIALS:

24" WIDE BELT SANDER
List: \$7,500 **SPECIAL: \$4,987**

18" BAND SAW
List: \$1,035 **SPECIAL: \$685**

12" LONG BED JOINTER
List: \$3,350 **SPECIAL: \$2,565**

1HP AIR DRUM SANDER
List: \$525 **SPECIAL: \$425**

***SALE ENDS MARCH 15, 1985**

Call the Dealer in Your Area:

NC—(704) 376-7421	NY—(518) 872-0369
IN—(219) 353-7551	WI—(715) 384-9998
IL—(815) 758-6009	LA—(504) 738-6063
KS—(316) 942-8475	FL—(813) 665-3458
MD—(301) 340-7377	WA—(206) 575-1447
CA—(415) 499-0408	CA—(408) 248-3535
OR—(503) 256-9568	UT—(801) 262-2020
OH—(513) 872-8376	

or contact:
SUNHILL ENTERPRISES
414 OLIVE WAY, SUITE 210
SEATTLE, WA 98101
(206) 622-5775

centrifugal force had split the cylinder open—one half was still on the lathe bed, but the other half had traveled some 20 ft. to bump the shop door at about 4 ft. above the floor. Had it hit my left temple, I would not be writing this letter to you now.

I have no advice to give to anyone, but I realize the importance of proper gluing, especially when you are going to turn a piece of wood that has been glued by the post-blocking method. A second checking is worth the time spent. And furthermore, when you're in doubt, don't do it.

—Charles Brien, Longueuil, Que.

When large pieces of green wood are turned, bits and pieces of wood fly off and hit the turner all over the upper torso, including the face and arms. These small pieces of wood sting and hurt. Black walnut sap, which is somewhat toxic, can cause a rash on the skin.

A face shield, which should always be worn, protects the face. But a shop apron does not cover enough of the body to be of much help in protecting the rest of the upper torso. I use a welders' leather jacket to handle this problem. Welders' jackets are made from tough horsehide; large and loose-fitting, they have a high neck and long sleeves with snap fasteners.

Also, I'm a right-handed turner, so my left hand is usually near the spinning work. I always wear a heavy linemen's glove on my left hand. It has saved me from some nasty splinters, cuts and abrasions.

—Earl Rice, Augusta, Ga.

Just one more solution to the problem that Thad Evans and Milford Schulz (Letters, *FWW* #46 and #47) had with their Carlyle Lynch highboy: I too built this piece, and my solution for the cock beading was to plane down some cherry to $\frac{3}{16}$ in.,

and then on the scroll saw, cut it to match the shape of the apron. I then face-glued the cocking bead on and carved it to its final shape. The result was cock beading with grain that matches the apron it's on.

—Rolf Warncke, Oak Ridge, N.J.

As professionals in the field of furniture repair and refinishing, we have a somewhat different understanding of "building forever" than is spoken of by T.A. Sharp in *FWW* #49 (p. 6). Using glues that allow disassembly at a future time makes it possible to replace broken pieces. Furniture that is used is often abused and is subject to an endless variety of damage. In our opinion, building forever is building sensibly so that a piece can be repaired and returned to service when necessary. A joint that will never come apart does not meet that criterion.

—Emily and Eliot Roberts, Sparta, Tenn.

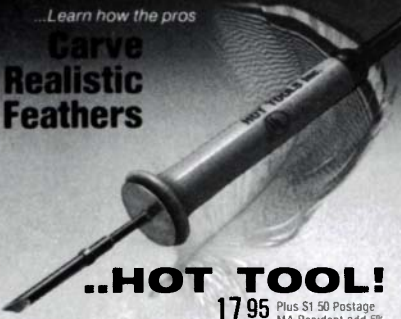
In a Quick Tip in issue #49, Theodore Odom says that the use of mineral spirits will show up scratches long enough for you to resand. But if you are planning to apply a lacquer finish, mineral spirits may cause adhesion problems. Instead, use lacquer thinner. When the scratches show up, mark those areas so you can go back later to sand.

—Morrie A. Minich, Portland, Ore.

One of my students discovered an error while working on a reproduction of the Sidney Barnsley dining table (*FWW* #48). The plans give the exposed length of the cross stretcher as $14\frac{1}{2}$ in. In fact, when drawn full-scale, the crosspiece on the lower stretcher measures 16 in. exposed. We discovered this after a fair amount of head scratching.

—William Thomas, Manchester, N.H.

...Learn how the pros
Carve Realistic Feathers



..HOT TOOL!
17.95 Plus \$1.50 Postage
MA Resident add 3%
Dealer Inquiries Welcomed
send today for brochures

HOT TOOLS Inc.
P.O. Box 615-F • Marblehead, MA 01945 • 617/639-1000

A good miter is hard to find.



Now you know where to look!

POOTATUCK CORPORATION
P.O. Box 24, Dept. FW851
Windsor, VT 05089 (802) 674-5984

Name _____
Address _____
City/State/Zip _____

POWERMATIC



10" Table Saw, Model 66
Complete with: 48" Rails
Single Phase 3 H.P.
230v Magnetic controls
New Posi-track fence
\$1650 FOB McMinnville, TN.
Quantity limited at this price.
Add \$60 for old-style cast-iron fence illustrated.
For Biesemeyer fence add \$99.
Miss. residents add 6% tax.

Before you buy, call us toll-free
(800) 821-2750. Ask for Max or Bobby.
In Miss. (800) 321-8107.

We Also Stock:
BLACK & DECKER
BOSCH
DELTA-ROCKWELL
DREMEL
FREUD
HEGNER
INCA POWER TOOLS
JET
JORGENSEN
MAKITA
PORTER-CABLE
R.B.I.
SKIL
STANLEY TOOLS

Addkison
HARDWARE CO. INC.

126 E. Amite St., PO Box 102, Jackson, MS 39205

NATIVE AMERICAN HARDWOODS



WALNUT, BUTTERNUT, CHERRY
CURLY & BIRD'S-EYE MAPLE
Most Other Domestic Woods

- EXTRA WIDE/EXTRA THICK STOCK
- TURNING SQUARES/BLOCKS
- QUARTERSAWN/BOOKMATCHED LUMBER
- SPALTED LUMBER/BLOCKS
- THIN STOCK NO MINIMUM
- FLOORING/PANELING WHOLESALE & RETAIL

Comprehensive Listing—One Dollar (Refundable)
NATIVE AMERICAN HARDWOODS LTD.
R1, W. VALLEY, N.Y. 14171 • (716) 942-6631

ROLL TOP DESK PLAN



Full Size

This Roll-Top Desk is one of our finest furniture plans. It is similar to those of the 1800's and is made of oak lumber. Size is 55" x 21" x 49"H. Plan includes base and roll-top unit. You do not have to purchase two separate plans. Clear, easy-to-follow drawings and instructions.

Desk Plan—\$11.00.....\$14.50 Catalog.....\$1.00
ARMOR Dept. D Box 290, Deer Park, NY 11729



TAKE PART... History in the making

You, too can go down in history. Experience the **new Carbide Tipped Woodturning Tools**; outstanding tool life and high quality performance under demanding work conditions!!

The traditional carbon steel turning tools have been around for years ...then along came HSS (which is more costly) but holds a useable sharp edge longer than plain carbon. Now, through latest technology, carbide tips have been added to the steel blade for the sharpest cutting edges that last longer between sharpenings and gives an even smoother finish.

Buy your Woodturning Tools...in kit form or individually to suit a particular project or add to your collection...

In addition to the 4 pc. carbide set and the 8 pc. HSS set you can add the **8 pc. Hobby set**... (not illustrated) same quality tempered and ground 3 1/2" HSS blades, with 5 1/2" hardwood handles. Use with large lathes for detailing or with small hobby lathes.

re-EDGE-uate your tools!!

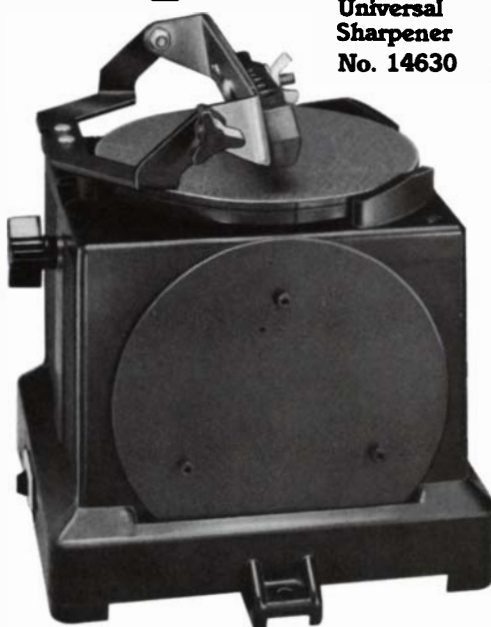
To complete **your** workshop use the **NEW Universal Sharpener** to put a keen edge on all your turning tools.

Specially designed for low speed (200 rpm), low temperature dressing of your tool edges without having to use a grinder (which could possibly over-heat the tool thereby ruining its temper), or a cumbersome time consuming whetstone.

This sharpening system uses six inch diameter **removable** disc pads and replaceable, cloth-backed abrasive grit discs assuring a flat surface for keeping chisel and plane edges true.

- You have more flexibility and save time in sharpening.
- Comes with two disc pads and one each No. 150 and 240 cloth-backed abrasive grit discs.

All items are U.S.A. manufactured



SHARPENS
Chisels
Drill bits
Knives
Scissors
Plane
blades
and
more

FREE!

Chisel Storage
Box Plans.
Send name,
address, zip,
to Tools, Etc.



**Universal
Sharpener
No. 14630**

ORDER TODAY! No risk, money back guarantee. If you're not satisfied, just return in original carton for immediate credit or refund... we pay the shipping cost ... both ways!

Item No.	Description	Qty.	Price	Extension
Carbide Tipped				
17541	1" Skew Chisel		\$17.95	\$
17542	1/2" Round Nose		17.95	
17543	3/4" Gouge		17.95	
17544	Right Skew; face plate		17.95	
17545	4 PC. SET — One each of the above (Individually priced @ \$71.80) Plus FREE Silicone Carbide Stone Save \$10.00		61.80	
High Speed Steel				
17521	1/4" Gouge		7.45	
17522	1/2" Gouge		7.95	
17523*	3/4" Gouge		9.75	
17524	1/2" Spear Point		7.75	
17525*	1/2" Round Nose		7.45	
17526*	1/8" Parting Tool		7.45	
17527	1/2" Skew		7.45	
17528*	1" Skew		9.75	
17853	4 piece Beginning Set — includes items indicated by * (Individually priced @ \$34.40) Save \$5.00		29.40	
17859	8 piece Set — one each of all 8 Chisels No. 17521-28 (Individually priced @ \$65.00) Save \$10.00 , plus FREE Detail tool for delicate work		55.00	
17984	8 piece Hobby Set		36.00	
14630	Universal Sharpener		79.95	
Shipping & Handling, add \$3.50 per order			3.50	3.50
KY residents, add 5% tax				
TOTAL (U.S. Dollars)			\$	

Method of Payment

☐ Check Enclosed ☐ VISA ☐ MasterCard

Card _____ Good Thru _____

Name _____

Address _____

City _____

State _____ Zip _____

TOOLS ETC.



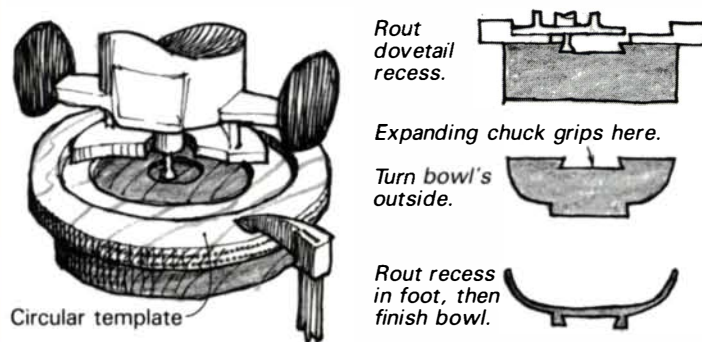
Dept. 458501, 510 East Main St.
Louisville, KY 40202

Order by Phone 1-800-233-1133
(Except KY) 8:30 to 5:00 EST Mon.-Fri.

Chucking bowl blanks

It seems to me, in reading past methods on woodturning, that many turners must be spending more time fiddling with face-plates and attaching the work to the lathe than actually turning. I'd rather spend my time turning, so I devised this quick procedure that takes me from a blank to a finished 10-in. dia. bowl with $\frac{1}{8}$ -in. thick walls in 30 minutes.

The key to the method is a 6-in-1 Universal Chuck, which has an expanding collet that locks into a dovetail recess in the workpiece. First I cut a recess in the top of the blank, using a router with a dovetail bit and the circular template shown in the sketch. The router rides around inside the shoulder on the template to produce a recess to fit the chuck.



With the circular blank mounted on the chuck, I turn the bowl's outside profile. At this point you can turn a chuck recess in the bottom of the bowl if you choose, but I find it easier and faster to remove the bowl and cut the new recess with the router. It's important to center the bowl's foot in the template before cutting the recess, otherwise the bowl will wobble on the lathe. If you turn the foot to fit the center hole in the template, this won't be a problem.

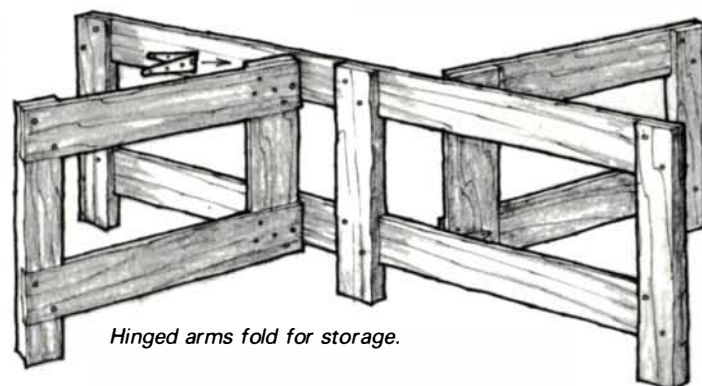
Now I return the bowl to the lathe and complete the inside. If desired, you can part off the bowl above the foot to eliminate all signs of the attachment method.

—F.H. Crews, High Point, N.C.

Quick tip: I steambend short pieces of wood by wrapping them in a damp towel and cooking them in a microwave oven. Three minutes on "high" will make a slender chair spindle limber enough. For heavier pieces, resoak the towel from time to time.

—Robert Hanlon, Gloucester, Mass.

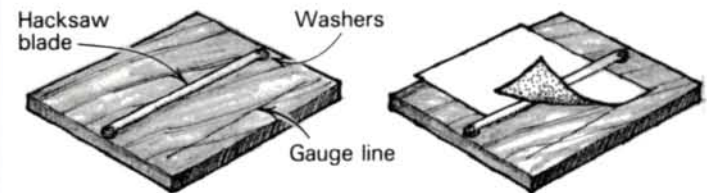
Folding saw rack



This multipurpose folding rack takes the place of several saw-horses, yet when stored it occupies less space than one. Unfolded, it can support a 4x8 sheet of plywood for ripping or crosscutting. It's also handy for cutting 2x4s to length and other framing work. With a piece of plywood on top, it becomes a handy work platform.

—Phil Mackie, Rhineland, Wis.

Sandpaper tearing tool



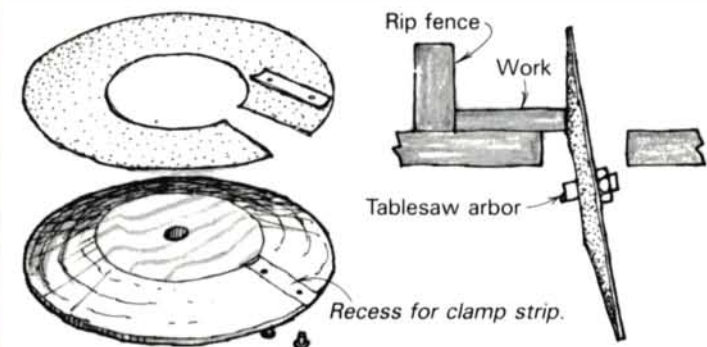
This idea has been around for a while, but this tool is one of the best I know of for cutting sandpaper sheets. Simply screw an old hacksaw blade to a scrap of plywood with washers under the blade for spacers. Mark standard sheet sizes on the plywood, or attach a rule for measuring sheets. To use, simply slide a sheet of sandpaper under the blade and pull for a quick, neat cut.

—Rick Mattos, Vallejo, Calif.

Quick tip: To tilt a tablesaw blade accurately, even to half a degree, attach a Sears magnetic-base protractor (#9-3995) directly to the blade.

—William Forsythe, Dansville, N.Y.

Precise tablesaw jointer disc



This cone-shaped tablesaw jointing device does precise work both in sanding boards to width and in leaving a good gluing surface. It's basically a 10-in. conical disc made from $\frac{3}{4}$ -in. plywood. What makes the device special is the small cone angle (9° on mine). Unlike a flat disc, which contacts the workpiece across its full width, the cone's contact is restricted to a small area, the radius that's located directly above the arbor. Another benefit is that vertical adjustments of the saw arbor produce very small increments in cutting depth (as an industrial modelmaker, I sometimes have to work in thousandths of an inch).

I fiberglassed the back of my disc for extra strength, and it's served me well for years. The cutting surface is an abrasive sander disc cut to fit the cone face and glued and clamped in place. I use plastic-laminate glue to secure the paper; to change abrasives I dissolve the cement with acetone. Varying the grade of abrasive paper allows various compromises between a fast cutting speed and good surface quality.

To use the sander, tilt the tablesaw's arbor to present a vertical cutting surface, as shown in the sketch. I usually guide the work along the rip fence.

—Dr. Robert Bogle, La Jolla, Calif.

Quick tip: When my scroll-saw blades dull, I extend their life by clamping a $1\frac{1}{2}$ -in. thick wooden table on top of the regular table. This moves the work up to the teeth that haven't been used yet.

—Joe Garson, New Haven, Conn.

Improved push sticks

In the past eleven years I've worked in several shops, from a furniture factory to a custom cabinet shop, and taught some high-school woodworking as well. As you might imagine, I've seen my share of tablesaw push sticks, most of which resemble

WOODWORKING WORLD

HOUSTON SHOW

SHAMROCK HILTON HOTEL
HOUSTON, TEXAS

JANUARY 11 - 5 pm - 9 pm
JANUARY 12 - 10 am - 6 pm
JANUARY 13 - 10 am - 5 pm



TORONTO SHOW

CONSTELLATION HOTEL
REXDALE, ONTARIO

FEBRUARY 1 - 5 pm - 9 pm
FEBRUARY 2 - 10 am - 6 pm
FEBRUARY 3 - 10 am - 5 pm

EXHIBITS, DEMONSTRATIONS & SALES

Machinery & Power Tools - Hand Tools - Hardwoods & Veneers - Sawblades - Bits & Cutters
Hardware - Clockmaking Supplies - Finishing Supplies - Magazines - Books & Plans
& MUCH, MUCH MORE

FREE SEMINARS

Featuring: Wayne Barton - Roger Cliffe - Hans Derke - Mark Duginske - Allan Fitchett

LOOK FOR THE WOOD WORLD BALLOON

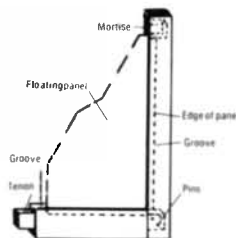
EVERYTHING FOR THE WOODWORKER

ADMISSION \$5 / \$1 OFF WITH THIS AD

Sponsored by

WOODWORKING ASSOCIATION OF NORTH AMERICA

For more information and seminar schedule call or write W.A.N.A.
35 MAIN ST., SUITE 6, PLYMOUTH, NH 03264 - (603) 536-3876



- We would like to take this opportunity to announce the publication of a new magazine for woodworkers. As you can see by the logo, our name is THE AMERICAN WOODWORKER. We are a very diversified publication printing a variety of articles including both projects and subjects of general interest to woodworkers. Our project sections are produced on three levels: beginning, intermediate and advanced. They include everything from a shaker candle holder to a Chippendale lowboy. Styles are both traditional and contemporary.
- The size of the magazine is a large 9" X 12" printed on a heavy glossy stock. It contains both photographs and easy to read drawings of all different styles of furniture and projects.
- In addition to other nationally known writers, there will be two regular columns; one written by Ernie Conover of The Dunbar-Conover Woodworking School. He will answer your questions about any woodworking subject. The other is a column about finishing written by George Frank, one of the world's leading authorities. He will answer your questions about finishing.
- There will be visits to interesting people and interesting places to discover what others are doing in woodworking. Also included are instructional articles including everything from quartersawing to inlaying, articles about tools, both hand and power, and much more.
- There is a section about manufacturing techniques including how to make and use jigs and fixtures. We also have historical articles about both people and furniture.
- There are show dates and locations, supply sources, and book reviews. THE AMERICAN WOODWORKER is dedicated to pure woodworking. There are no articles on home repair, etc.
- From time to time there will be informative articles that are unusually helpful to the woodworker. In our first issue there is an article explaining how to transfer a photograph or drawing to a piece of metal. This interesting technique can be used to make plaques, canister sets, inlays for various woodworking projects, etc.
- THE AMERICAN WOODWORKER will be published quarterly the first year. The subscription price is \$10.00, with the first issue out in March 1985. We have been woodworkers all our lives and hope that you will join us for an entertaining experience. Check us out if you like. We are old members of the Hendersonville business community, belonging to the Chamber of Commerce. If you are not 100% satisfied with your subscription, your money will be refunded. Use the coupon or just send your name and address along with your check or money order for your subscription. We guarantee you'll love it.

- BEGINNING, INTERMEDIATE, ADVANCED PROJECTS INCLUDING PHOTOS AND PLANS
- LARGE 9" X 12" SIZE ON HIGH QUALITY GLOSSY PAPER
- ALL STYLES OF FURNITURE AND PROJECTS
- TWO OF THE BEST COLUMNISTS, ERNIE CONOVER AND GEORGE FRANK
- INSTRUCTIONAL ARTICLES ON ALL PHASES OF WOODWORKING
- VISITS TO OTHER WOODWORKERS
- SECTION ON JIGS AND FIXTURES
- SHOW DATES, SUPPLY SOURCES, BOOK REVIEWS
- UNUSUAL ARTICLES OF SUBJECTS RELATED TO WOODWORKING

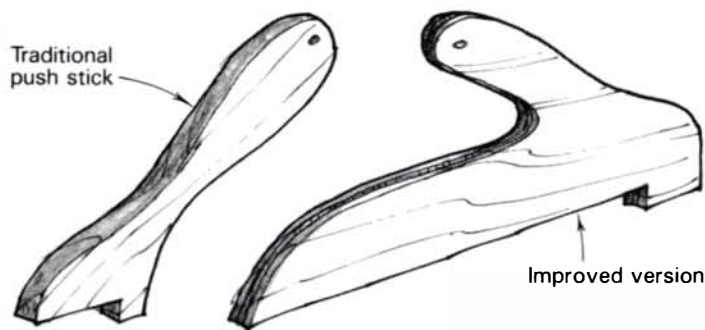
The American Woodworker

JM Publications, Inc. - Dept. FW-1
13 Walton Mall. P. O. Box 1408
Hendersonville, TN 37075

Yes! Start my subscription immediately.
☐ \$10.00 check or money order enclosed

PLEASE PRINT

Name _____
Address _____
City _____ ST _____ ZIP _____



the design shown at left in the sketch. The major shortcoming of this design is that it does little to counteract the table saw's tendency to lift the work off the table.

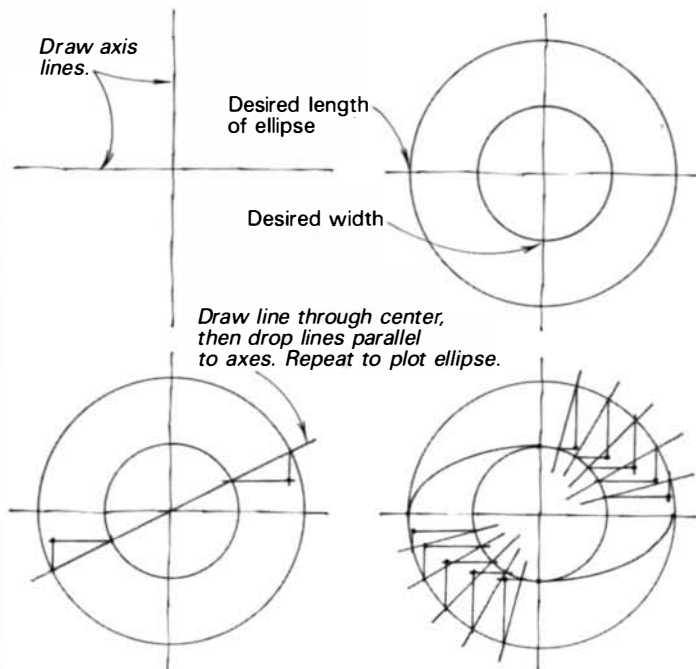
The alternative design, shown on the right, ensures a downward thrust on the work. In production runs, this design is safer and less fatiguing because you need only push forward, rather than forward and down. You can make wide push sticks from solid wood, but for narrow ones choose plywood, otherwise the step on the bottom of the stick may split off.

—Angelo Daluisio, Lancaster, N.Y.

Quick tip: I tried various safety glasses and face shields, but none kept my belt sander's dust out of my eyes, not until I donned a pair of motocross goggles. These have impact-resistant lenses, lightweight plastic frames, one-way ventilation and a detachable face mask—all for \$15 from the local motorcycle shop. Success at last!

—Tim Rott, San Jose, Calif.

Ellipse layout revisited



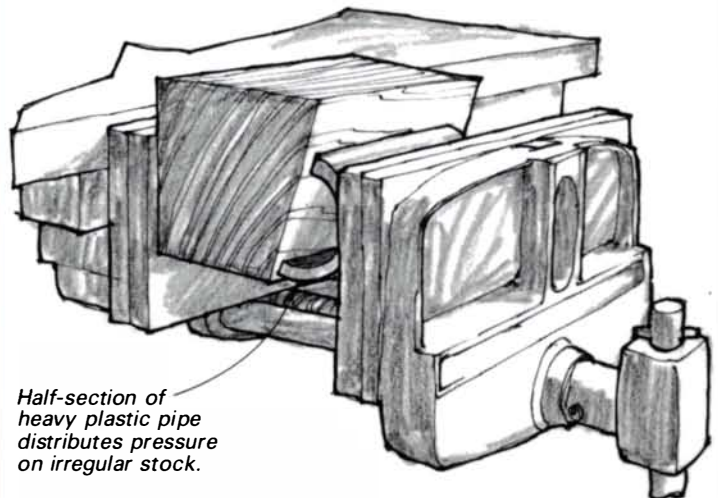
When laying out an ellipse, most people care more about its finished length and width than about the distance between the two focal points. The draftsmen's method shown in the sketch gets directly to the point without requiring calculations and gadgets.

—Lawrence Whytock, Brockville, Ont.

Quick tip: When I have a lot of power-sanding to do—either finish, belt or disc—I always wear a handball players' glove. It's ventilated on the back for comfort, and the palm is padded, which helps cushion some of the vibration. I can sand for hours without getting that "tingling" sensation in my hand and arm.

—R. Broberg, Huntington Beach, Calif.

Clamping odd shapes



Half-section of heavy plastic pipe distributes pressure on irregular stock.

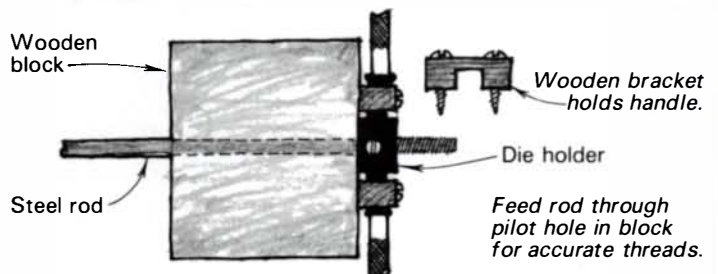
To hold odd-shaped workpieces in your bench vise, cut a section of heavy plastic or iron pipe in half and place the half-round against the workpiece. The pipe will distribute the pressure and hold the workpiece securely.

—Albert T. Pippi, Baltimore, Md.

Quick tip: A scrub plane cuts fast and clean because its iron is ground to a slight curve—the center cuts deep and the corners feather out of the wood. Instead of shelling out \$35 for a scrub plane, I just bought a replacement iron for my jack plane and ground it to a gentle curve. When the board gets down close to thickness, I switch back to my regular iron and finish up.

—Ben Barclay, Gibsons Landing, B.C.

Alignment block for accurate threading



I wanted to make my own maple handscrews, but found that freehand threading of the $\frac{5}{16}$ -in. steel rods invariably resulted in erratic thread patterns and wobbly clamps. I solved the problem by drilling a pilot hole through a 2-in. block and fastening my die holder directly over the hole with little maple brackets. To ensure firm clamping pressure, the cutouts in the brackets should be a fraction shallower than the height of the handles. I now get perfect threads every time, both right-hand and left-hand, and have produced a number of beautifully functional clamps at a fraction of store-bought prices.

—Chris Clark, Winnipeg, Man.

Quick tip: Magnetic bars are dandy tool holders, but they aren't cheap. Here's how I double their capacity: I mount the bar out from the wall on $\frac{1}{2}$ -in. spacer blocks and stick my infrequently used tools to the rear surface, handles up. My everyday tools go on the front, handles down. It's like getting a 50% discount.

—Doug Hammer, Solon Springs, Wis.

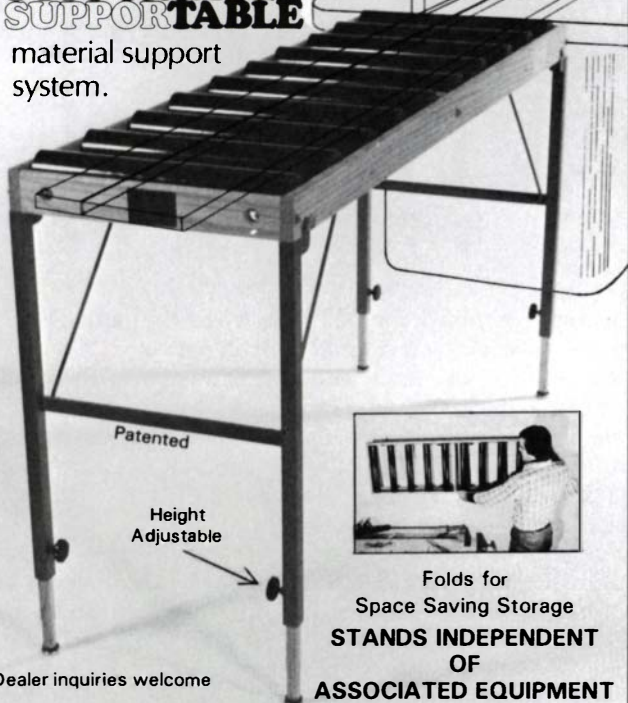
Clothes-iron shop applications

An ordinary clothes iron can simplify two furniture repairs: raising dents and reattaching loose veneer. To use the iron to remove dents and dings, set the heat to "cotton" or "wool,"

the Affordable
SUPPORTABLE
SUPPORTABLE
SUPPORTABLE

material support
system.

New!

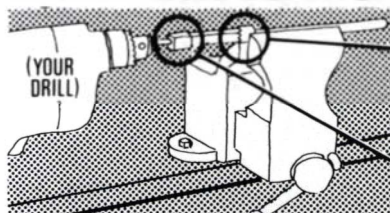


Dealer inquiries welcome

STANDS INDEPENDENT
OF
ASSOCIATED EQUIPMENT

For information write
TURNING POINT, INC. • BOX 9303A • VILLAGE WEST • FARGO, ND 58109
701-645-2319

MAKE YOUR OWN DOWELS! ANY LENGTH...ANY WOOD



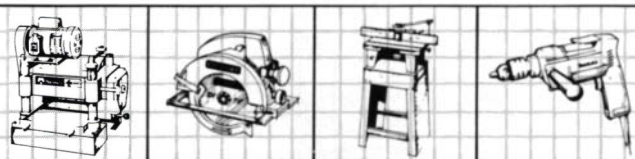
Buy My 5
Steel Dowel
Cutters—
 $\frac{3}{16}$ • $\frac{1}{4}$ • $\frac{3}{16}$ • $\frac{3}{8}$ • $\frac{1}{2}$
and special 3 pc.
aluminum chuck.

DUDS DOWEL CUTTERS

15913 Amherst Rd.
Birmingham, MI 48009

Write for more information.

\$20.00 PPD.
Money Back Guarantee
Other Sizes Available



Quality Power Tools at Affordable Prices!

Call toll free: 1-(800) 821-5177



Glenn Wing
POWER TOOLS

1437 S Woodward Avenue
Birmingham, Michigan 48011

1-(800) 448-1572
(NATIONAL)
(MICHIGAN)



POWERMATIC • DELTA • PORTER-CABLE • AEG • SHOP-VAC
MAKITA • BALDOR • MILWAUKEE • BOSCH • BOICE CRANE



ASHMAN TECHNICAL LTD.

Machinery • Tools • Shop Equipment
351 Nash Road N., Hamilton, Ont., Can. L8H 7P4
(416) 560-2400



Rockwell

WINTER SPECIALS



**10" ROCKWELL
DELTA UNISAW**
Made by Rockwell/Canada
Model 34-457 SX
"WITH CARBIDE BLADE"
3 H.P. Single Phase—230 V
Magnetic Starter
Electricals meet Canadian regulations
and may differ from U.S. specs.

\$1290. U.S. Funds

Unifence Model

\$1450. U.S. Funds



**DELTA RC-33
13" PLANER**
Model 22-651
2 H.P. Single Phase — 230 V
\$1140. U.S. Funds

MORE SPECIALS!

6" Jointer #37-220 \$540.U.S.
12" Wood Lathe #46-201 \$870.U.S.

SHIPMENTS FREIGHT COLLECT — NO OTHER CHARGES

FREE CATALOG THE EXTRAORDINARY SCREWDRIVER AND SCREWS



This exciting product—THE SQUARE HEAD—is now available to
woodworkers at all levels of skill.

Used for years by the finest furniture manufacturers. It makes the
Phillips and slot heads obsolete.

Essential for everyone's shop. Send for Free Catalog or send for
starter set \$8.50 plus \$1.50 shipping (add 5.5% in Ohio), and
discover why so many woodworkers prefer Square Heads. Master-
Card and Visa welcome.

JEGT INDUSTRIES
P.O. Box 5264, Dept. FW
Poland, Ohio 44514

PREMIUM VENEERS

Our 1985 Veneer Catalog is a must
for every professional woodworker's
reference library.

Send \$1.

WOOD SHED

1807 Elmwood Ave, Dept 29 Buffalo, NY 14207
716-876-4720

The Veneer Specialists



wet a cotton cloth pad and place it over the dent. Press the iron to the pad for two or three seconds and check your progress. Repeat the procedure until the dent is flush.

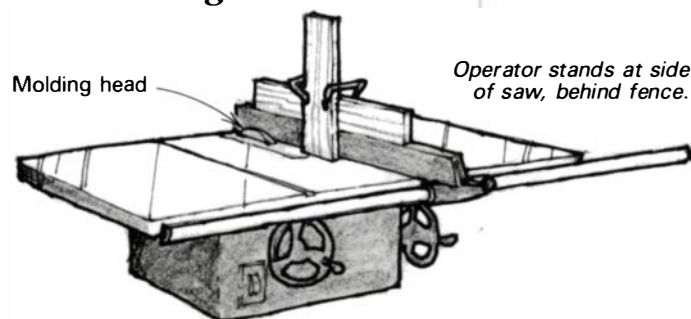
To repair loose veneer, place a damp cloth between the iron and the work. Apply the iron to the spot, taking care to move it about so as not build up the heat too fast—the veneer will scorch if you're not careful. This method doesn't work with some adhesives, but most old furniture was veneered with hide glue, which will reactivate and hold the loose veneer down again.

—Rollie Johnson, Sauk Rapids, Minn.

Quick tip: My shop iron steams out a dent only once in a while, but it does daily work keeping my coffee warm. The iron lives hot-side-up in a wall bracket that's bandsawn to hold it securely.

—Robert H. Hoelzer, Seattle, Wash.

Safe molding on the tablesaw



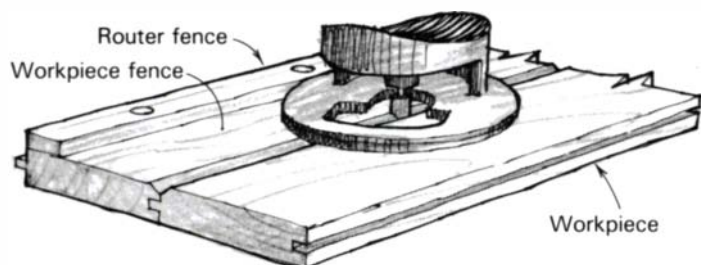
After I had a \$1300 accident at my jointer last year, I have a renewed interest in safety. The scariest operation I know is using the molding head on the tablesaw to shape short vertical boards such as drawer fronts. I have rendered this operation relatively harmless by clamping the drawer front to a long board that rides the top of the rip fence. I guide the work through the blade, standing to one side of the saw behind the rip fence.

—Richard Tolzman, Excelsior, Minn.

Quick tip: Anyone who restores furniture knows how difficult it is to match the original wood, stain, leather and so on in damaged pieces. To make life easier for the restorers who follow me, I always include samples of such things somewhere in each piece I build. Sometimes I make a drawer a little short to allow room for a package clearly labeled "parts," or I attach the package to the bottom of the carcass. Stain for touch-ups goes in a corked test tube, doubly protected with sealing wax. I also identify the finish and include any other pertinent information.

—Pendleton Tompkins, San Mateo, Calif.

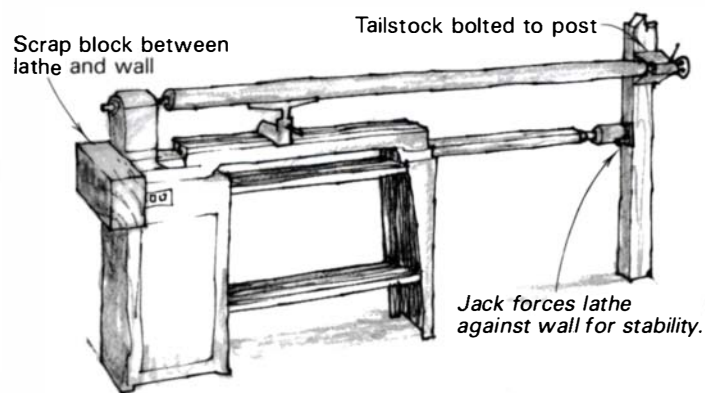
Routing V-grooves in tongue-and-groove



To produce identical chamfers on matching edges of tongue-and-groove stock, I use an extra piece of stock with a nailed-on router fence, as shown in the sketch. Both the tongued and the grooved edges can be pushed flush to the jig, ensuring a balanced V-groove in the finished work and eliminating the extra setup that would be required with a shaper or a tablesaw. You could adapt the idea to a router table just as easily.

—W.A. Ward, Underhill, Vt.

Extending lathe capacity



Here's how I extended the bed capacity of my lathe. First I bolted the tailstock to a support post in my shop. To make sure the tailstock was level with and in line with the headstock, I ran a chalkline and a line level between the two. To keep the lathe in position, I used an hydraulic cylinder to force the lathe's base against the wall—a spare Lally column would work nearly as well. A piece of scrapwood protects the lathe where it presses against the wall.

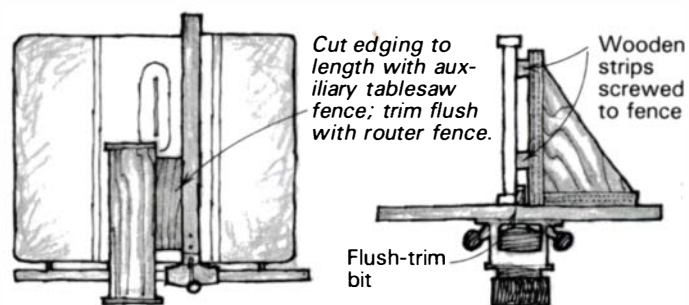
For slightly shorter stock, you could shim the lathe out farther from the wall, or dispense with the jack by bolting the lathe to the floor where you need it. I did half the turning and then flipped the workpiece to finish, so I could use my regular tool rest. If you have a freestanding tool rest, you can do the work all in one shot.

—D. Mayerson, Berkeley, Calif.

Quick tip: When laying out $\frac{1}{4}$ -in. holes for shelf supports on cabinet sides, cut a strip of $\frac{1}{4}$ -in. pegboard and use the holes as a drill guide.

—Richard Tolzman, Excelsior, Minn.

Edging plywood drawer fronts



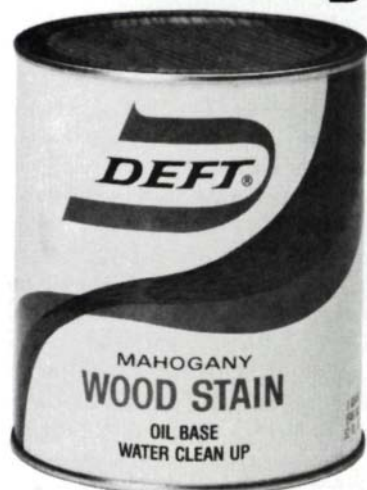
Here are a couple of tricks I use to apply solid-wood edging to plywood drawer fronts. The first is a simple auxiliary tablesaw fence to trim the edging to length. I glue the edging to the ends of the drawer, leaving a $\frac{1}{4}$ -in. overhang. Then, with the auxiliary fence adjusted for a perfect flush cut, I simply push each corner through the saw.

To trim the edging flush with the face of the drawer front, I use the router table setup shown in the sketch. Make a tall fence for the router table and screw a couple of wooden strips to it. Chuck a ball-bearing flush-trim bit in the router and adjust the fence so the bearing is flush with the surface of the strips. When you run the panels through, the edging rides under the bottom strip and the tall fence makes it easy to keep the panel perpendicular.

—Rick Turner, Petaluma, Calif.

Methods of Work buys readers' tips, jigs and tricks. Send details, sketches (we'll redraw them) and photos to Methods, Fine Woodworking, Box 355, Newtown, Conn. 06470. We can acknowledge contributions only when the final decision has been made. We'll return those that include an SASE.

User Friendly



Deft, Inc., Irvine, CA 92714 • Alliance, OH 44601

DOMESTIC & FOREIGN HARDWOODS

Quality stock for Cabinet Work

Most all sizes from 1" up to 4" in thickness

HARDWOODS

ASH—BASSWOOD
BIRCH—BUTTERNUT
CHERRY—CHESTNUT
EBONY—MAPLE—OAK
POPLAR—ROSEWOOD
TEAK—WALNUT
Also hardwood plywoods

SOFTWOODS

SUGAR PINE—CYPRESS
CEDAR—SPRUCE
DOUGLAS FIR etc.

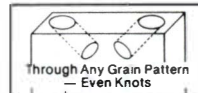
MAURICE L. CONDON CO., INC.

248 Ferris Avenue
White Plains, N.Y. 10603
914-946-4111
Monday through Friday
8 AM to 4:30 PM

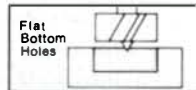
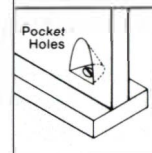


FORSTNER BITS MADE IN AUSTRIA!

We will not be undersold by anyone even though our Forstner bits are of the highest quality available.



Bore clean, effortless holes in any wood (even thin stock, veneer, end grain and knots!). These bits will make all other wood bits in your shop obsolete.



MODEL	SIZE	PRICE EACH	
G1260	3/8"	\$ 5.50	Prepaid to you
G1261	1/2"	\$ 6.25	Prepaid to you
G1262	5/8"	\$ 7.00	Prepaid to you
G1263	3/4"	\$ 7.75	Prepaid to you
G1264	7/8"	\$ 8.50	Prepaid to you
G1265	1"	\$ 9.25	Prepaid to you
G1266	1 1/8"	\$10.00	Prepaid to you
G1267	1 1/4"	\$10.75	Prepaid to you
G1268	1 3/8"	\$11.50	Prepaid to you
G1269	1 1/2"	\$12.50	Prepaid to you
G1270	1 5/8"	\$14.00	Prepaid to you
G1271	1 3/4"	\$15.00	Prepaid to you
G1272	1 7/8"	\$17.00	Prepaid to you
G1273	2"	\$18.50	Prepaid to you
G1274	2 1/8"	\$19.95	Prepaid to you

Buy the complete set and save \$38.45!

15 pc. set from 3/8" to 2 1/8" inclusive.

ONLY \$135.00
Prepaid to you!

We ship real fast . . .
TRY US.



PHONE OR CALL YOUR ORDERS IN USING YOUR CREDIT CARD. PAYMENT BY REGULAR CHECK WILL DELAY SHIPMENT 3 WEEKS. MINIMUM ORDER REMAINS AT \$20.00 PLEASE.

GRIZZLY IMPORTS, INC.

P.O. BOX 2069, BELLINGHAM, WA 98227 • PHONE (206) 847-0801



IF YOU THINK YOU CAN CUT CORNERS WITH AN OLD BLADE, PUT IT TO THE TEST.

Because your work demands tools of exacting and delicate precision, we make X-ACTO® knife blades both sharp and precise. But because our blades can't keep their accuracy forever, we also make them easily replaceable.

THE X-ACTO TEST

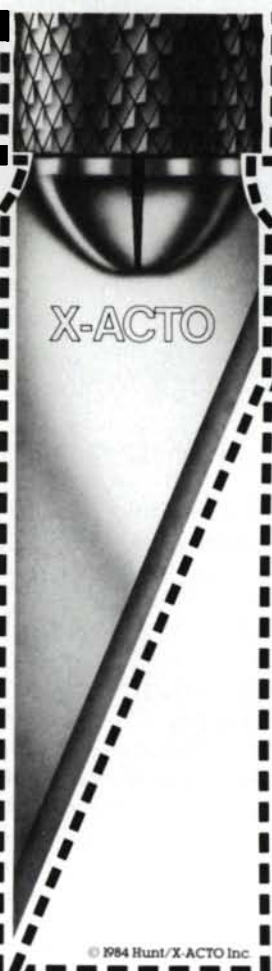
A sharp X-ACTO blade will maneuver smoothly along the curves and corners of this dotted line, making the kind of clean cut you expect in your work. If, however, your blade drags, shreds, slips or catches somewhere along the line, then it's no longer giving you the precision your work demands. In which case, it's time to replace your X-Acto blade with a fresh one.

When used properly, your X-Acto knife will become indispensable. But when used frequently, remember that the blade is disposable.



X-ACTO
CRAFT KNIFE BLADES

Put new life
in your X-ACTO knife.



© 1984 Hunt/X-ACTO Inc.

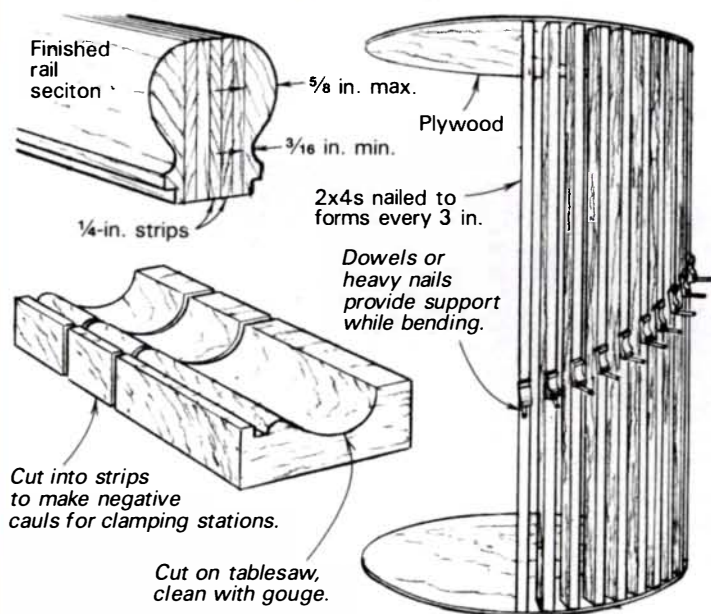
Curved handrail

I'm making a winding staircase and need help with the curved railing. What's the best way to bend 2½-in. thick stock? How do I profile the curved rail on the shaper?

—Hap Davis, Calgary, Alta.

Gary Boudreaux replies: Forget about bending 2½-in. thick stock. Laminate your railing. I've had good luck laminating handrails as shown in the drawing. Make the outer layers as you would any molding and laminate them to flat inner pieces no thicker than ¼ in. These inner laminations should be wider than the finished railing and planed to shape after glue-up.

For bending and clamping, you need to make a negative caul of the molding out of a soft wood like pine. Cut this caul into short pieces to support the rail and to give it backing at its clamping stations. Depending on your staircase design, you may be able to bend the railing around the outside stringer. If not, you'll have to build a bending form from plywood and 2x4s as shown, the same diameter and height as the staircase. The railing will follow the same rise and run as the stair treads, so lay out the clamping stations accordingly. I find it helpful to do a dry run. When everything is laid out properly, apply a slow-setting glue like yellow glue to the laminations, then drive a finishing nail through the entire stack, right in the middle of its length. This will help keep the laminations from sliding out of alignment. With at least one other person to help, start clamping in the middle and work out toward each end, bending and clamping as you go.



The only problem I've had with this system is the need for so many clamps (two every 3 in.). The thin lower edge of the railing wants to flare out, so use plenty of clamps to avoid gaps in the laminations.

[Gary Boudreaux builds staircases in Nevada City, Calif.]

Plunge routers on a router table

Whenever Fine Woodworking shows a router, it's invariably a powerful plunge router. Most articles about router tables, however, show a smaller, standard router, usually a Sears. Are the large plunge routers inappropriate for use in router tables? It seems to me that the extra power would be a definite advantage.

—Jim Monroe, Beaver, Pa.

Jim Rome replies: You usually see Sears routers on router tables because they're relatively inexpensive. You can bolt one on and forget about it. Because a large plunge router has lots of power and handles those sturdy ½-in. shank bits, it would

be great on a router table except for one problem: it's hard to accurately adjust the depth of cut because you have to push upward against the stiff plunge spring.

[Jim Rome wrote about making blind finger joints on a router table in FWW #46.]

Matching solid wood and plywood

Why does hardwood plywood take stain differently than solid wood of the same species? I've had problems with mahogany, red oak and birch no matter what type of stain I used. How can I make the colors match?

—Winston P. Lord, New York, N.Y.

George Frank replies: Hardwood plywood is faced with veneer, and because of the way it's manufactured, veneer soaks up more liquid than solid wood. Generally speaking, veneers are sliced from log sections that have been soaked and heated. In the veneer-cutting process, the fibers develop small cracks called knife checks, while in solid wood most of the fibers are intact. Only the most expert human eye can detect the difference between these two surfaces, but a drop of water can do the job unerringly. The solid wood will absorb the moisture reluctantly and slowly; veneer, with zillions of microscopic storage spaces among the cracked fibers, will gobble it up eagerly. If the drop of water contains a dye—red, for example—the veneer will become an angry red, while the solid wood dyes only a blushing pink.

Put the lid on those empty pores. After final-sanding, spray a thin coat (it's called a wash coat) of shellac on the veneer only, not the solid wood. The alcohol solvent will evaporate quickly, but an invisibly thin coating of the shellac will remain in the pores, sealing them. The sealed veneer will now absorb less liquid and, therefore, less pigment. When the shellac is dry, sand lightly before applying dye or stain.

I ought to give you proportions for the wash, but I can't do that exactly. Only experimentation can determine the right proportions. I start with a base mixture of about 3½ lb. of shellac dissolved in a gallon of alcohol. For the wash coat, I dilute this base mixture with alcohol at the ratio of 1 part base mixture to 3, 4 or 5 parts alcohol by volume.

[George Frank, a retired master European wood finisher, lives in South Venice, Fla.]

Disassembling glue joints

I repair old furniture, and would like some tips on breaking glue joints.

—Henry J. Retzer, Beltsville, Md.

Dick Boak replies: Heat or moisture or both will release most wood-glue joints. White glue seams will often release simply with warm water. A common trick is to inject warm water directly into the seam with a hypodermic syringe. A tiny hole can be drilled if necessary to allow access to hidden mortises or dovetails. It is also helpful to wrap the seam with a damp cloth for several hours, as it often takes that long for dried glue to reabsorb moisture and become tacky.

Heat will always quicken the softening process of most old glues (except plastic resin glue). Sunlamps, heat lamps, heat guns, hair dryers, even ordinary light bulbs work well for this purpose. A household iron can be used to heat a wider area, but use a towel or some other means of protecting the wood to keep the finish from being damaged by the heat.

Many guitar repairers use steam to release the neck-to-body dovetail joint. Steam has the advantage of carrying heat and moisture simultaneously. You can make a makeshift steam pot from an old coffee pot or tea kettle, but the ideal setup is a cappuccino pot, available in gourmet stores. Most of these units generate a relatively dry, high-pressure steam, and have a cutoff valve and a self-tripping safety release valve. To use, attach a length of reinforced heat-resistant hose to the output

ULTIMATE DOVETAIL JIG

NEW tapered sliding dovetail template.

Ball bearing guided, cam clamps, machine & hand dovetails up to 16" wide.



DOVETAILS

- Half inch machine
- Quarter inch machine
- Half inch hand type
- Half inch box joint

FOR BROCHURE WRITE

WOODMACHINE COMPANY

• 2509 SHELLEY RD. • RALEIGH, N.C. 27612 • 919-782-0178



Hardwoods of Memphis

Fine Woods and Tools

1-800-321-5239

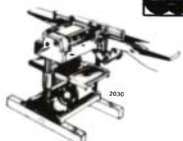
2267 JACKSON AVE., MEMPHIS, TN 38182 901-452-9663

HARDWOODS OF NASHVILLE 615-889-9555

2000 ELM HILL PIKE, NASHVILLE, TN 37210

HARDWOODS OF LITTLE ROCK 501-758-5020

5105 McCLANAHAN DR., N. LITTLE ROCK AR 72116



DELTA-ROCKWELL

28-243 14" Band Saw \$535
37-609 6" Jointer \$295
34-410 10" Cont. Saw \$755
34-010 9" Miter Saw \$155

HITACHI

F1000A Planer Jointer \$1340
F100F 12" Planer \$1070
B600A 14" Bandsaw \$1540

RYOBI

R-150 1 HP Plunge Router \$80
R500 3 HP Plunge Router \$165
Cordless Driver/Drill \$80

MAKITA

2030 Planer Jointer \$1280
2040 15 1/2" Planer \$1170

• Most Tools Prepaid Freight •

HARDWOOD LUMBER OUTLET

AT ANDERSON & McQUAID SINCE 1946

10,000 BD' ON DISPLAY - 100,000 BD' INVENTORY

• HARDWOODS

• SOFTWOODS

• EXOTIC WOODS

ASH
BASSWOOD
BEECH
BIRCH
BUTTERNUT
CHERRY

HOLLY
MAHOGANY, SA
MAPLE, HARD
MAPLE, BIRDSEYE
MAPLE, CURLY
OAK, RED

OAK, RED RIFT
OAK, WHITE
OAK, WHITE RIFT
PINE, EASTERN C&B
POPLAR
WALNUT, AMERICAN

AFROMOSIA
AVODIRE
BOCOTE
BUBINGA
COCOBOLO
EBONY, INDIAN
EBONY, MACASSAR

GONCALO ALVES
GRANADILLO
LIGNUM VITAE
MORADO
OAK, ENG. BROWN
OSAGE ORANGE
PADOUK

PEARWOOD, EUROPEAN
ROSEWOOD, EAST INDIAN
SHEDUA
TEAK
WENGE
YEW
ZEBRA
ZIRICOTE

ALL STOCK FACED/D2S/RIE/SANDED 2 FACES
PRECISION CUT TO SIZE - CUSTOM MILLWORK
MILL DIRECT ORDERS - ROUGH LUMBER
RESTORATION MOULDINGS

NO ORDER TOO LARGE OR TOO SMALL

FREUD SAW BLADES & ROUTER BITS

617-876-3250

HOURS: MON TO FRI 7:30-4, SAT 8:00-12

170 FAWCETT ST., CAMBRIDGE, MA 02138

(OFF CONCORD AV. NEAR FRESH POND ROTARY)

CALL OR WRITE FOR PRICE LIST

Wood Moisture Meters

Pocket-Size
MINI
LIGNO

\$110

Only



High quality moisture tester for the serious
hobbyist or the professional woodworker:

- Moisture range 6-20%, indicates 1% steps
- Battery safe on/off switch between pins
- Portable with protective cap over pins
- Rugged case in high impact plastic
- Handy shape for convenient use
- For lumber, veneer, fiberbrds

Call toll free 800-227-2105

Free brochures on line of
moisture meters (range
4-30%, 4-60%) and acces-
sories to monitor air and
kiln drying available.

Lignomat
USA LTD

P.O. Box 30145 fw
Portland, OR 97230

Tel: 800-227-2105
503-257-8957

Sharpen your tools the Samurai way!

KING DELUXE WATER STONES from the original supplier of
Japanese woodworking tools in the U.S.A. King water
stones make it possible to obtain a razor edge with ease.

1. #1000 grit coarse stone for fast initial sharpening:
8" x 2 1/2" x 1 3/8". 2. #6000 grit polish stone
for final honing and polishing: 7" x 2 1/8" x 1/2".
Two stone set... \$18.50 postpaid.

Full instructions and latest catalog included.

THE JAPAN WOODWORKER

1731 Clement Ave., Alameda, CA 94501 / Phone (415) 521 1810

Enclosed is check, money order. ☐ Catalog only... \$1.50

Credit card number:

NAME

ADDRESS

Phone No.

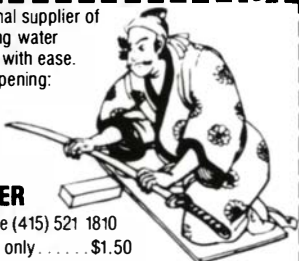
CITY

Calif. residents add sales tax.

STATE

ZIP

FW



THE HEAVYWEIGHT

BUILT FOR THE PROFESSIONAL / PRICED FROM \$239

The Heavyweight is entirely American-made
with top-quality materials and construction.
It's priced for the hobbyist, but tough
enough for the professional wood worker.

A 1/2HP motor with four-step
pulley provides power to spare for
turning, sanding, grinding,
buffing and drilling. Accessories
include a complete tool
turning set and a face
plate and sanding disk
for outboard
turning.

12" Wood Lathe

Ground steel ways.

100% American-made.

Cast iron head & tail stocks.

52" long; 38" between centers.

Sealed ball bearing head stock.

Free brochure on request.

WILLIAMS & HUSSEY MACHINE CO.

Dept. 52, Milford, NH 03055

Toll-free: 1-800-258-1380 In NH: 1-673-3446



valve with a hose clamp. Put a basketball needle valve or a hypodermic needle on the other end, to enable the steam to reach the bottom of a deep glue joint. A slight jolt with a mallet to break the seam, followed by a gentle rocking motion during steaming, should release almost any seam quickly and easily. Seams that have been lacquered or polyurethaned after assembly should be scribed before release so that you don't fracture the finish.

The above methods should work for all water-soluble glues. The solvents for some waterproof glues are as follows: acetone for cyanoacrylate; acetone or methyl-ethyl ketone for model cement; naphtha or rubber-cement thinner for contact cement; tetramethylguanidine for epoxy (heat aids release). [Dick Boak manages Woodworkers' Dream for C.F. Martin Co. in Nazareth, Pa.]

Decay resistance

If both are kiln-dried, which is more resistant to decay: Douglas fir or western hemlock? —Herbert W. Pratt, Boston, Mass.

R. Bruce Hoadley replies: Decay is caused by microorganisms in the wood. These require moisture to live, so if either wood is kept dry, there should be no problem. But if wood is exposed to moisture, particularly repeated changes from wet to dry, microorganisms thrive, and any decay resistance is determined by other factors.

The most important of these are toxic substances that the living tree deposits as waste products in its heartwood. Some species of trees produce these in abundance and are very resistant to decay; other species have few extractives and therefore little resistance. Industry imitates the tree by impregnating lumber with preservatives that both resist moisture and inhibit the microorganisms. My book, *Understanding Wood* (The Taunton Press, 1980), has a table that grades natural resistance—Douglas fir is classified as being moderately resistant, and the hemlocks as slightly or non-resistant. Keep in mind that this refers only to heartwood; sapwood doesn't have extractives, and is prone to rot unless chemically treated. Extractives, by the way, are a mixed blessing—some of the natural deposits are quite hard, and quickly dull cutting tools.

[R. Bruce Hoadley is professor of wood science at the University of Massachusetts at Amherst.]

Fastener holding strength

Which has the greater holding power: a sheet-metal screw, a common wood screw, a lag screw, or a screw in a threaded metal insert?

—Pat Warner, Escondido, Calif.

Daniel Cassens replies: Due to the variability of fasteners and woods, it's virtually impossible to provide a precise answer to your question. Testing a fastener in a particular application will provide the most accurate information, but there are formulas that can help indicate general trends.

The withdrawal strength of a threaded metal insert can be predicted by the formula $F_2 = 1.188D^{0.25}L^{1.25}S$, where F_2 = the withdrawal strength of the insert, D = insert diameter, L = insert length, and S = shear strength of the wood in PSI parallel to the grain at the current moisture content.

Insert length and wood shear strength are much more important than the diameter of the insert. For example, a threaded insert 0.33 in. in diameter that's threaded 0.50 in. into the face grain of sugar maple at 7% moisture content will have a calculated withdrawal strength of 1,015 lb. The same insert in yellow poplar, a relatively lightweight wood, will have a withdrawal strength of 518 lb. These values assume that the pilot hole is the same as the insert's root diameter. The finer the thread on the insert, the greater the withdrawal strength. Withdrawal strength from the end grain is substantially lower.

The withdrawal strength of common wood screws from face grain can be predicted by the equation $F_2 = 3.204D(L - D)^{0.75}S$, where F_2 = screw diameter in inches, L = depth of penetration of the threaded portion of the screw, and S = shear strength of the wood in PSI parallel to the grain at the current moisture content. For example, the withdrawal strength of a #10 wood screw with ½ in. of thread inserted into the face grain of hard maple is 678 lb.; for yellow poplar, it's 346 lb. For 1-in. penetration, the values are 1400 lb. and 711 lb., respectively. A correction in length is needed to take into account the fact that the tip of the screw isn't as effective in resisting withdrawal loads as is the full-diameter shank portion. If this tip effect isn't figured in, the strength of short screws will be greatly overestimated.

I recommend that the pilot-hole size for wood screws be 70% of the root diameter of the screw. In dense woods, however, the pilot-hole size may have to be increased to prevent splitting the wood or twisting off the head of the screw.

In some cases, self-tapping screws may give an increase in holding strength from 5% to 9% over common wood screws. Self-tapping screws applied with a pilot hole have also outperformed wood screws. Differences between screw types appear small, however, and are compounded by depth of penetration and pilot-hole size, if any.

Formulas haven't been developed to predict the withdrawal strength of lag screws. There's no reason to expect their strength to be greater than that of common wood screws and it may, in fact, be less.

[Daniel Cassens is associate professor of wood products at Purdue University in West Lafayette, Ind.]

Blushing lacquer

What causes lacquer to blush when sprayed at high humidity? Why will a mist coat with a large percentage of thinner blush, while a coat of unthinned lacquer won't? When spraying a guitar body, you can often see the pattern of the internal bracing when blushing occurs; the braces seem to inhibit blushing, which occurs everywhere else on the thin soundboard and back. Why?

—Abraham Wechter, Pau Pau, Mich.

George Morris replies: Lacquer blushes when atmospheric water vapor condenses on the newly sprayed surface. When lacquer is sprayed, the sudden release of compressed air and the extremely high evaporation rate of the lacquer thinner combine to super-cool the surface, inviting condensation. The more thinner, the more cooling, which explains why the unthinned lacquer doesn't blush. The internal bracing in a guitar body acts as a heat sink, warming the lacquer and reducing the blushing effect directly over the brace.

To avoid blushing, avoid spraying on especially humid days. If you must, use a retarder to slow the evaporation rate. When blushing does occur, allow the lacquer to dry at least an hour, then wipe with 0000 steel wool.

[George Morris makes guitars in Post Mills, Vt. He wrote about lacquer finishes in *FWW* #31.]

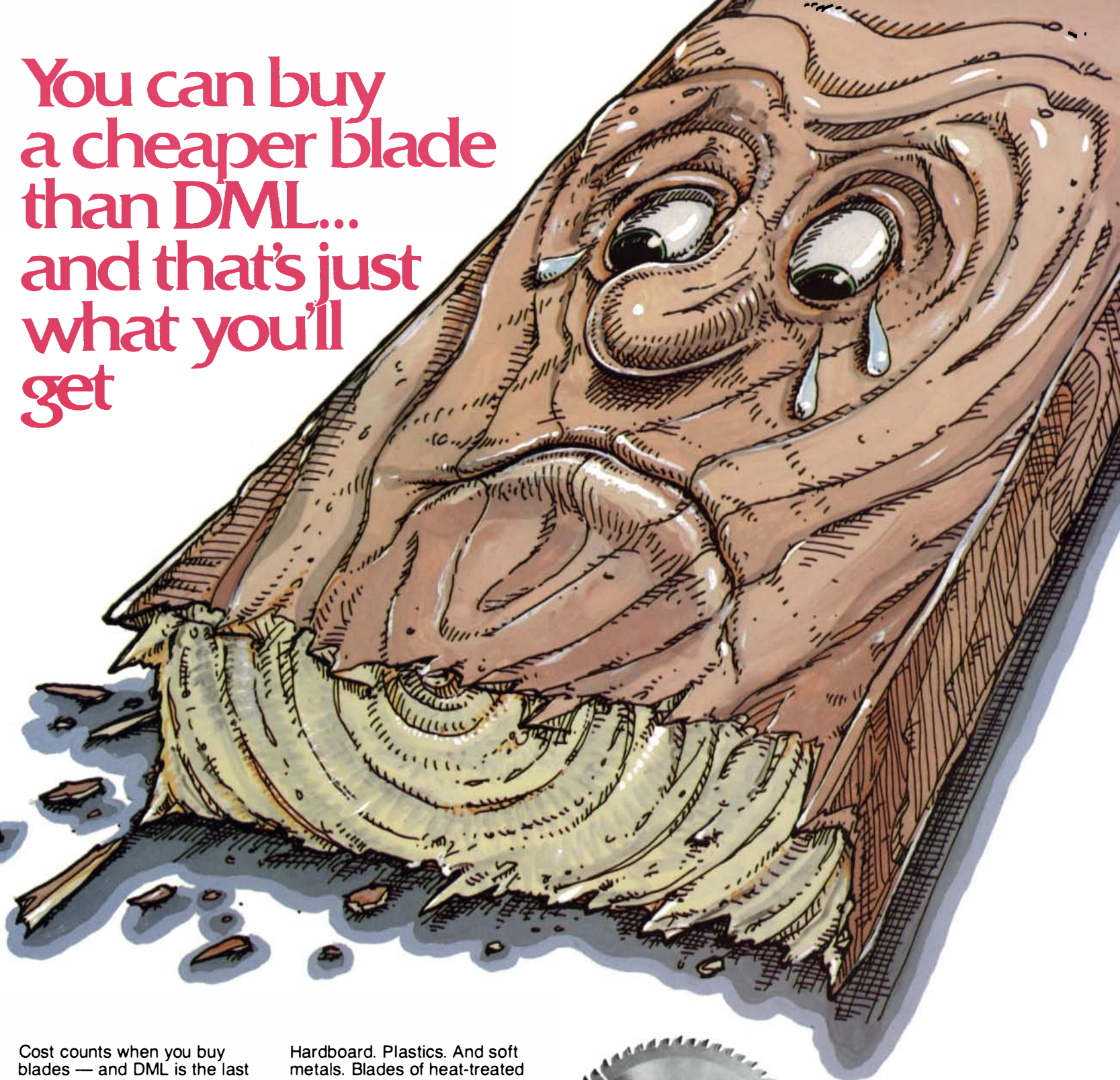
Glue for cutting boards

Which glue is best suited for cutting boards and other kitchen utensils? Is casein glue sufficiently waterproof? Is waterproof resorcinol glue nontoxic after curing?

—William Zorumski, Poquoson, Va.

George Mustoe replies: Glues for kitchen utensils must be waterproof and chemically inert. The glue bond must withstand organic acids, bacteria and hot detergent solutions. The adhesive must also be free of any leachable toxic residues that could contaminate food. Transparent epoxy is a particularly good choice. Even though the uncured resin is toxic, the final glue bond consists of inert plastic. Resorcinol is probably safe,

You can buy
a cheaper blade
than DML...
and that's just
what you'll
get



Cost counts when you buy blades — and DML is the last to deny that fact. A sharp buyer always looks for the best saw for his money. But wait a moment before you plunk down your dollar. Realistically, do you know your seller and his wares? Are his prices always the best? Is he always promoting some sort of discount? Don't you wonder . . . why?

DML, also, runs the occasional promotion. But we feel we should give you more than just dollar inducements. And we do.

DML offers you a saw for your every application: crosscutting; ripping; trimming; general purpose sawing; combination cutting. For your work in wood.

Hardboard. Plastics. And soft metals. Blades of heat-treated tool steel. Dressed to industrial standards, tipped with premium carbide, diamond honed, precision balanced and tensioned. Over 250 in all. In a whole slew of sizes and configurations, to fit your portable and stationary equipment. Industrial quality saw blades, matched to your exact cutting needs.

In sum, DML believes in giving you the right saw blade for your work. And for a fair price. You see, we're a bit suspicious of a saw that's always marked down by its manufacturer. Maybe you should be, too.



For more information or the distributor nearest you, write DML, Inc., 1350 S. 15th Street, Louisville, KY 40210

NAME

COMPANY NAME

ADDRESS

CITY

STATE

ZIP

DML
Cutting everything but corners

A SUBSIDIARY OF VERMONT AMERICAN CORPORATION

but the dark red color can be a cosmetic disadvantage. Casein and urea-formaldehyde glues can be used for cutting boards and countertops, but their slight solubility in hot water makes them unsuitable for utensils that are likely to be washed frequently. Cyanoacrylate can be used for small repairs. [George Mustoe wrote about glues in *FWW* #43 and #44.]

Inlaying metal in wood

I want to inlay wood with brass and aluminum, but can't find enough information to get started. Can you help?

—J.C. Montague, Burnaby, B.C.

Tage Frid replies: All you need to do is cut a cavity with a router or carving tools and glue the inlay in place. Don't inlay strips of metal across the grain in solid wood—as the wood shrinks, the metal will pop out of the groove. Contact cement works well, but you can also fasten thin inlays with flake shellac. Rough up the back of the inlay and spread a few shellac flakes in the cavity. Put the inlay on top and heat the metal with an iron until the flakes melt. Remove the iron and quickly clamp the inlay in place before the shellac cools (put a piece of paper between the inlay and the caul so the clamp won't mar the work). When the metal is cool, file and sand it flush with the surrounding wood. Don't use a belt sander—friction heat will melt the shellac.

[Tage Frid is a retired cabinetmaker and professor emeritus at the Rhode Island School of Design.]

Inga wood

I purchased a piece of veneer from a local supplier who called it inca. I can't find anything about it in any of the books I've checked. Can you tell me anything about this wood?

—Judith Harcus, Lund, B.C.

Paul McClure replies: Your veneer is actually *Inga*, a genus in the *Leguminosae* family of about 250 species of trees and shrubs. Dense, heavy woods such as Brazilian and Indian rosewood, kingwood, bubinga and wenge are species in this family. Your veneer sample came from South America, probably from either Brazil or Argentina, where it is called *Inga rana* and *Inga del cerro*, respectively. The tree is used as a shade tree to protect the plantations of coffee and cacao. The lumber has a strong tendency to warp, cup and twist as it dries.

[Paul McClure is a dealer in exotic woods in Tempe, Ariz.]

Removing resin from softwoods

I make tables from local larch timber, and although it makes attractive furniture, the wood contains pockets of resin which tend to bleed. Can you suggest a cost/time effective way to remove the resin?

—Peter Byrne, Inverness, Scotland

Gene Wengert replies: Resin deposits in softwoods are quite common. These sticky substances are soluble in turpentine. The resin is a mixture of chemicals, some of which will flow at room temperature and bleed or exude from the wood for years after the wood is cut. In fact, the chemicals can bleed through paint and varnish. Other chemicals in the resin are hard at room temperature and flow only when heated.

The cure for softwood resins is to heat the wood to 160°F (71°C) or above for 4 to 6 hours near or at the end of drying. This procedure, called setting the resin, is commonly done in kiln-drying. It causes the soft chemicals to vaporize. When the wood cools, only the hard part of the resin remains. Unless the wood is reheated (for example, by excessive heat in sanding), the remaining hard resin will not pose a problem.

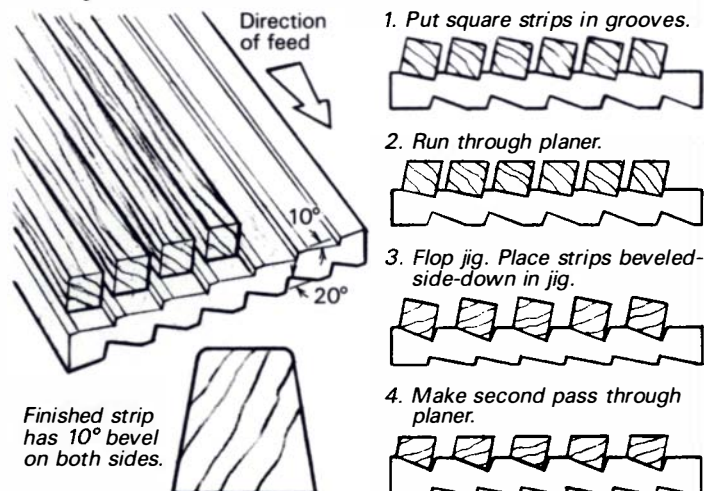
Hardwood resins, usually called gums, which can be found in cherry, Spanish cedar (a hardwood) and several other species, don't respond to this heat treatment.

[Gene Wengert is extension specialist in wood technology at Virginia Tech in Blacksburg, Va.]

Follow-up:

Re making tambour doors (*FWW* #48, pp. 54-58). The use of a jig provides a simple means of cutting the bevels on slats for tambour doors. Make the jig of ¾-in. plywood or particle-board wide enough to handle a number of slats and a few inches longer than the longest slats. The jig consists of grooves on both sides as shown in the drawing. Cut the grooves with a dado head on the tablesaw. The grooves on one side should match the desired bevel angle on the slat. The grooves on the other side should be twice the bevel angle. The jig illustrated makes a slat with a 10° bevel on each side.

To use the jig, first place the slats in the grooves that have the shallower angle. Then run the setup through a thickness planer. Make sure to run all your slats through before re-adjusting the planer for additional cuts.



After finishing the first bevel, turn the jig over and place the slats in the deeper angled grooves, with the uncut edge up. Again run the jig, slats up, through the planer.

This process provides a smooth bevel cut with the same degree of angle on each side of the slat. The main advantage of this process over using a tablesaw is the smoothness of the cut. Upon completing the bevel cuts, add small rounds to the two exposed edges of the slat with a shaper or a router table.

—David M. Lynch, Janesville, Wis.

Readers can't find:

... a parts list and owners' manual for a Sears Craftsman lathe model 101 07301.

William C. Fletcher, Upland, Calif.

... a tailstock for a Walker Turner wood lathe.

—Don Garlick, Bellflower, Calif.

Readers want to know:

I'd like to hear from anyone familiar with a DFDA-4 Polamco shaper.

—Frank Bowman, Boonsboro, Md.

The name and address of the manufacturer of a "K-16" 16-in. cast-iron tablesaw.

—H.C. Gilliland, Petersburg, Alaska

Sources of supply:

—Camauba wax flakes and cakes are available from Dusty Splinters Enterprises, PO Box 3204, Flushing, N.Y. 11386.

—Furniture pads for protecting furniture in transit are available from Tom Hogan, Transport Systems, Rt. 724, PO Box 428, Parker Ford, Pa. 19457.

—Thirty-inch long shell augers, for boring woodwind instruments, are available from Frog Tool Co. Ltd., 700 W. Jackson Blvd., Chicago, Ill. 60606.

Send queries, comments and sources of supply to Q & A, Fine Woodworking, Box 355, Newtown, Conn. 06470.

UltraSand™

The Ultimate In Heavy Duty Power Sanders

Simplicity, accuracy and neatness are all part of the new and affordable drum sander designed by Kuster Woodworkers.

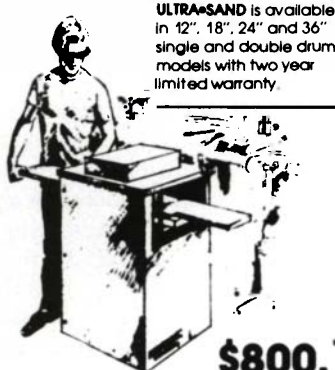
The work is laid on a table which adjusts vertically to the finish thickness desired. ULTRA-SAND™ Power Feed Roller System will handle the rest... automatically feeding your work at the proper speed for best results.

Large 6" diameter drums, covered with abrasive cloth belts, will surface plane wood across or with the grain. End grains are handled smoothly without chip marks, grain raising gouging or "washboarding."

No longer will you have to lug large pieces of wood to the cabinet or millwork shop for planing... ULTRA-SAND will reduce 3/4" wood to veneer.

The ULTRA-SAND Double Drum System offers rough to finish sanding in ONE PASS, with speed and accuracy.

Dust Collection System available on all models for hook up to your shop-vac for dust-free operation.



ULTRA-SAND is available in 12", 18", 24" and 36" single and double drum models with two year limited warranty.

\$800.*

*Model 12S



Double Drum model with large 6" heads and adjustable table.



Separate motors control sanding heads and feed rollers providing plenty of power for smooth, accurate operation.

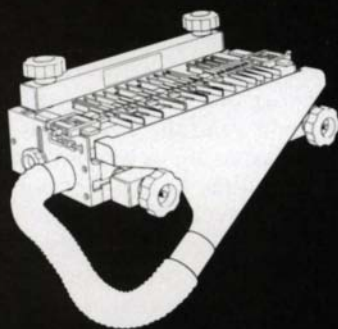
KUSTER WOODWORKERS

P.O. Box 34 • Skillman, N.J. 08558
(201) 359-4680

For a demonstration, call or write for dealer nearest you!

"A superb piece of equipment . . ."
"A significant advance . . ."

THE LEIGH DOVETAIL JIG MODEL D-1258



The only jig that allows you to cut infinitely variable spaced half blind and through dovetails with ease and accuracy.

For free brochure and ordering information:

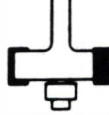
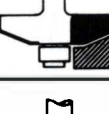
IN THE U.S. CALL TOLL FREE 1-800-663-8932
IN CANADA CALL COLLECT (604) 992-2440

Or Write:
LEIGH INDUSTRIES LTD. BOX 4646
QUESNEL, B.C., CANADA, V2J 3J8

LEIGH

CARBIDE TIPPED ROUTER BITS PROFESSIONAL PRODUCTION QUALITY SPECIAL OFFER — SAVE 50% - 75% BELOW COST

1000's SOLD TO READERS OF FINE WOODWORKING

BEST CUT BEST PRICE	ITEM NO.	DESCRIPTION	RADIUS	LARGE DIAM.	CUTTING LENGTH	PRICE
	#01	1/4" R	1/4"	1"	1/2"	\$13.00
	#02	3/8" R	3/8"	1 1/4"	9/16"	14.00
	#03	1/2" R	1/2"	1 1/2"	5/8"	15.00
	#04	1/4" R	1/4"	1"	1/2"	15.00
	#05	3/8" R	3/8"	1 1/4"	5/8"	16.00
	#06	1/2" R	1/2"	1 1/2"	3/4"	19.00
	#07	5/32" R	5/32"	1 1/4"	15/32"	18.00
	#08	1/4" R	1/4"	1 1/2"	3/4"	20.00
	#11	3/8" RABBETING	Deep 3/8"	1 1/4"	1/2"	14.00
	#09	1/8" (KERF) SLOT CUTTER		1 1/4"	1/8"	14.00
	#10	1/4" (KERF) SLOT CUTTER		1 1/4"	1/4"	14.00
	#12	45° CHAMFER	45° Angle	1 1/2"	5/8"	15.00
	#15	RAISED PANEL	20° Angle	1-5/8"	1/2"	25.00
	DOVETAIL BITS					
	#16	3/8" DOVETAIL 9°		3/8"	3/8"	7.50
	#17	1/2" DOVETAIL 14°		1/2"	1/2"	8.50
	CORE BOX (ROUND NOSE)					
	#19	3/8" CORE BOX	3/16"	3/8"	3/8"	11.00
	#20	1/2" CORE BOX	1/4"	1/2"	11/32"	14.00
	GROOVE FORMING OGEE					
	#22	1/2" GROOVING OGEE		1/2"	3/8"	16.50
	#23	3/4" GROOVING OGEE		3/4"	7/16"	21.00
	#24	1/4" Straight Bit	1/4"	1"		7.00
	#25	5/16" Straight Bit	5/16"	1"		7.00
	#26	3/8" Straight Bit	3/8"	1"		7.00
	#27	1/2" Straight Bit	1/2"	1"		7.00
	#28	3/4" Straight Bit	3/4"	1"		10.50
	#13	1/2" FLUSH TRIM		1/2"	1"	8.50
	#14	3/8" KEY HOLE (This Bit only HSS)				8.50
CUTS 3/8" KEY HOLE FOR FLUSH MOUNTING PICTURE FRAMES, ETC.						

WHEN ORDERING ANY 3 OR MORE, DEDUCT \$1.00 EACH
ALL PRICES POSTAGE PAID

- Professional Production Quality
- 1/2" Ball Bearing Pilot
- 1/4" Diameter Shanks x 1 1/4" Long
- One Piece Construction
- Two Flute Thick High Quality Tungsten Carbide Tips

To order by Master Charge or Visa Toll Free
7 Day — 24 Hour Order Service Call
1-800-523-2445 Ext. 56 (In PA 1-800-346-7511 Ext. 56)
or send check to: MLCS, P.O. Box 53, Rydal, PA 19046

Artists Design Furniture by Denise Domergue. *Harry Abrams Inc., 100 Fifth Ave., New York, N.Y. 10011, 1984. \$35.00, hardcover; 176 pp.*

To Miriam Slater it is "... freedom from the serious formality of the rectangle." To Howard Meister it is "... a broader, more general statement about humanity [and] an abstraction for the human body." To Roland Reiss it involves "... a language of cultural styles and the relationship between objects." What's the subject? Given that these quotes are all from contemporary artists, you might suppose them to be comments on abstract sculpture. In fact the talk is about furniture, and not the time-honored pieces in a museum collection, but the furniture they designed and built themselves. The quotes could go on for pages, which in fact they do in *Artists Design Furniture*.

Handsomely bound and well illustrated with more than 200 photographs, the book presents the furniture of 67 artists, the majority of whom are known for their painting or sculpture. Rather than try to explain the pieces or link the artists by style, the author has provided a brief introduction and then turned the artists loose to speak for themselves. This proves to be a wise tactic, for their comments—alternately dense and blithe, penetrating and antagonistic—reveal substantially more about this fresh and beguiling work than any critical study would accomplish. Here the artists are to tell us that furniture is more cerebral than ever before, and now not just reflects the design sensibilities of its time but also has much to say about the culture for which it is made.

Artists have long seen in furniture what Isamu Noguchi calls "an opening to art beyond the accepted categories." Domergue picks up the trail prior to 1900, when artistic taste was dominated by the stagnant conventions of the French Academy. She moves briskly through the Post-Impressionists and Cubists to the Bauhaus, which, she says, "brought Art and Furniture as close to integration as they have ever come in our culture."

This synthesis was plunged into chaos by World War II. The Bauhausers moved to America, now the center of artistic activity. There, Abstract Expressionist painters and sculptors strove to reveal the subconscious. By the time their introspective efforts had distilled into the rarefied "isms" of the '60s, Architecture had disappeared behind a monolith of glass and steel, and Design was little more than parody. In short, art had become surly and withdrawn, unwilling to address the textures and contrasts of a human world. Creativity had become so grounded in theory and certification that it represented, in effect, another academy of conformity.

Domergue, perhaps surprisingly, sees artists' furniture as helping to break out of this new conformity:

"The more I pushed my research, the more I felt that this highly personal, narrowly defined cross section of work—artists' furniture—represented a humanizing, inspiring and accessible body of purposeful creative activity. If it is the role of art to address itself to the spiritual deprivations of humanity in a specific time and to nourish our most profoundly human aspects, this unexpected work came to fulfill that need for me, whether or not it qualified for the pantheon of Art."

The question of whether or not it does so qualify will probably be a source of critical debate for some time to come. The artists certainly can't agree. On one side, for example, is Larry Bell, who, though his work is solidly functional, insists, "I'm not in the furniture business. I don't separate the stuff I do from my art." For Billy Al Bengsten, "Furniture is furniture. I figure if anyone else can do it, it isn't art." Neil Jenny comes down more flat-footed than anyone with his opinion that furniture is "... simply a three-dimensional object. It has no image of social import, no timeless content. Furniture is not art." (This didn't stop him

from having his object produced in an edition of 200.)

In contrast, Robert Wilhite feels that furniture "does essentially the same thing [as sculpture], but it functions as well." Leo Sewell sees "... no real distinction between my sculpture and my furniture," and likewise Roy Lichtenstein "... went about it in exactly the same way I did the sculpture, so although I had to think about [its] use, I really can't see any important difference."

Clearly, if the subject arose during lunch amongst any half dozen of these artists, the beer would go flat long before anything like consensus appeared. But despite their differences, most are anxious to retain the bankable label of Artist, so they hasten away from talk of furniture, regardless of whether it's written with or without quotation marks.

Though this conflict of labels seems most often stated in terms of whether or not furniture is art, it could be more clearly expressed in terms of the functions that qualify the ambiguous object as furniture. Much of the work shown moves toward the old ideal of a synthesis of art and function, but there are plentiful examples of work in which function is incidental to, or at least secondary to, the use of furniture imagery, as if the usefulness were either an afterthought or the icing on the cake.

By the author's own admission she was confounded by this body of furniture-related, non-functional art. By shouldering it aside she has invited the reader to be confounded as well—which isn't difficult, given pieces like Robert Rauschenberg's "Cardboard Table," for example, which according to the artist "looks even more useless in a photo than it does in real life." One resolution of the function dilemma is indicated by Terence and Laura Main, who feel that "information is very important and we accept it as a function." In fact, much of this new work is fascinating not for fusing art and function but for mocking them, giving each license, as it were, to insult the other.

This attitude has its precedents, too. While the Bauhaus group was at work blending art and architecture, design and technology, the Surrealists and Dadaists were going in another direction entirely. They took the commonplace object out of context to make it resonate with significance. Furniture, which both accommodates and expresses our humanity, was a central theme of theirs, too. If today the useful object has again emerged to be graced by art, it has emerged to be revealed by it also, and thus are we revealed.

In a culture that is more materialistic than ever, it seems natural that artists should turn their attention to the material qualities of something we approach as frequently and unguardedly as furniture. But that the culture also suffers materialism as a sort of disease seems painfully obvious. It is equally important, then, that these same artists are using the forms and images of this consumerism—the furniture of our lives—to reveal what they will about the values of our culture. It is unlikely that in becoming social arbiters, artists would overlook their right (shall I say obligation?) to be social critics as well.

The concern for individuality and expression in materialism has produced some of the most serene and joyful work of the last twenty years. But, as this work illustrates, it has also begun anew to pry beneath society's successive veneers, to help us confront and understand our material obsessions even as it elevates the object to be worthy of our obsessiveness.

—Michael Pierschalla

A History of Industrial Design by Edward Lucie-Smith. *Van Nostrand Reinhold, 135 West 50th St., New York, N.Y. 10020, 1983. \$55, hardcover; 236 pp.*

Industrial design, as the author explains, is the design of machines and things made by machines. This book chronicles the field from pre-industrial societies to today, examining every-

MAFELL

Leading manufacturer of professional carpentry and mobile woodworking machines – founded in 1899

The unique PULL-PUSH Saw

Erika ...

A new idea in circular saws which proves that there are still better ways of doing things.

ERIKA is called **PULL-PUSH Saw**, because you can either **PULL** the saw blade through the material or – in conventional manner – **PUSH** the material through the saw blade.

ERIKA serves as a very accurate **Circular Saw Bench** with tilting arbor and sliding table and – without resetting – as a **Radial Arm Saw** of high precision, the saw blade with motor moving on ball bearings on two rails supported at both ends under the table.

ERIKA – in fact – is a sort of radial arm saw, but upside-down, with no arm obstructing or limiting your working space.

Technical Data: Single-phase brushless induction motor 120 V/60 c., 23 hp, cutting height 2 3/8 in., 45° tilt, precision **die-cast table with dovetail edge rail all around**, 82 lbs, optional accessories for every sawing operation.



\$ 979,50*

1 YEAR WARRANTY

... and her partner

Paul – the Planer

PAUL is the ideal partner for **ERIKA**. Whoever wants to do a good job on the spot with his **ERIKA** is likely to require a matching **jointer-planer**.

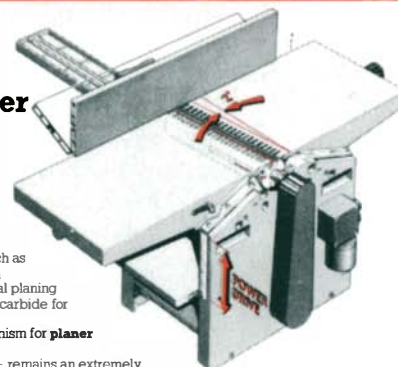
PAUL as a jointer-planer has been designed with a **cutting width of 11 inches** – corresponding with the cutting length of **ERIKA** as an inverted radial arm saw.

PAUL offers truly **professional features** – such as

- **progressive cut of 2"** for ultra-smooth finish
- **2 sets of cutters** – one full length for normal planing operation and the other, 3 3/8 inches long, of carbide for edge trimming
- **power-driven** raising and lowering mechanism for planer table with manual micro-adjustment

PAUL – with all his professional standing – remains an extremely compact feather-weight champion **under 100 lbs.**

Technical Data: Single-phase brushless induction motor 120 V/60 c., 3 hp, planing width 11 in. thick, height 5 3/8 in., cutterhead speed 6700 rpm, all tables and frame **die-cast**.



\$ 1449,50*

1 YEAR WARRANTY

Both machines are ideal for professional work on the spot or in locations where stationary machines cannot be set up. Demanding hobby-joiners, too, will appreciate their precision, versatility and reasonable price.

Sales and Service:

MAFELL US Office

c/o Merritt P.M.I., P.O. Box 363
Lockport, N.Y., 14094 – 0363
Tel. (716) 4345558

Rudolf Bass, Inc.

Main office and warehouse
45 Halladay Street, Jersey City, N.J. 07304, Tel. (201) 433.3800

Branch offices
175 Lafayette Street, New York, N.Y. 10013, Tel. (212) 226.4000
1101 East 25 Street, Hialeah, FL 33013, Tel. 691.2277

Tel. out of N.Y. 1.800.526.3003

or through leading local dealers – trade inquiries welcome.

* suggested retail price, plus tax where applicable, plus freight.

Ask for free leaflet and price-list on all available accessories.

Please send \$ 2 for very detailed 32 page brochure on these machines and their performance. (Supplied free with each machine)

mafell
made in Germany

Mafell Maschinenfabrik Rudolf Mey GmbH & Co KG · P.O.B. 1180 · D-7238 Oberndorf/N. · F.R. of Germany · Telex 760322

Let's make this short ... and very sweet! MR. SAWDUST BLADE PRICES CAN NOW BE DROPPED 30%!

I knew it could happen.

Everybody knows we've never quoted a price in our ads. If we had, we'd have scared the life out of you ... and the Mr. Sawdust Signature line would have died an early death.

You listened to our **QUALITY** story. You saw us prove our points in shows. You took us up on our **unlimited** guarantee. And you assured us that price was *not* the most important factor.

You moved our production from dozens to hundreds. And you made my blades the most desired among the serious woodworkers. You were good to us ... and for us ... and we can now be *good* to you.

For these good old American reasons, we are announcing permanent savings in our blade prices.* (And we don't have to take a full-page ad to do it!)

America's Foremost
Power Tool Professional

FORREST

FORREST MANUFACTURING COMPANY, INC., 250 DELAWANNA AVE., CLIFTON, N.J. 07014

For complete information and prices, write for our 2 brochures "The Cut is Everything." (also includes Dado sets) and "Mr. Sawdust II" (ULTRA SMOOTH PLANER SAWS).

Please enclose \$1.00 for Postage and Handling.

*Dampeners and dado-heads not included in price-break.

MR. SAWDUST I

	WAS	NOW ONLY
10" 60T.	\$162.00	\$113.40
9" 60T.	156.00	109.20
8" 60T.	150.00	105.00

MR. SAWDUST II

	WAS	NOW ONLY
10" 40T.	\$156.00	\$109.20
30T.	135.00	94.50
9" 40T.	146.00	102.20
30T.	125.00	87.50
8" 40T.	136.00	95.20
30T.	115.00	80.50

6" Dampener \$23.00

5" Dampener 22.00

4" Dampener 20.00

TO ORDER ...

PHONE TOLL FREE! 1-800-526-7852

(In NJ: 201-473-5236)



thing from ball-point pens to aircraft to furniture. Although targeted at a general readership, there's enough in here to make the book interesting to woodworkers, with works by Chippendale, Frank Lloyd Wright, Marcel Breuer, Sir Ambrose Heal, C.R. Mackintosh and other designer/craftsmen illustrated. Even woodworkers who enjoy designing one-offs can probably cull a few ideas. —Roy Berendsohn

Shepherds' Compleat Early Nineteenth Century Woodworker by Stephen and Victoria Shepherd. *Green River Forge, Ltd., PO Box 715, Roosevelt, Utah 84066, 1983. \$27.50, hardcover; 195 pp.*

This ambitious book seeks to discuss virtually all phases of early 19th-century woodwork, from carts to cabinets, signs to pie-crust cutters. But like many such books, its size allows for only a cursory discussion of each subject. And some of the authors' advice seems, well, bad. For instance, as part of the restoration of an antique tabletop, they recommend kerfing its underside to within a quarter inch of its surface. The book succeeds admirably, though, in showing how wood pervaded the lives of our ancestors, and the authors deserve credit for pointing out that today's craftsman/historian is part of that legacy—not just a spectator of the past. —Roy Berendsohn

Build Your Own Metal Working Shop From Scrap by David J. Gingery. *Distributed by Lindsay Publications, PO Box 12, Bradley, Ill. 60915; and Campbell Tools Co., 2100 Selma Rd., Springfield, Ohio 45505; 1980-82. \$54.65 (seven volumes), paperback; 844 pp.*

Many folks who want to build their own woodworking machines soon discover that they need a metalworking shop to do it. David Gingery tells how to build basic metalworking machines from aluminum and pot-metal scrap, using a charcoal-fired foundry and green-sand molds. The seven volumes in the series are *The Charcoal Foundry*, *The Metal Lathe*, *The Metal Shaper*, *The Milling Machine*, *The Drill Press*, *The Dividing Head and Deluxe Accessories*, and *Designing and Building the Sheet Metal Brake*. With the first book you build the foundry and make practice molds. With the foundry and the second book you build the lathe, and so on. Invest a little money and a lot of time and you'll have a metal shop. Then come the woodworking machines—but you'll have to look elsewhere for how to build them. —Roger Holmes

Finishing Eastern Hardwoods edited by Roy M. Carter. *Distributed by Forest Products Research Society, 2801 Marshall Ct., Madison, Wis. 53705, 1983. \$18.00 (members), \$25.00 (nonmembers), paperback; 241 pp.*

The art of wood finishing has gradually become a science, and this book is a welcome addition to the sparse field of technical texts on the subject. Although the title implies a certain exclusiveness, the book provides a comprehensive overview of finishing materials and processes that are applicable to hardwoods and softwoods alike. Be aware, however, that this is a technical text and not a "how-to" on finishing.

The book, a series of articles by leading authorities in the field, begins with good coverage of wood structure and properties as they relate to finishing. Photomicrographs and electron micrographs readily demonstrate why structurally different woods have different finishing characteristics. The discussion of the types, makeup and proper use of coated abrasives (sandpaper) reinforces the well-known but often neglected relationship between substrate preparation and final finish quality.

Uniform color and color control can be as important as sur-

face quality in obtaining the desired "look" of a piece of fine furniture. To lighten a dark wood or to remove blemishes such as mineral streaks, fungal discolorations and chemical stains, bleaching is the only reasonable course, and 12 common bleaches and application techniques are described here. On the other side of the coin, the judicious selection and use of stains, dyes, fillers and glazes is thoroughly discussed.

Transparent films, used for wash coats, sealers and top coats, form the body of a finish. Finish types, from nitrocellulose lacquers to polyester conversion coatings, including traditional oils and varnishes, are compared from application through performance—helpful information when you're choosing a finish for a particular situation.

Finishes for furniture, kitchen cabinets, hardwood floors and millwork are covered, along with quality control of production materials and processes. The section on finishing equipment presents extensive information on compressed-air, airless and electrostatic finishing technology and equipment, spray-booth safety, film-curing mechanisms and equipment, and material handling and storage. And the article on finishing wood for exterior use is an excellent account of the weathering process on untreated wood and the exterior performance of various wood finishes. A comprehensive 37-page glossary of terms used in finishing rounds out the volume.

The book's main fault is its lack of an index, and I would have liked to have seen more on exterior coatings. Overall, however, *Finishing Eastern Hardwoods* is a valuable addition to any woodworker's reference library. —William B. Smith

The Dinghy Book by William Atkin. *Atkin and Company, PO Box 3005, Noroton, Conn. 06820, 1984. \$7.00, paperback; 36 pp.*

For those amateur woodworkers who are also afflicted with the yachting bug, John Atkin has provided a welcome republishing of ten dinghy designs originally offered by his father, the highly respected naval architect, nearly sixty years ago in *MotorBoating* magazine. If you want to build your own dink to tow along behind your boat, or just want a way to get out on the water, this book is just the ticket. There are designs for every taste, from the flat-bottomed pram *Rinky-Dink*, to the round-bottomed sailing *Handy-Andy*, to the amusing but entirely legitimate *Takapart*, a three-sectioned punt that may be used whole or in various combinations of its parts.

That some of the materials (and all of their prices) are dated is, to me, a compelling feature of these designs. Most people who briefly dabble in small-boat building are usually happier with the older, "saltier" ways of working. For example, solid wood is used instead of plywood; Jeffery's marine glue, a relatively ancient bedding/adhesive (still available), is used instead of modern adhesives such as epoxy. Of course, high-tech'ers are free to substitute as they please.

Although a surprising amount of how-to information is crammed into this slim volume, I would in addition recommend perusing a basic boatbuilding manual, since in this trade there are always new tricks to discover. Most of Atkin's designs do require that a bit of milling be done in advance, but even the least machine-equipped hobbyist can have it done at the lumberyard. And with only a basic kit of hand tools and a saber saw, you'll be able to fill a winter's free time with enjoyable woodworking. —Michael Sandor Podmaniczky

Michael Pierschalla is a woodworker in Cambridge, Mass. Roy Berendsohn makes period furniture in North Carolina. William Smith is an assistant professor of wood science and technology at the University of Massachusetts at Amherst. Michael Podmaniczky builds boats in Thomaston, Maine.

One week workshops for students of all ability levels and media interests.

MARCH 4-29, 1985

CLAY (electric kiln - gas - raku firing, stoneware - porcelain, wheel - handbuilding) / FIBER (weaving - knit, rug, tapestry, wearables, basketry) / FABRIC (dyeing, quilting, wearables) / METAL (fabrication, enameling, blacksmithing) / STAINED GLASS / WOOD (construction, turning) / PHOTOGRAPHY

graduate/undergraduate credit
assistantships/scholarships
summer one and two week sessions
June 3 - August 16, 1985
year round gallery exhibition schedule



ARROWMONT
School of Arts and Crafts

Box 567, Gallatinburg, TN 37738 (615) 435-5860

WOODTURNERS

TWO-DAY TURNERS' WORKSHOP [SINCE 1976]

For beginners and experienced turners. Midweek or weekend throughout the year. Two students per class for personal attention. Sharpening and proper use of tools for faceplate and centers turning. Build confidence and experience, or just find out if you like to turn. Full accommodations available.

MYFORD ML8 WOODTURNING LATHE

Finest quality and design, including outboard tool rest for bowl turning, 36" or 42" between centers.

THE ZIMMERMAN WOODTURNING LETTER

Comprehensive, instructive, the "why" as well as the "how." Excellent preview or review for workshop.

1983 EDITION: 76 PAGES, \$7 ppd.

1984 EDITION: 72 PAGES, \$8 ppd.

1985 EDITION: 72 PAGES, \$9 ppd.

SEND 60¢ IN STAMPS FOR DETAILS

Including SORBY turning tools, chucks, and DOUBLE-STICK TAPE. (Why use messy glue and paper to hold on bowls?)

RUSS ZIMMERMAN, RFD 3, BOX 242
PUTNEY, VERMONT 05346

Professional Craft Studies*

- WOOD • FIBERS
- CLAY • METAL

* a 2-year program for career-oriented craft students

call or write for a descriptive brochure

THE
WORCESTER
CRAFT
CENTER



25 WORCESTER
SAGAMORE ROAD MASSACHUSETTS
01605
(617) 753-8183

EDICO

THE WOOD PEOPLE

School Shop Suppliers For
34 Years

Now - You craftsmen can select
from over 21 species: Appalachian
and imported hardwoods, softwoods,
veneers and turnings.

Kiln Dried Delivered Prices
Catalogue \$1.00 (refundable)

Write Box 5373 FW
Asheville, N.C. 28813

Phone (704) 255-8765
for faster service

EDUCATIONAL LUMBER CO., INC.

KIRBY STUDIOS

1985
FULL TIME SCHOOL OF
WOODWORKING and DESIGN
ONE WEEK SUMMER CLASSES IN
GEORGIA AND VERMONT..
Full information - available.
811 Atlanta Rd. CUMMING
GEORGIA 30130
404-889-9823



**"...The Home Shop
Machinist Magazine is an
outstanding single source
of knowledge..."**

That comment is from one of our subscribers. And it echoes what many others are saying about *The Home Shop Machinist*.

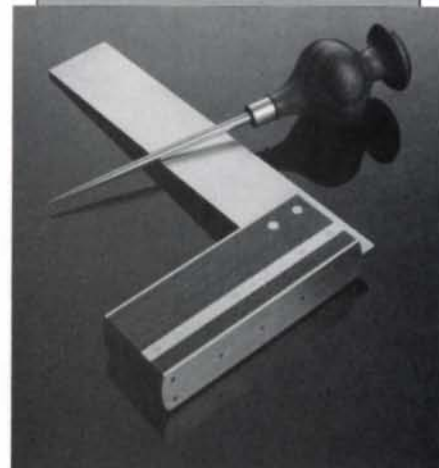
Check one issue and we think you'll agree that it is the best source for metalworking information for the hobbyist and the small shop operator.

Start your subscription now: (USA) \$18.50 per year (6 issues), \$35.00 two years (12 issues), Canada and other countries \$21.00 per year (U.S. Funds). VISA or MasterCard orders phone operator 660 Toll Free (800) 824-7888. Or write:

THE HOME SHOP MACHINIST
P.O. Box 1810-M • Traverse City, Michigan 49685

These Two Tools May Be The Finest You Will Ever Own.

A wonder to look at, a joy
to hold and a pleasure to use.



The TS-2 TRY SQUARE is the most beautiful square we have ever seen. Solid brass and rosewood, it is the perfect marriage between materials and craftsmanship. So compelling are its texture and feel that most of our past sales have been to galleries! Most important of all, the TS-2 is guaranteed square to $\pm .002$ " inside and out, over the length of the 8" blade.

Designed as a companion tool with our square, we proudly offer the SA-2 SCRATCH AWL. Another exquisite piece of work. With a blade long enough and a point sharp enough to get into those tight dovetail layout situations, this eight inch tool is a craftsman's dream. The hardened tool steel blade is capped with a hand-turned rosewood handle with detailing so precise, no production machine can even come close to it. Finished to 600 grit!

Our Guarantee: If either of these tools fail to live up to the copy in this ad, we will buy them back within 30 days.

Bridge City Tool Works
2834 N.E. 39th
Portland, OR 97212
(503) 282-6997



Please send me:

___ TS-2 Try Square(s) @ \$47.00 ppd. each

___ SA-2 Scratch Awl(s) @ \$27.00 ppd. each

___ Catalog \$1.00 (Free with purchase)

Enclosed is ☐ Check ☐ Money Order

☐ Visa ☐ MC ☐ AE Expiration Date _____

Card # _____

Name _____

Address _____

City _____ State _____ Zip _____



Peter Dean MFA Graduate
1984
Gaming Table, 1983
Ebony, holly and pear wood
30" x 34" x 34"

"One of the finest programs in the country..."

New York Times

Boston University Program in Artisanry

A professional school for the design, construction, management, and study of fine and production crafts. **M.F.A., B.F.A., A.F.A.** degrees and a **Certificate of Mastery** offered in **wood, metals, fibers, and ceramics**. Come enjoy the cultural and historic riches of Boston in a supportive and challenging environment.

- Accelerated degree programs for transfer students.
- Intensive summer programs at foundation and advanced levels for educators, professionals, and transfer students.
- Part-time and noncredit courses for beginning and advanced students.
- Close contacts with prominent museum curators, gallery directors, and collectors.
- Nationally known faculty and administrators who care about you and your career.
- Financial aid available (*inquire early*).

For Information:

Patricia Doran
Program in Artisanry NYF4
Boston University
620 Commonwealth Avenue
Boston, MA 02215
617 353-2022
Boston University is an equal
opportunity institution.

RIT *Craft* MATTERS

Art/Design/Crafts

College of Fine and Applied Arts

School of Art and Design: Computer Graphics/Graphic Design/Industrial and Interior Design/Medical Illustration/Packaging Design/Painting/Printmaking

School for American Craftsmen: Ceramics/Ceramic Sculpture/Glass/Metalcrafts/Jewelry/Weaving/Textile Design/Woodworking/Furniture Design



Rochester Institute of Technology
Office of Admissions
Box 9887
Rochester, New York 14623

FINE CABINETMAKING with James Krenov

accepting applications April 1 to May 1
for 1985-86 program
beginning September, 1985

for further information phone 707-964-7056 or write:

Program Coordinator, Woodworking
College of the Redwoods
Mendocino Coast Education Center
440 Alger Street
Fort Bragg, California 95437

RESIDENT DESIGNER / MAKERS OF FINE FURNITURE

David Powell
John Tierney

Bill Sayre

William Bauer
Jeff Darsch

LEEDS DESIGN WORKSHOPS

INTERNSHIP: Within the context of a working studio craft workshop the Intern Program provides aspiring designer/makers of fine furniture with the strongest possible foundation of skills, techniques and design training essential to their profession.

For further information write to: Leeds Design Workshops, One Cottage Street, Easthampton, Massachusetts, 01027.

Fine Furnituremaking And Design.

Rhode Island School
of Design's Furniture
Program offers a range
of graduate and under-
graduate courses for the
designer/craftsman, the
designer for industry,
and the furniture artist.



Conducted by Tage
Frid (Prof. Emeritus)
and Seth Stem
(Program Head). Write:
R.I. School of Design,
Admissions Office,
Dept. FW, 2 College St.,
Providence, RI 02903.

THE WENDELL CASTLE WORKSHOP

The Standard is Excellence

An Intensive Two Year Program in
Furniture Design and Studio Woodworking

18 Maple Street
Scottsville, New York 14546
716/889-1521

N.Y.S. Accreditation/Write or Call for Catalog



Learn woodworking and furniture design.

An intensive full-time learning situation emphasizing traditional technique as well as modern methods of woodworking.

Individual level instruction, ample work areas and an industrially furnished machine room provide a stimulating and efficient learning situation for the serious woodworking student of limited experience. **Bench spaces are available for Fall 1985.** Ask us about our summer workshops in traditional hand tool joinery.

Write or call:

Primrose Center
401 West Railroad St. (406) 728-5911
Missoula, MT 59801

SET YOUR OWN SPEED LIMIT.

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).

 **DELTA**
Behind Our New Name Is Our Old Reputation.

 **DELTA**

1805
STROKES/MIN.

FASTER
OFF

115 VAC 1.3 AMP

SAFETY
MANUAL BEFORE

5. Hold workpiece firmly against table.
6. Keep hands and fingers away from blade.
7. Do not make any adjustments, remove jammed or pieces, until tool has been stopped.
8. Do not operate while under the influence of alcohol or medication.

NOW! REDUCE THE RISK AT YOUR TABLE SAW



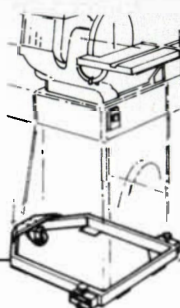
folds down neatly

WITH THE **MOBILE™**
NEW SAWING CENTER

OUTFEED ROLLERS

- safe, accurate sawing
- available in 15" and 37" widths
- handle panels with ease
- dual-position table

AND INCREASE FLOOR SPACE

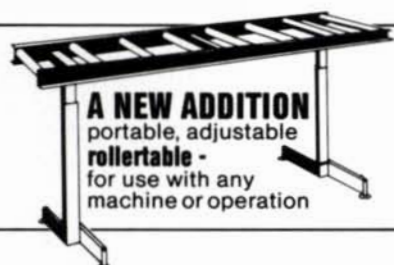


MOBILE MACHINE BASES

- increase shop working area
- maximize usable floor space
- 3 point base will not rock
- locking wheels
- makes machine so easy to use and store
- over 80 standard models

PLANER STAND WITH ROLLERS

- raises planer to proper working height
- provides machine mobility
- five-fold increase in workpiece support
- storage is a snap



A NEW ADDITION
portable, adjustable
rollertable -
for use with any
machine or operation

EASY DOES IT!

Discover HTC's many unique products designed only with you, the dedicated woodworker in mind. Find out how you can make your machining safer, increase working area of your shop and accomplish nearly impossible tasks easily, quickly and accurately - **all by yourself!**

CALL TODAY!

HTC PRODUCTS, INC.
120 E. HUDSON S-8
ROYAL OAK, MI 48067
(313) 399-6185



1-800-624-2027 ext. 108

GUIBOURTIA TESSMANNII

(BUBINGA, AFRICAN ROSEWOOD, KEWAZINGA)

Available in the BOULE —
WIDE BOOKMATCHED BOARDS
4/4 & 6/4 — \$2.66 Bd. Ft.*

—ALSO—

DOUSSIE	PADOUK
ZEBRAWOOD	WALNUT
WENGE	PURPLEHEART
AFRICAN MAHOAGANY	CHERRY
MAPLE	SHEDUA
GONCALO ALVES	OAK

OTHER SPECIES AVAILABLE

*4/4 IN 200' LOTS OF MIXED EXOTIC SPECIES

- Friendly, Knowledgeable Service
- The Best Small Quantity Prices Available
- We are a Direct Importer
- If You Need 20' or 2000' call or write for our Brochure



"The finest from around the world"

WYNDHAM WOODS

P.O. Box 506

Ellettsville, Indiana 47429

(812) 334-7735

FREE COLOR CATALOG

Build Your Own Grandfather Clock
Prices Starting Under

\$300

(including movement and dial)



- Do-it-yourself case kit, parts pre-cut
- Finished clocks
- Solid 3/4" hardwoods: black walnut, cherry, oak
- Heirloom quality
- Factory direct prices
- Solid brass West German chiming movements
- Money back guarantee
- Prompt shipment

Write for
FREE information



**EMPEROR
CLOCK COMPANY**

WORLD'S LARGEST MANUFACTURER
OF GRANDFATHER CLOCKS

Dept. 1405, Emperor Industrial Park
Fairhope, Alabama 36532 • Phone 1-205-928-2316

I am interested in ☐ Do-It-Yourself Kits
(please print) ☐ Finished Clocks

Name _____

Street _____

City _____

State _____ Zip _____

Carved Legs



Wide selection of
carved legs and period
furniture kits
Fine hardwoods
Brochure \$1.00



WINDSOR CLASSICS LTD.
15937 WASHINGTON ST.
DEPT. D2
GURNEE, IL 60031

TIRED OF HUNTING FOR

22½° ? **NEW**

OCTAGON GAUGE

TO SET MITER TO SAW BLADE FOR
22½° CUT. HARDENED ALUMINUM
GAUGE HAS OCTAGON FORMULAS
AND 14" RULER SCREENED ON. ALSO
SCREWCHECKER AND INFORMATION.

\$7.95

Plus \$2.00 Handling
and Shipping.

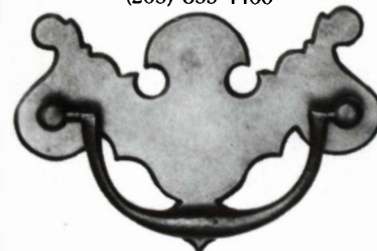
California residents add 6% sales tax. Send
check or money order to:

LYON

ELECTRIC
COMPANY, INC.
P.O. BOX 81303
SAN DIEGO, CA 92138

HORTON BRASSES

Nooks Hill Road, P.O. Box 120F
Cromwell, CT 06416
(203) 635-4400

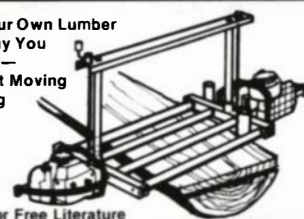


Mfrs. of

Fine Hardware for Over 50 Years
Send \$2.00 for a catalogue

PORTABLE SAWMILLS

Cut Your Own Lumber
The Way You
Want It—
Without Moving
The Log



Write for Free Literature



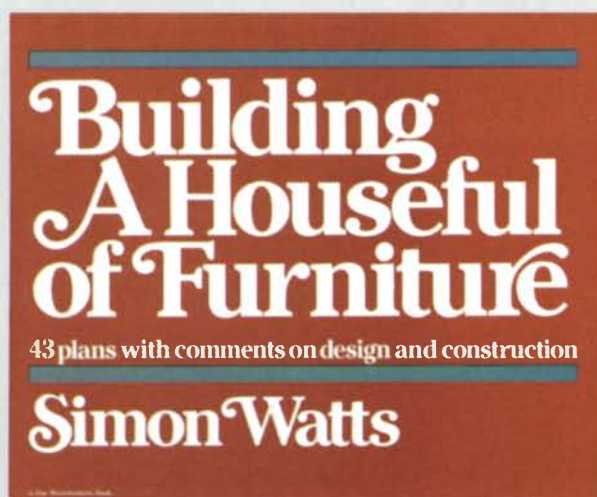
INFORMATION HOTLINE (201) 744-6110

SPERBER TOOL WORKS

Box 1224E • W. Caldwell • N.J. • 07007

Books for Craftsmen

Three favorites from The Taunton Press



Building A Houseful of Furniture by Simon Watts

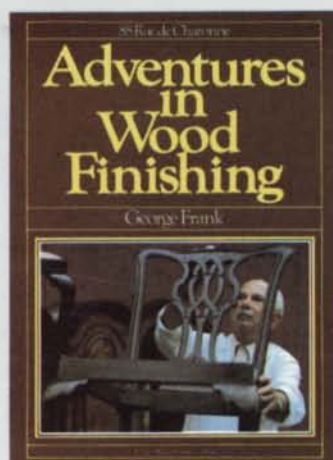
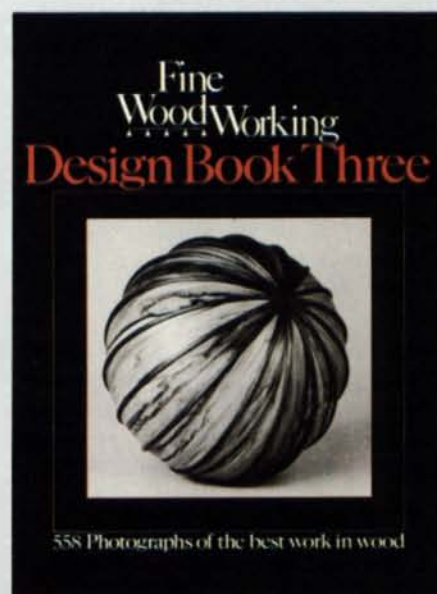
Here are complete plans for 43 pieces of furniture—beds, chests, bureaus, tables, sofas and more—the pick of Simon Watts' 20-year career as a professional woodworker. The range of projects is broad enough to challenge both amateurs and experienced craftsmen, and many of the plans can be adapted to suit your own needs. Watts explains how he himself built the furniture and how to handle the tricky construction problems you may encounter. This is one project book that will bring you hours of woodworking enjoyment.

Softcover, 224 pages, \$19

Fine Woodworking Design Book Three

Whether you love working with wood or just love living with it, this book will bring you hours of inspiration and delight. The 558 photos here were chosen from thousands submitted to the editors of *Fine Woodworking* magazine, and picture some of the finest in contemporary woodworking. You'll find a delightful array of cabinets, desks, beds, chairs, toys and more. Selected for their beauty, craftsmanship and originality, these pieces give you an expanded sense of what's possible and a new appreciation of today's woodworkers. The book also features a worldwide Directory of Woodworkers to help you find craftsmen in your area.

Softcover, 216 pages, \$14



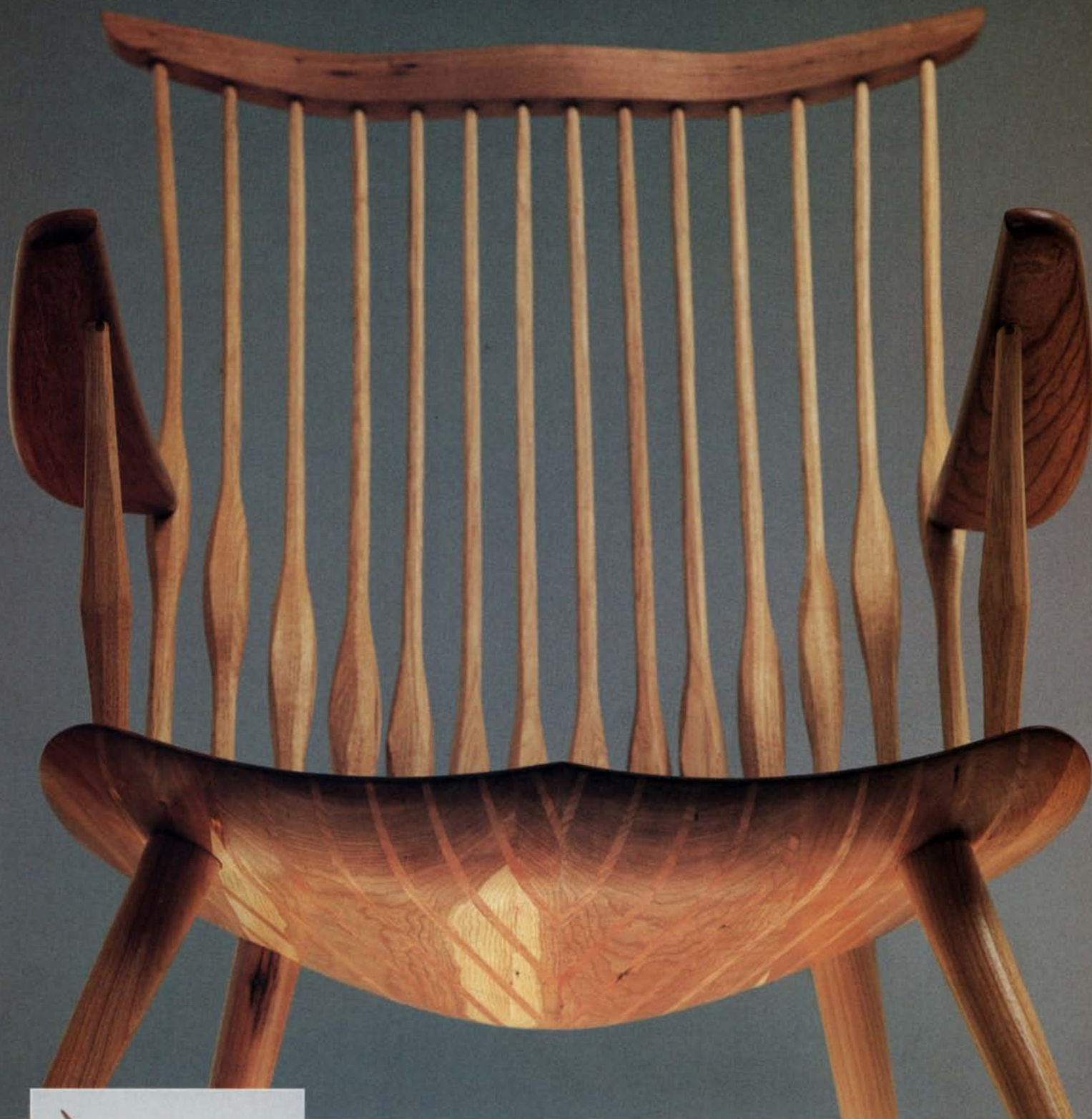
Adventures in Wood Finishing

by George Frank

Ever since he began his career as a wood finisher in Paris in the 1920s, George Frank has been busy learning, inventing and improvising different methods of finishing wood. Here he shares the secrets of a lifetime in the trade—everything from the old-timers' recipes for dyes and stains to the culmination of his own search for the perfect wax, from a mirror finish that shines to an "antique" finish that will fool the experts. Even if you've already done plenty of finishing yourself, you're sure to pick up some valuable new tricks (and some marvelous anecdotes) from this gifted storyteller and craftsman.

Hardcover, 128 pages, \$10

To order: Use the insert after page 82, or call toll-free 1-800-243-7252 and use your credit card.



Wedges forced into kerfs bend a flat blank into a seat that is pleasing in both comfort and looks. This Windbow rocking-chair seat was formed by bending the seat halves individually, then joining the shaped pieces.

Kerf-Bent Seats

A tablesawn alternative to scooping

by Jeremy Singley

Progress is often a matter of new inventions finding uses. When some unknown genius (from Windsor?) started building chairs with that new-fangled machine—the first practical lathe—the result was a happy event for every generation since. Though his fellow craftsmen may have branded him a heretic, it's certain he wasn't a purist. That's comforting, because it leads me to believe that he wouldn't mind me using even newer inventions to improve his designs. In fact, if he'd had a tablesaw and modern glues, I suspect he would have come up with innovations as interesting as my method for shaping hardwood seats.

I stumbled on the idea of bending seats by driving wedges into sawkerfs about six years ago when I found that a conventionally scooped seat felt better if its rear ridge was eliminated, so that the seat curved east to west but not north to south. This reduced the curve to two series of straight, parallel lines, and kerfing seemed an obvious possibility.

Obvious, but not easy. In the weeks of experimenting that followed, I grew wiser about wood, the laws of nature, and man's ability to endure disappointment. The first thing I learned was why woodworkers avoid wedge-bending. When you kerf wood across its grain, you cut away its strength, and it usually breaks. When you kerf wood along its grain, you exacerbate its weakness, and it usually splits. I finally resolved the dilemma when I found that wedges glued into kerfs cut at a slight bias to the grain strengthen the wood, not weaken it. The resulting bend, wider at the seat's front than at its back, turned out to be perfect for comfort.

After a lot of fooling around, I settled on a kerf angle of 77° , with the cuts spaced on 1-in. centers as shown in figure 1A. I found that eight kerfs, four in each direction, create a scoop deep enough to please both the bottom and the eye. I also discovered that I could make a center ridge by kerfing two half-blanks (figure 1B) and then joining the halves together.

Eventually these revelations evolved into a production system that's well suited to the small shop. The required jigs and fixtures can be made in a day or two, and no exotic tools or machines are needed. The single-blank method, because it is simple and cheap, became my preference for dining chairs. The double-blank method, whose effect is sinfully elegant, though costly, found its way into my top-of-the-line Windbow rocker, shown on the facing page. This rocker style, which sells for about \$2,000, uses 18 wedges. If you use more than 12 on a single-bent seat, though, the scoop will be too deep to be comfortable.

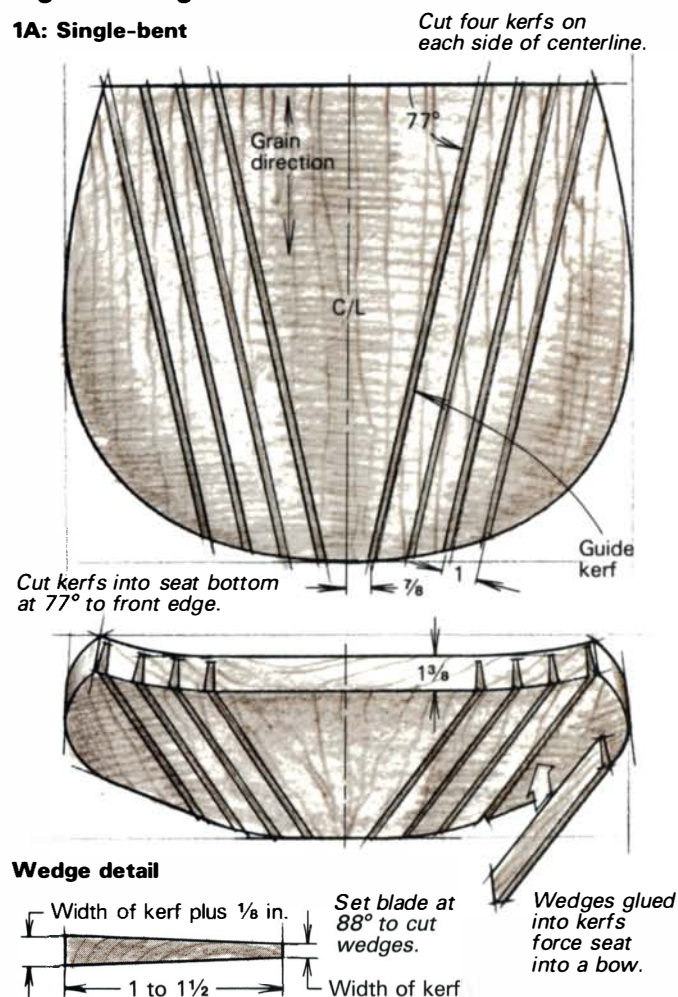
I begin with the same edge-glued seat blank you'd normally hack at to carve out a conventional Windsor seat. I use $1\frac{3}{8}$ -in. stock for most of my single-bent dining chairs and $1\frac{1}{2}$ -in. for my double-bent Windbow rocker. All woods seem to wedge-bend equally well. Uniformly dense woods like maple and rosewood, which are too hard to be compressed slightly, don't make good wedges, however. I usually make the seat and the wedges from the same wood, but for maple seats I use oak or ash wedges.

When I'm making seats, I edge-glue two sets of blanks and have them surfaced to the same thickness at a local mill shop. One set is for the seats; the second, glued up from the wood with the straightest grain, is for wedge stock. I glue the wedge stock into blanks about 21 in. long and at least 14 in. wide to minimize waste—it's risky to run narrow wedge stock through the tablesaw, so the outside inch or so of every board gets thrown away. I make the seat blanks wide enough to fit the pattern for the particular chair I intend to build.

I work on the seat blanks as soon as I get them back from the

Fig. 1: Wedged seats

1A: Single-bent



1B: Double-bent

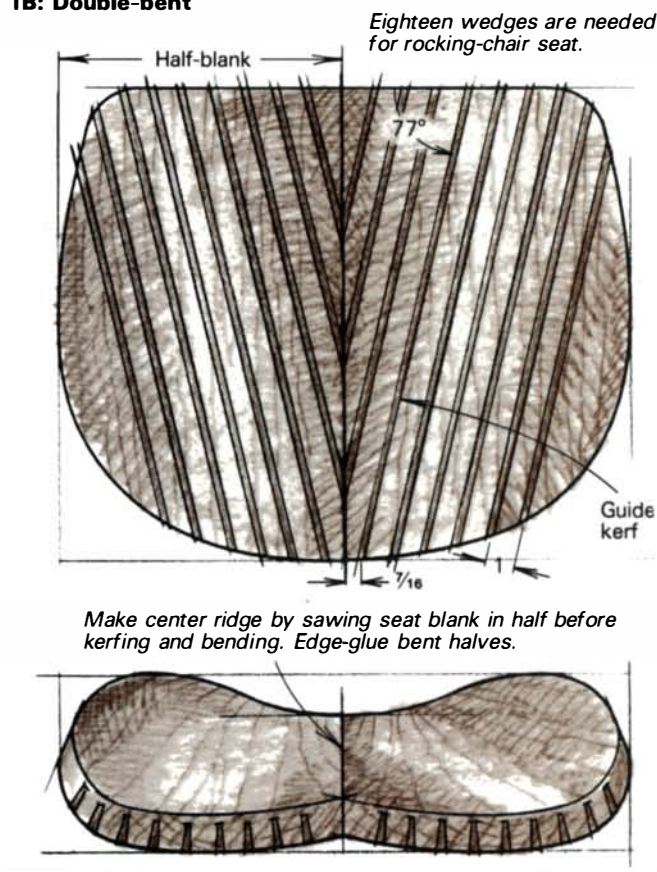
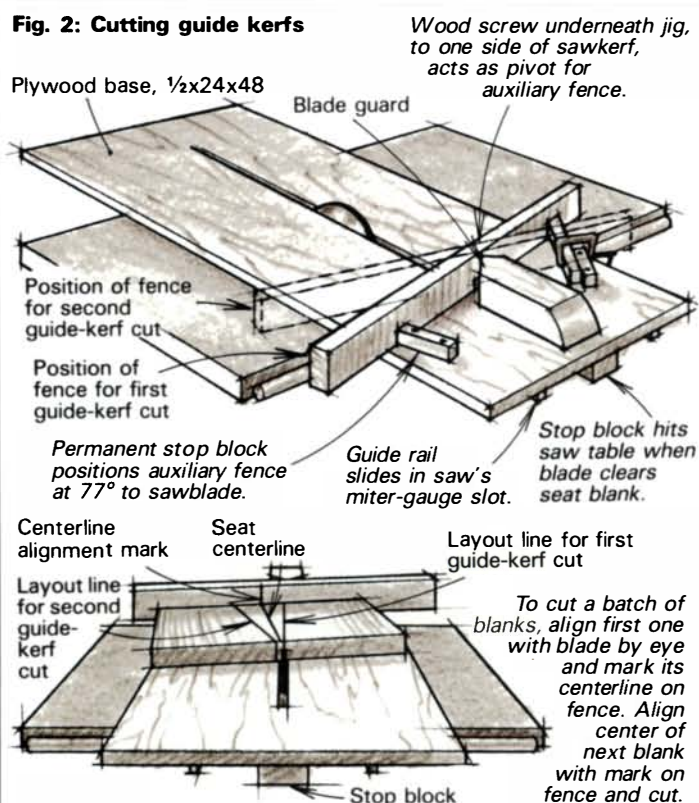
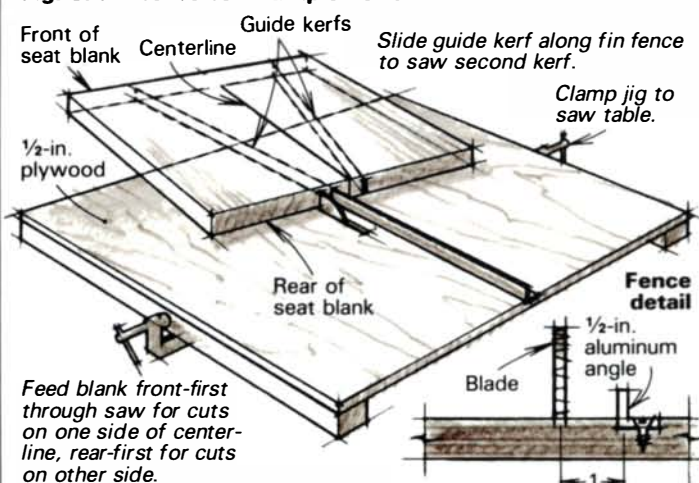
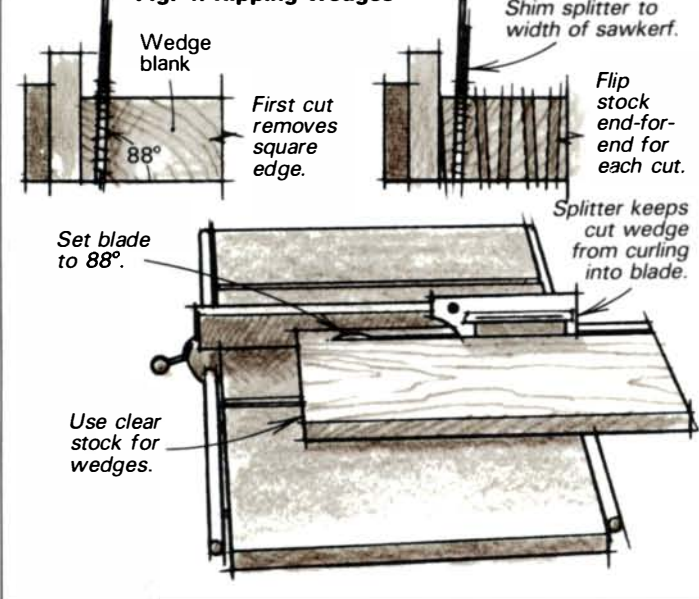


Fig. 2: Cutting guide kerfs**Fig. 3: Fin fence for multiple kerfs****Fig. 4: Ripping wedges**

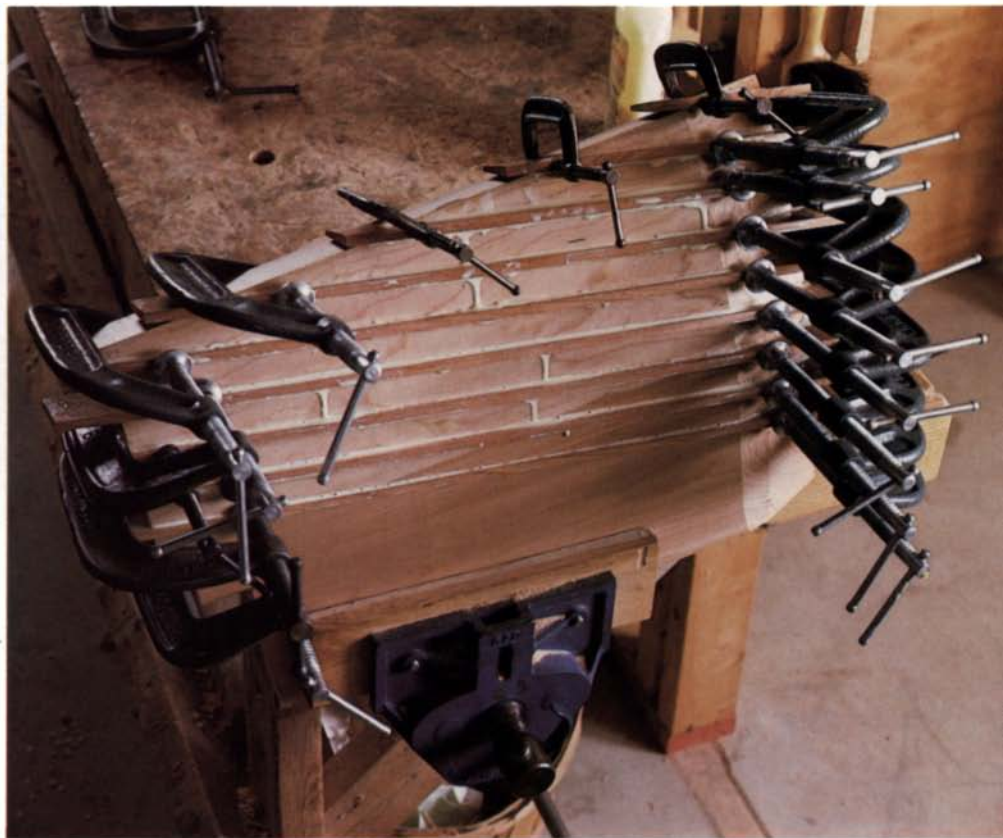
mill shop, before they can warp. The edges of these glued-up blanks are usually rough and irregular, so I first cut their fronts square and straight: I place my paper pattern on each seat blank, mark the center of the front edge, and use the front of the pattern as a straightedge to draw a line on the blank. I extend this line across the full width of the blank, bandsaw just shy of the line freehand, then nibble to it with a jointer. To prevent the jointer from sniping off the trailing end of the blank, I chamfer that corner slightly before running the blank over the jointer.

For a single-bent seat, I place a framing square perpendicular to the front of the blank and draw a line down the blank from the center point I previously marked. Then I align the centerline of the seat pattern and the blank's centerline, and transfer the position marks for the guide kerfs. I don't worry about the seat outline just yet—it will be traced onto the blank after bending. For most designs, the position marks should be $\frac{7}{8}$ in. on either side of the centerline at the back of the seat. Using a homemade bevel gauge set at 77°, I lay out the two guide kerfs (figure 1), and to make it easier to see the lines when setting up the saw, I extend these lines down the back edge of the blank. I mount the blank on the carriage shown in figure 2 and rotate the blank until the sawblade is centered on the guide-kerf line. Then I push the carriage and blank through the saw, which I set to cut to within $\frac{5}{32}$ in. of the blank's top surface. To obtain a good gluing surface, I use a sharp carbide blade with at least 40 teeth for cutting both the kerfs and the wedges.

After I've cut the first guide kerf on one side, left or right, of all the blanks, I switch the carriage fence over to the opposite angle and repeat the procedure. Then I change to the fin fence shown in figure 3. The guide kerf drops over the fin fence—a piece of aluminum angle stock let into a plywood saw base—and guides the blank while the next kerf is cut an inch from the previous one, then that kerf lines up the next, and so on. The trick is to always bear to the left side of the fence, keep the blank firmly aligned, and push it through at a slow, even rate. The blank is fed tail-first into the blade to cut the kerfs on one side of the centerline, and front-first to cut those on the other side. This step usually isn't any trouble, but I have been known to lose count and cut one too many kerfs. It's also important to handle the blanks carefully—they're stiff enough to require gentle persuasion when the wedges are inserted, but if you snap them, they may break. Once all the blanks are kerfed, I usually cut the bottom front chamfers on a tablesaw or a bandsaw, using a fine-cut blade to keep from tearing out the walls of the kerfs. I don't cut the back seat chamfers until later.

Because setting up to cut wedges is so tedious, I always cut plenty of extras once I have the saw adjusted. The wedges won't be accurate unless the blanks are dead flat, so I hand-plane off any irregularities left by the surfacer. Before trying to cut the wedges, I shim the tablesaw's splitter, which on my Rockwell is part of the blade guard, with veneer and paper until it is exactly the width of a sawkerf (figure 4). I also replace the saw's metal throatplate with a plywood one that fits tightly against the blade, to eliminate the danger of the wedge hanging up on the throatplate slot. For ease of adjustment, I then crank the blade to maximum height and set the splitter behind and parallel to it.

I tilt the blade to 88°, lower it so it just protrudes from the wedge stock, and adjust the fence by trial and error. I initially set the fence so that the wedge point will equal the width of the sawkerf in the seat. I joint one edge of the blank and saw the first wedge, which, being tapered on only one side, is dis-



When inserting wedges, it helps to have an assistant (above). One person holds the blank with the glued kerf over the edge of the bench and pushes down on the overhanging section to fold the kerf open. The helper inserts the glue-covered wedge and forces its ends down while the first person forces the middle section down. The blank is then upended in a vise (right) and C-clamped just enough to squeeze out excess glue and to seat the wedges. When all the wedges are secure, the blank is placed on the floor and bar-clamped across its width (see next page).

carded. Then I flip the stock end-for-end and feed it far enough to cut a trial kerf about $\frac{1}{8}$ in. long. I measure the width of this wedge tip with calipers and fine-tune the fence accordingly.

The setup tolerance for cutting workable wedges is a hundredth of an inch, more or less. Back in the old days, when I owned a used Sears saw that in a former life must have been a corn chopper, I achieved this accuracy by attrition: every third wedge or so went into the recycling box. My Rockwell does much better, but even so I'm never short of paint-stirring sticks.

Feeding the wedge stock past the blade is, unfortunately, not a science or even an art—the subtleties that can't be taught come with practice, however. So with a level head and a winning outlook, ease the stock forward at a steady rate, applying firm pressure downward and light pressure into the saw's fence. About halfway through I transfer to very light but steady pressure toward the splitter, which acts as a fence as the end of the blank approaches the sawteeth. As the blade completes the cut, I finish up with a clean follow-through to prevent the back sawteeth from scarring the blank, and lift the wedge clear of the blade with a push stick in the same motion. Do it right, and the wedge will be as smooth as a seamless stocking. Do it wrong, and you've won another paint stirrer for your collection.

Before going any further, I make sure that the wedge fits the kerfed seat blank. Gently folding the blank open over the edge of the workbench with the fingertips of one hand, I ease the wedge into the open kerf with my other hand. Once I'm assured that everything fits, I continue cutting wedges, flipping the stock end-for-end between each pass. After about ten passes, sometimes the sawn edge of the stock no longer rests against the fence without rocking, so I joint it again. I also discard any wedges that end up with glue joints down their spines.

The actual bending operation is the fun part—unless something goes wrong. Then it's a nightmare, but if you have your clamps and materials ready before you begin, your bending par-

ties should be pleasant. The wedging process is the same for both single- and double-bent seats, but the methods of clamping—as I'll explain—differ slightly. I begin by laying the blank kerf-side-up on the bench, then inserting glue-covered wedges. Yellow glue is best for wedging, and to get it on the kerf walls, I squeeze it in the kerf from the glue bottle and spread it with a flat stick, getting both sides good and gushy.

While I'm painting up the first kerf, my assistant, Jane Miller, spreads glue down both sides of a wedge with a 3-in. paint roller. Then I position the blank so that the glued kerf is directly over the edge of the workbench. Holding the center of the blank down against the bench with the fingertips of my right hand, I grasp the overhanging portion with my left hand and gently fold the blank open. Jane then inserts the wedge and pushes the ends of the piece home with her thumbs, grasping the underside of the blank with her fingertips for leverage. At the same moment, I force down the middle part of the wedge with my thumbs. As the wedge settles in, the seat makes a quiet cracking sound to tell us everything is all right. If everything isn't right (sometimes an improperly cut wedge turns up in the pile), we throw the wedge away and try another. Don't risk disaster by hammering the wedge in.

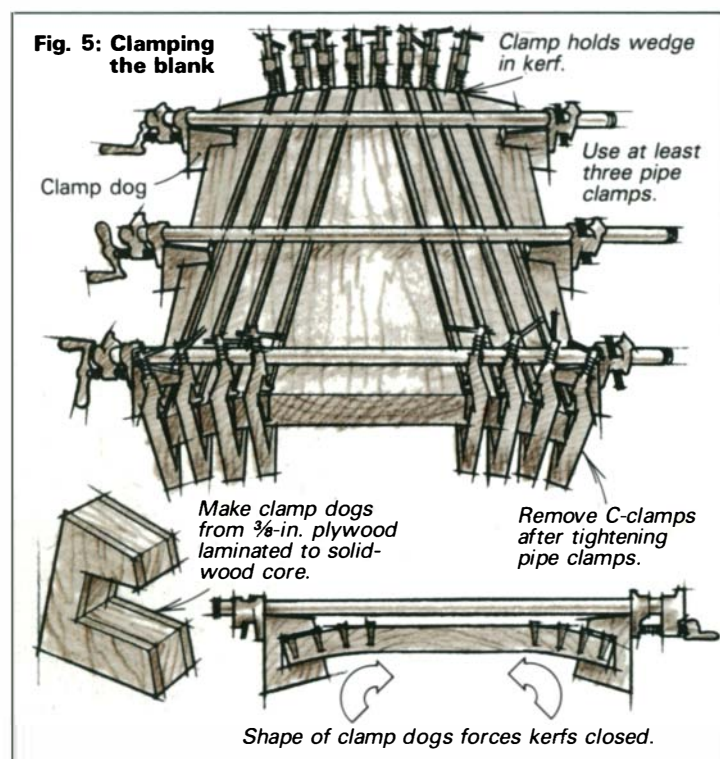
When all the wedges are in, I upend the blank in a vise and clamp the wedges home at one end of the seat while Jane does the same at the other end, using 4-in. C-clamps set in as far as their throats will allow. We snug up the clamps just enough to squeeze out the excess glue and to seat the wedges. Excess pressure may crack the seat. (If it does, a little back-and-forth action on the clamp screw will work glue into the crack, so it will be glued shut when the clamp is backed off and the pressure released slightly.)

With the C-clamps in place, I lay the single-bent blank bottom-up on the floor and apply the clamp dogs that I developed to counter the bar clamps' tendency to open rather than

close the kerfs (figure 5). The dogs put the clamping pressure high enough over the seat bend to close the kerfs. In areas where the bend will be great, I sometimes have to notch the waste slightly so the dogs will fit. Once the bar clamps are tight, I remove the C-clamps.

When the glue is dry and the bar clamps are removed, I mount the blank bottom-up between the dogs on my bench. I hog off the projecting wedges with a large fishtail gouge, followed by a short plane with its iron ground slightly convex. The last $\frac{1}{32}$ in. or so of wedges, along with the glue beads, is removed with a smooth plane. I also plane any flat areas on the seat bottom, then belt-sand with 120-grit. After sanding the bottom, I flip the seat over and spokeshave away the flats that appear between the bends on the blank's top surface. To smooth contours, I tape a foam-rubber cushion, covered with a paper pad, on the platen of a belt sander and "bag sand" the surfaces to a sweet curve with 120-grit.

Once the top and bottom of the bent blank are cleaned up, I trace the seat-pattern outline onto the blank and cut it out on a bandsaw fitted with a plywood table extension. The curved blank is unstable on the bandsaw table, so to steady it I usually wedge my fist between the edge of the seat bottom and the table, in front of or behind (and well away from) the blade. Otherwise the drag of the blade would slam the seat down onto



With a large gouge, Singley chops off projecting wedges (left) before hand-planing the seat bottom. Steadying it with his fist, he then bandsaws the seat to shape (above). Steel-strap clamping fixtures (below) and tabs along the back edge allow a double-bent blank's unwieldy shapes to be glued with pipe and C-clamps.



the table, with unfortunate consequences for saw, seat and self-composure. Sometimes, if things aren't going well, I clamp a wooden block between the seat bottom and the saw table, stopping to move the block from in front of to behind the blade at about the midpoint of the cut.

If you want to try making double-bent seats, you begin with the same-size seat blanks as for single-bent ones, but this time saw each blank up the middle. Mark each set, so you can match up the pairs later. Next joint the sawn edge on each half and cut the front edges square on the tablesaw. Here the centerline will be the jointed edge. The guide kerf is the first full-length kerf nearest the centerline (figure 1B), and should be $\frac{1}{16}$ in. from it at the back. Use the carriage to cut a guide kerf in each half-blank. Then with the fin fence, add three or more kerfs to *both* sides of each guide kerf. Run the blank front-first over the blade for the kerfs on one side of the guide kerf, tail-first for the opposite side. Regardless of the blank's orientation, however, always run the wall of the guide kerf against the left side of the fence.

Bend each seat half individually, using the method described for single-bent seats—you won't need clamping dogs for these small halves, though. After bending, clean off the wedge splines, then belt-sand each half's bottom to a smooth, continuous curve before gluing the two parts together. The jointed edges twist when the blank is bent, so they must be trued up again. Set the blank on an extended bandsaw table and use a try square to position the rear of the twisted edge so it's vertical to the table. Clamp a steady block under the blank to hold it in position, resaw the edge square, then run the edge freehand over the jointer (do this back-edge-first, or the wedges will tear out).

The seat halves must make an airtight fit, so you may have to touch up the edge with a hand plane. When I'm satisfied with the joint, I stand one half-seat, joint up, in the vise and hold the mating half against it. The two chamfers never match exactly, so I use a knife to trace the outline of the shallower one onto the edge of the overlapping fatter one, then I spokeshave the fat chamfer to the traced line. When both halves are matched, I use the homemade clamping brackets shown in the bottom photo on the facing page to glue up.

After the seat has been cut out and edge-sanded, all that remains is to make it into a chair. I explained how I do this in *FWW* #46, pp. 72-77. How you do it is up to your creativity, but be forewarned: whether double- or single-bent, the seat can be hard to handle, because it doesn't have any flat surfaces.

The biggest problem is that the underside of a bent seat curves upward and shows its underbelly for all the world to see. Instead of trying to hide my seat bottoms as traditional chair-makers do, I make them part of the design. Sometimes I round the bottom edges into an upward sweep, giving the seat a bowl-like effect. Other times I try for an undulating clamshell edge, with both the bottom and top saddled up to a thin line. I rough out much of this shaping work for the front edge on a tablesaw or a bandsaw before bending the seat, then finish with plane, spokeshave or sander shortly before assembling the chair. I also shape the back chamfers at this stage.

Designing chairs with bent seats is a challenge. Even though I've been doing it for years, the technique still excites me—there are so many things yet to try. In my wildest dreams I see chairs that wrap clear around the sitter, chairs that reach for the sky, chairs that ebb and flow, chairs tied in a bow. There are more possibilities than one person can explore in a lifetime. □

Jeremy Singley is a full-time woodworker in E. Middlebury, Vt.

A simply elegant chair

After I had developed a machine method to produce shaped hardwood chair seats, a customer asked me if I could design a chair that could be built in a day. Coincidentally, I had already been asking myself the same question, and decided to try to come up with a simple yet comfortably elegant chair.

I eventually settled on the flowing A-shaped form shown in the photo below. It's strong yet light, and with only six parts to keep clean, it's easy to care for. It's also the simplest chair I can think of—there are no turned or bent parts, no complex joints.

Begin by making full-size patterns for the seat and other shaped parts shown in the drawing on the next page. Edge-glue 1½-in. thick clear cherry to make a seat blank and kerf-bend it as already described.

Bandsaw the legs from 1¼-in. thick boards and taper their ends. I do this freehand on my jointer, but a taper jig on the tablesaw would also work. To cut the top leg notches, use the pattern to set up a tablesaw jig to hold each pair of legs while you cut a ⅛-in. wide, 2¼-in. deep notch in each one. I find it easiest to cut all the left-side pieces first, then all the right-side pieces.

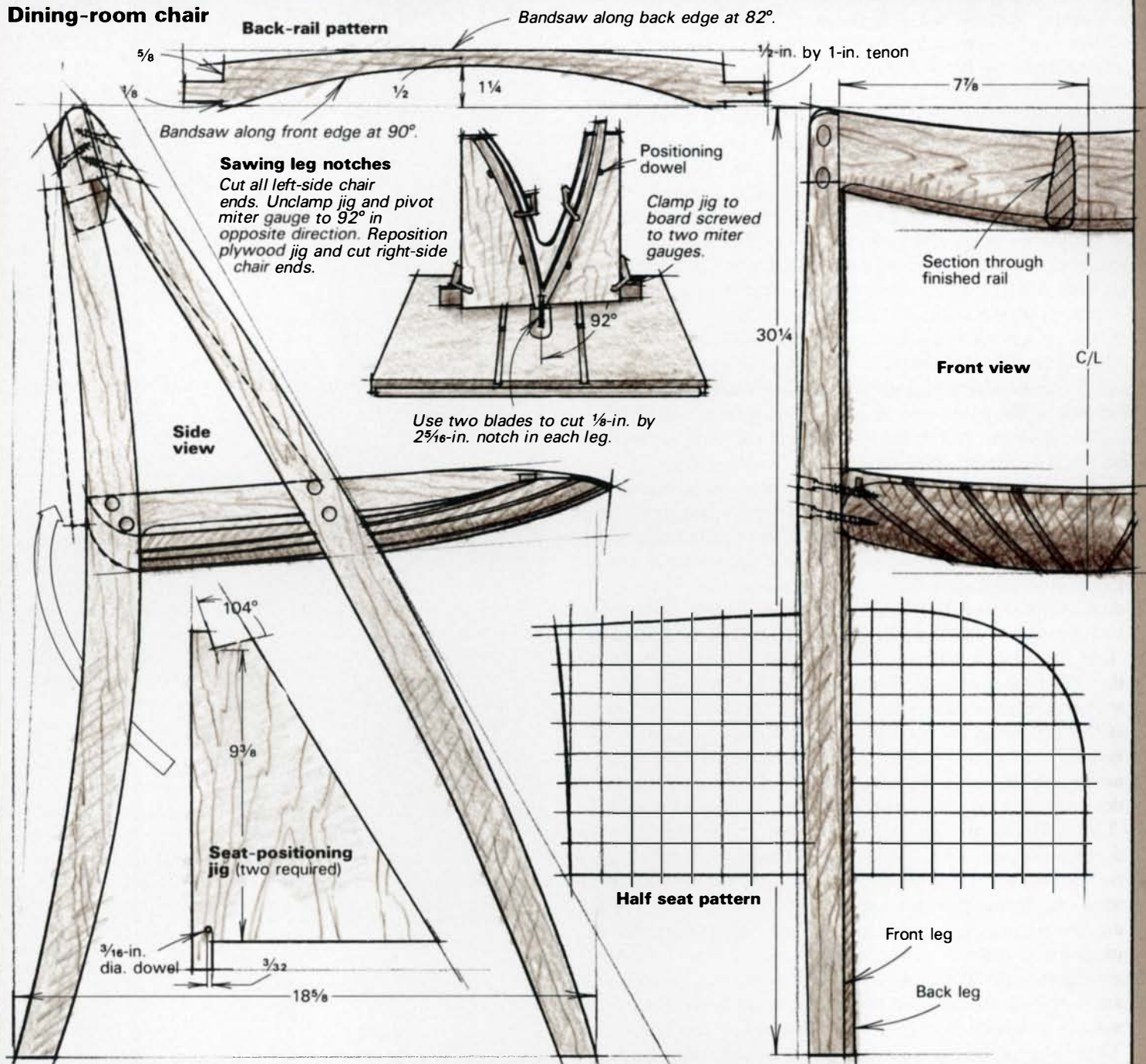
The back rail is a three-step operation. First bandsaw the rail's front profile from 1⅞-in. thick stock, then cut the tenons. Screw a board as long as the rail to your miter gauge to steady the concave top edge of the face-down blank while you cut the tenon shoulders. Make another pass with the rail upright against a high fence to cut each cheek.

After cutting the tenons, trace the elevation-view curve on the top edge of the back, and bandsaw the contour. To hold the back vertical, make a cradle, or tape on the scrap that was sawn from the blank's bottom. Set the blade at 90° for the front curve and at 82° for the back curve. This produces a slight belly for shaping the bottom edge, as shown in the cross section on p. 36. Don't worry that the sawblade runs off the stock at the bottom



Screws and glue replace complex joinery in simple chair.

Dining-room chair



edge—you can blend the curve when you sand the pieces.

Next rout the legs and back with a 1/2-in. piloted quarter-round bit, and finish-sand the flat surfaces of the legs. Shaping is matter of personal preference—I shape all the edges of the front legs, but stop the quarter-rounds on the back legs about 4 in. from the bottom of the seat. Centerbore the legs 3/8 in. deep with a 1/2-in. Forstner bit.

To assemble the frames, glue and screw the front leg to the back's tenon with a countersunk #8x1-in. wood screw in the top hole, and a #8x1 1/4-in. screw in the bottom hole. Angle the screws up and toward the center of the back to pull the shoulders tight. Then glue and screw on the back legs in the same way with #8x1 1/2-in. screws.

Once the two frames are joined to the back, spoke-shave and sand the back to match the contour of the leg tops, blend in all quarter-rounds, and finish-sand the back. Clamp the two spacers to the legs to align the seat. If

necessary, rejoin the seat edges for a good fit, realign the seat in the frame and drill the legs for the bottom screws.

I use shanked #10x2-in. screws here to pull the joint tight, then add #8x1 3/4-in. shankless drywall screws (which are threaded along their entire length) on the top to hold the joint tight against shrinkage. Drill for the top screws with a 1/8-in. twist bit (no shank hole). When you're satisfied with the way the seat fits, remove it from the frame, glue the joints and reassemble. If you prefinish the chair parts, except in areas where the legs meet the seat, excess glue will be easier to remove. Although I've found that this glue-and-screw joint is very strong, you might prefer to notch the legs to fit over the seat for additional strength.

Finally, plug the screw holes with wooden plugs or dowels, then sand. I apply two coats of gel polyurethane for protection, then a coat of polymerized tung oil to give the cherry a richer tone. —J.S.

Hardwood Lumber Grades

There's a method to the madness

by David Sloan

I've bluffed my way through many a lumberyard. I learned young. When I was a kid, I wanted a big hunk of maple to make a rifle stock. At the lumberyard, the man in charge pointed to a pile of thick maple planks. "Come and get me when you've found what you want," he said. I did, and for years afterward, that's the way I bought wood. Whenever I'd hear lumberyard lingo like "FAS or number one common, sir?", I'd put on my poker face, give a knowing nod, and say, "Sure. Uh, do you mind if I look through the boards?" I didn't have the slightest idea what lumber grades like FAS or No. 1 common meant, but I knew a nice board when I saw one.

My bluff worked fine until I bought wood for a big job. I didn't have time to pick through a hundred oak boards, so I went with a grade called No. 2 common because it was cheap. Much to my dismay, there was a short, narrow, knotty board for every nice one that came off the truck. I suggested that the knots added character, but my customer didn't agree. I had to order more oak, and ultimately lost money on the job.

That lesson motivated me to learn about lumber grades. I picked up the basics from books. Recently I rounded out my education by attending a three-day log-, lumber- and tree-grading workshop in Indiana, where I even got to do a little grading myself. Purdue University and the Indiana Hardwood Lumberman's Association sponsor several of these workshops each year. Attending one is a good way to learn about hardwood grading. (For information, write to Daniel Cassens, Dept. of Forestry and Natural Resources, Purdue University, West Lafayette, Ind. 47907.)

Grades provide the basis for determining lumber quality and price. The *concept* of hardwood grading is simple: a high-grade board must have more clear, defect-free surface area than a low-grade board. The grading system provides standards for defects and board size, and equations for calculating clear surface area.

The standard grades of hardwood lumber are (from best to worst) firsts and seconds (FAS), selects, No. 1 common, No. 2 common, and No. 3 common. There are special grades for certain species, but in general the standard grades are what you'll find. The chart on p. 38 describes the top four standard grades. No. 3 common boards aren't suitable for furniture, and usually end up as pallets or shipping crates. Familiarity with the top four grades will get you through most situations, although lumberyards rarely stock all four. Some yards will have only FAS and No. 1 common; some will sell a mix of the top two grades and call it "selects and better"—it varies from yard to yard. Increasingly popular is a non-standard grade called "FAS one face" (abbreviated F1F). In this grade, one board face will



To choose the grading face, grader Wally Cole flips a red-oak board with his steel-tipped lumber rule. Cole marks a grade with his crayon-tipped wand and records the surface measure and grade in the logbook in his left hand.

Calculations make the grade

The drawing below shows how a grader visualizes clear face cuttings on the board's worst face. To make the grade, the cuttings must exceed minimum size and contain enough cutting units to meet minimum requirements based on board surface measure (SM). One cutting unit = 12 sq. in. (i.e., 1 in. x 12 in., or 2 in. x 6 in.). Both boards shown have an SM of 8 (SM = [width in in. x length in ft.] ÷ 12; drop fractions under 1/2). The chart gives the minimum cutting sizes and maximum number of cuttings permitted. To determine minimum number of cutting units required, multiply SM by a conversion factor (10 for FAS and selects, 8 for No. 1 common, 6 for No. 2 common).

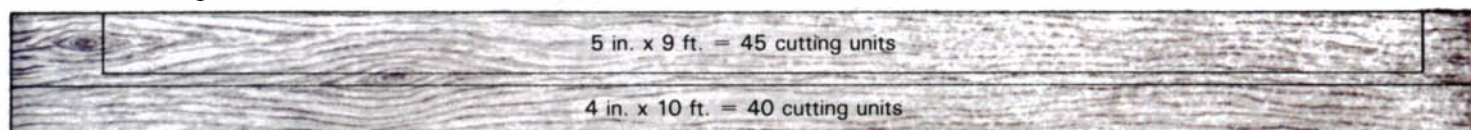
Minimum standards for hardwood grades

Standard grade	Minimum board size* (width x length)	Minimum size of clear face cuttings* (width x length)	Minimum % of clear surface area on graded face	Maximum number of cuttings permitted:	
				SM	Cuts
Firsts and seconds or FAS (two separate grades combined and sold as one)	6 in. x 8 ft.	4 in. x 5 ft. or 3 in. x 7 ft.	Firsts: 91⅓% Seconds: 83⅓%	4 to 7	1
				8 to 11	2
Selects (graded on best face)	4 in. x 6 ft.	4 in. x 5 ft. or 3 in. x 7 ft.	91⅓%	12 to 15	3
				16 and over	4
No. 1 common	3 in. x 4 ft.	4 in. x 2 ft. or 3 in. x 3 ft.	66⅔%	2 to 7	1
				8 to 11	2
No. 2 common	3 in. x 4 ft.	3 in. x 2 ft.	50%	12 to 15	3
				16 and over	4

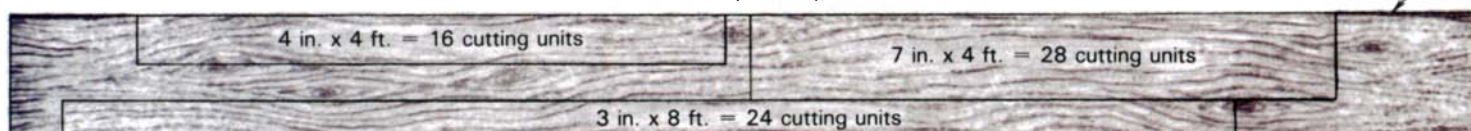
*May vary for some species.

Clear face cuttings

FAS board (red oak), 10 ft. x 10 in.



No. 1 common board (red oak), 10 ft. x 10 in.



grade FAS, and the other face No. 1 common or better.

Here's how grading works. Boards aren't graded by their overall appearance, as you might think. The system is based on the assumption that a hardwood board will be cut into smaller pieces to make furniture parts, flooring, etc. Boards are graded by overall length and width, and by the size and number of imaginary "clear face cuttings" (the furniture parts) that the lumber grader visualizes (no actual cutting is involved) in between knots and other defects on the board's *worst* face. One grade, selects, is graded on the best face; F1F is graded on both faces. No unsound defects, such as large holes, loose knots or wane, are allowed on the reverse side of the imaginary cutting. The higher the grade, the wider and longer the clear cuttings have to be, as shown in the drawing above.

In addition to the size of these clear cuttings, the grading rules also specify the number of cuttings a board must contain to make a grade. That's not all. When the surface area of all the clear cuttings in a board is added up, the total must exceed a specified minimum requirement. The surface area of the cuttings is measured in cutting units. One cutting unit equals 12 sq. in. of board surface. (To find the number of cutting units in a cutting, multiply width in inches times length in feet.) The total

number of cutting units required varies for each grade and also within each grade, depending on the board's overall surface area. Two boards that are exactly the same size with the same number of defects and the same amount of defect-free surface area could end up as different grades—the *location* of the defects could prevent a board from having large enough clear cuttings to make the higher grade.

The defects in between the clear cuttings can vary drastically from board to board within a grade. They could be tiny knots, but are just as likely to be holes or large knots. There are size limitations for knots and holes, but in general the grading system isn't concerned much with the defects, only the clear wood in between.

The actual rules for determining grade are ridiculously complex, but they work. To make things even more complicated, grading rules differ somewhat depending on the species. For example, in cherry the "clear cuttings" may contain tiny knots. The National Hardwood Lumber Association's pocket-size rule book (\$3 from PO Box 34518, Memphis, Tenn. 38184) gives all this information. It reads like the instructions for an IRS tax form, but it's worth having if you want to understand lumber grading. And if you buy lumber in quantity, it's essential.

After reading all this, you may conclude that the grading sys-

tem has little relevance to small-scale woodworking—a valid point, perhaps. The system was designed to meet the needs of the lumber and wood-products industries, not the individual woodworker; without the rules, million-board-foot lumber transactions would be impossible. But if you understand it, the system will enable you to buy and sell boards in quantity, sight unseen. When you specify a grade, you don't have to examine the boards to know, very specifically, what you're getting in a shipment. If there's a dispute between buyer and seller, out comes the rule book. The grade can be verified by measuring the board in question and making a few calculations.

Every decision in the lumber business, from the felling and bucking of the tree to the sawing and edging of the boards, is made with one thought in mind: produce as many high-grade boards as possible. The more high-grade boards a log yields, the greater the profit for all concerned. A wide board that would make some woodworkers swoon with delight will be ripped in two if doing that will raise the grade.

So how can you tell which grade to buy? If you need only a few boards, or you're concerned with a board's overall appearance, you're better off using my old trick of picking out what you want. (Be considerate. Ask permission before you pick, and restack any boards you move.) The best boards will always be in the FAS pile, but if you want to save money, look in the No. 1 common pile first. You'll find a few nice boards. The difference in retail price between an FAS board and a No. 1 common board is roughly 40% (for red oak), but sometimes the difference in appearance isn't that great. A knot that was a defect in the grader's eyes may be pleasing to yours.

When you need a quantity, say, 50 bd. ft. or more, the law of averages starts to work and you can buy blind by grade alone. Not surprisingly, the NHLA rule book ignores aesthetics. In the real world, however, any large single-grade order will contain nice boards, ugly boards, and boards in between. The larger the order, the more likely it is that you'll have an even distribution of nice, ugly and in between (remember statistics in high school?). So when buying by grade, it's always a good idea to order a little more wood than you'll need, to allow for waste. The lower the grade, the more waste you should expect. You'll have minimal waste with FAS or selects, but you'll pay more.

Even if you want perfectly clear stock, you may not always need to buy FAS for every furniture project. The chart gives the minimum sizes for clear cuttings in each grade. These are the smallest clear pieces that you can expect to get out of a board. Consider what size pieces of clear stock your project requires and buy the lowest grade that will give you that size. If only one side of the board will show, buy selects (or F1F) instead of FAS. The cuttings are the same size as FAS, but selects cost a little less.

What if your project requires long, wide, pretty boards and you don't need a lot of little furniture parts? Pick if you can. On a big job you may have to buy blind. The chart gives you the minimum percentage of clear surface area you can expect on the graded face. If money's no object, play it safe and buy FAS or selects. In these grades you'll have wider boards and fewer defects. But if, like me, you don't mind a few knots in the middle of your pet project, or gluing up narrower boards, you can usually save money by ordering No. 1 common. You'll get a few ugly boards, and roughly 17% less clear wood than with FAS, but each board foot will cost about 40% less. And besides, those knots add character, remember? □

David Sloan is an assistant editor at Fine Woodworking.

A grader in action

Grading requires a lot of measuring and a lot of math. When you're learning—juggling unfamiliar tools, rules and numbers—it seems to take forever to grade just one board.

George Screpetis from Pineville, La., an instructor at the Purdue University grading workshop I attended, said that a pro spends only a few seconds with each board. Fumbling as I was at the time, that was hard to believe. It took me a few seconds just to get my grading rule book out of my back pocket. I decided to see for myself.

Wally Cole is a professional grader at Cole Bros. Lumber Co., a sawmill in Woodbury, Conn. He's an amiable young man, in his early thirties I'd guess. The afternoon that I stopped by, I found him standing on the grading platform armed with the tools of his trade: a lumber rule, a crayon-tipped wand and a logbook. As the newly sawn and edged red-oak boards shuttled along on the roller-chain conveyor that crossed the platform, he quickly eyeballed each board's length and measured its width with his lumber rule. A scale printed on the rule gave him the board's surface measure (surface area in square feet). Giving the board a quick flip with the steel-tipped rule and his boot, he chose the worst face for grading, mentally calculated the required number of cutting units and visually laid out the clear face cuttings. Then, with a flourish of his crayon-tipped wand, he marked the board with a grade symbol. As the graded board moved down the conveyor, he ticked off the grade and surface measure in his logbook. Two handlers working with him stacked the boards into piles by grade. The entire grading sequence took only a few

seconds for each board, just as George Screpetis had said.

A good grader like Cole can grade as much as 10,000 bd. ft. in an 8-hr. shift. Graders often get paid by the board foot, so speed is just as important as accuracy. Sometimes Cole seemed to do nothing more than flip a board with his rule before he marked a grade. In fact, he was so fast that I couldn't wind, focus and shoot my camera fast enough to keep up with him. "The best boards grade themselves," he explained. A defect-free board takes only a glance, because if it's large enough to make FAS, no further scrutiny is needed. It's automatically FAS.

Cole was grading to fill an order. The customer had specified standard FAS, F1F, No. 1 common and No. 2 common. If a customer's specifications differ from the standard grading rules, Cole will grade to meet those specs.

I asked if some species were more difficult to grade. Cole said that red oak is one of the easiest woods to grade green because it doesn't have unusual characteristics. Yellow poplar, also being sawn the day I visited, is tougher to grade because it has tiny burls that look like knots at first glance. The burls aren't considered defects in poplar, but knots are, so the grader must check each board carefully to avoid confusing the two.

Hardwood boards are often graded twice: once green, and again after kiln-drying. Since the boards are already graded when they go into the kiln, the dry-grader regrades only boards that have drying-related defects that would cause a drop in grade. Boards more than 10 in. wide are usually picked out at the second grading and sold at a premium. —D.S.

David Pye

Master of wood and words

“The workmanship of risk has no exclusive prerogative of quality. What it has exclusively is an immensely various range of qualities, without which at its command the art of design becomes arid and impoverished.”



Pye turned and carved these boxes of kingwood (foreground), rosewood and English walnut.

The bowls and boxes shown on these four pages are from a Crafts Council exhibition in London celebrating the 70th birthday of David Pye, woodworker, author, and former professor of furniture at the Royal College of Art. Twenty years ago Pye published the first of two remarkable books about design and making (see bottom of page), and craftsmen have been in his debt ever since. The books firmed up the soggy theoretical underpinnings of craft, and helped a generation of makers to better understand the work they were about.

Pye has long been a maker of things, often wooden, and a maker's sensibility is at the core of his writing (selections from both books accompany the photos shown here). He is a superb analyst with an uncanny ability to identify the essences of objects and processes, and to note basic similarities and differences among them. By categorizing and explaining these fundamentals, Pye offers workers a set of analytical tools as useful as any in the shop.

For example, Pye dismisses distinctions between hand and machine work as meaningless. He talks instead of the workmanship of certainty and the workmanship of risk. In the workmanship of certainty, results are to varying degrees predetermined by the use of jigs, which can range from a hand plane (a jugged chisel) to a computer-aided router. The workmanship of risk depends on the worker's dexterity and judgment; the quality of the piece is continually at risk during the making. Most woodworkers shift back and forth between these limits—think of the times you move from table saw to chisel. The tools and forms with which Pye has chosen to work—turned and carved bowls and boxes—allow him to explore his categories fully, to attempt to shatter and also to merge them.

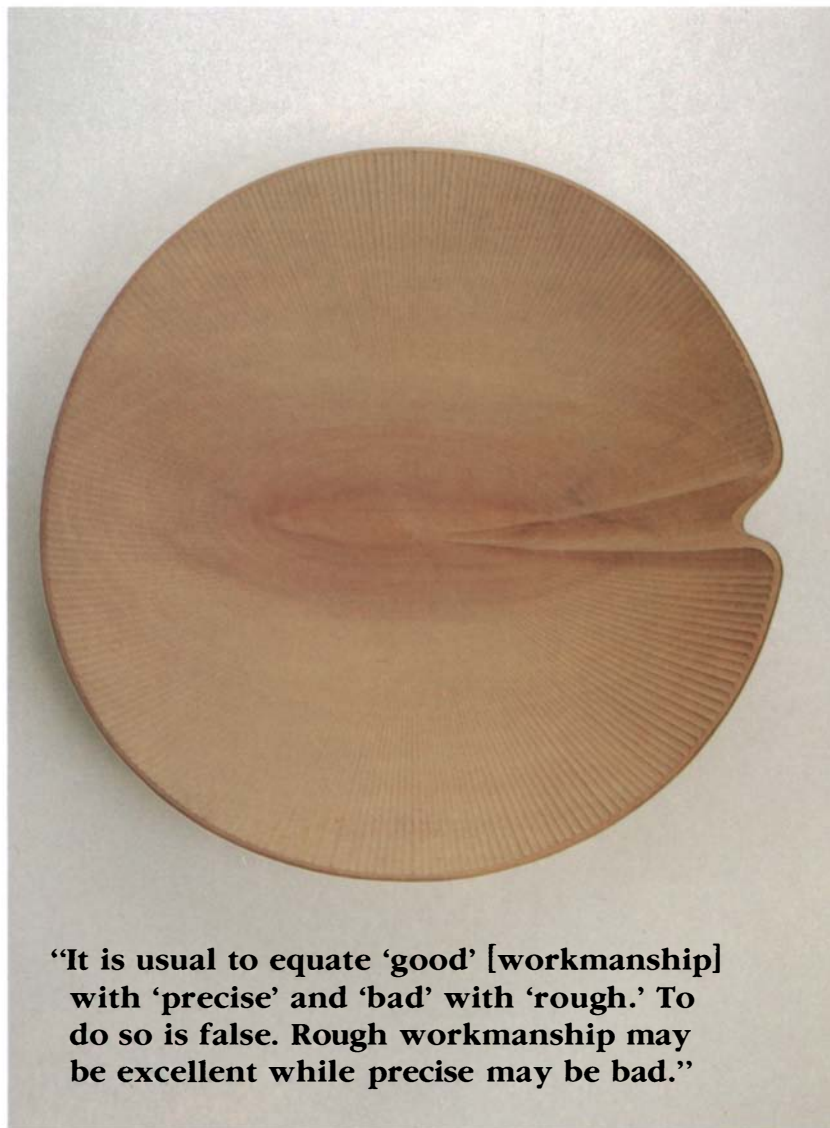
These explorations take place in a cluttered room on the ground floor of Pye's old house in Sussex. Pye's principal tool, a foot-powered treadle lathe, sits just inside French doors, bathed in light from two large windows. His woodworking techniques have the same clarity and directness as his writing. He roughs out the inside of a bowl, for example, with an adze, and finishes the surface on a homemade fluting engine (bottom photo, p. 42). Then he bandsaws the blank and carves the outside with the knife shown at right above. A smaller fluting engine on the lathe engraves the tiny facets on the lids of his boxes (top photo, p. 43).

Though technically the fluting engines are machines, they aren't mere mechanical slaves. Every cut has vitality, and the eye and hand that guide the tool are evident in every bowl and box. Almost all of Pye's work displays this seeming contradiction. The pieces aren't handwork, but they aren't machine work either. They are highly regulated, but by dint of care and skill not elaborate jigs and rotary cutting tools. They are refined workmanship achieved by the methods and technologies ordinarily associated with rough workmanship. They're lively. They're derived from traditional items. But they're informed by late-20th-century understandings. The same could be said of his writing, and therein, perhaps, lies the reason for the continuing influence and importance of David Pye. □

This introduction was compiled from notes supplied by Desmond Ryan, John Kelsey and Roger Holmes. The Nature and Aesthetics of Design (1964) is available from Van Nostrand Reinhold, 135 West 50th St., New York, N.Y. 10020, for \$9.95. The Nature and Art of Workmanship (1968) is available from the Cambridge University Press, 32 East 57th St., New York, N.Y. 10022, for \$11.95. Photos by David Cripps, courtesy of Crafts Council, London.



To shape the outside of his bowls, Pye uses his version of a clog-makers' block knife. The 18-in. dia. dish below is made of wild service tree.



"It is usual to equate 'good' [workmanship] with 'precise' and 'bad' with 'rough.' To do so is false. Rough workmanship may be excellent while precise may be bad."



Pye carves bowls and dishes, like the wych-elm dish above, with the fluting engine shown below. The blank is fastened to an indexed turntable; the gouge moves from the edge to the center of the blank.



“Smoothness and all the qualities of surface finish, flatness, straightness, fairness of curves, neat fitting, neat detailing at junctions, all the qualities of appearance which decent workmanship produces, are to be seen still in immense numbers of the things of all sorts which men make; and almost all of these graces could be omitted or made worse without any loss of effectiveness in the devices which exhibit them. They are . . . an affair of art, and not less important than design in the large, for without them the best of design is entirely wasted so far as appearance goes.”

“For most of your life the parts of your environment which you are looking at are likely to be at close ranges . . . not on a hilltop, or in the distance, or as seen in the photographs in architectural magazines. It is for this reason that the art of workmanship is so evidently important. It takes over where design stops: and *design begins to fail to control the appearance of the environment at just those ranges at which the environment most impinges on us.*”



Pye engraves on the lathe with a smaller fluting engine. The pearwood box below is turned inside, carved outside.

“If you want to enable someone to sit, it will be idiotic to proceed in the way that students of design are sometimes advised to do, and think out the whole problem from first principles, as though all the people who for the last four thousand years have been making and using chairs were half-wits. Where the problem is old, the old solutions will nearly always be best (unless a new technique has been introduced) because it is inconceivable that all the designers of ten or twenty generations will have been fools.”



“No one will find the patience to become a proficient [amateur or part-time professional] workman . . . unless he has a lively and continual longing to do it . . . I doubt whether there is anything which a determined part-time professional could not attain to, except speed, and even that comes in time.”

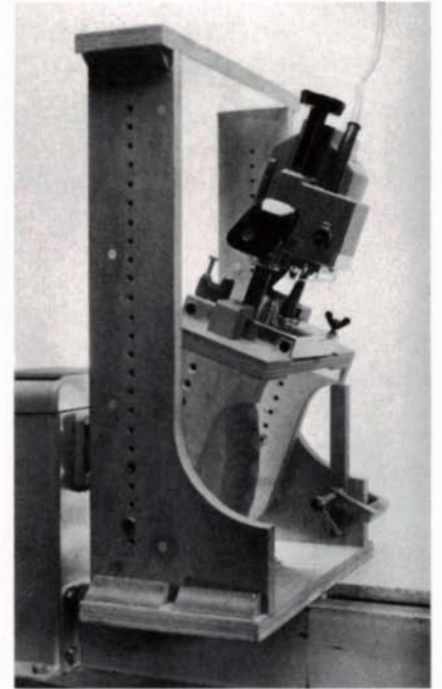
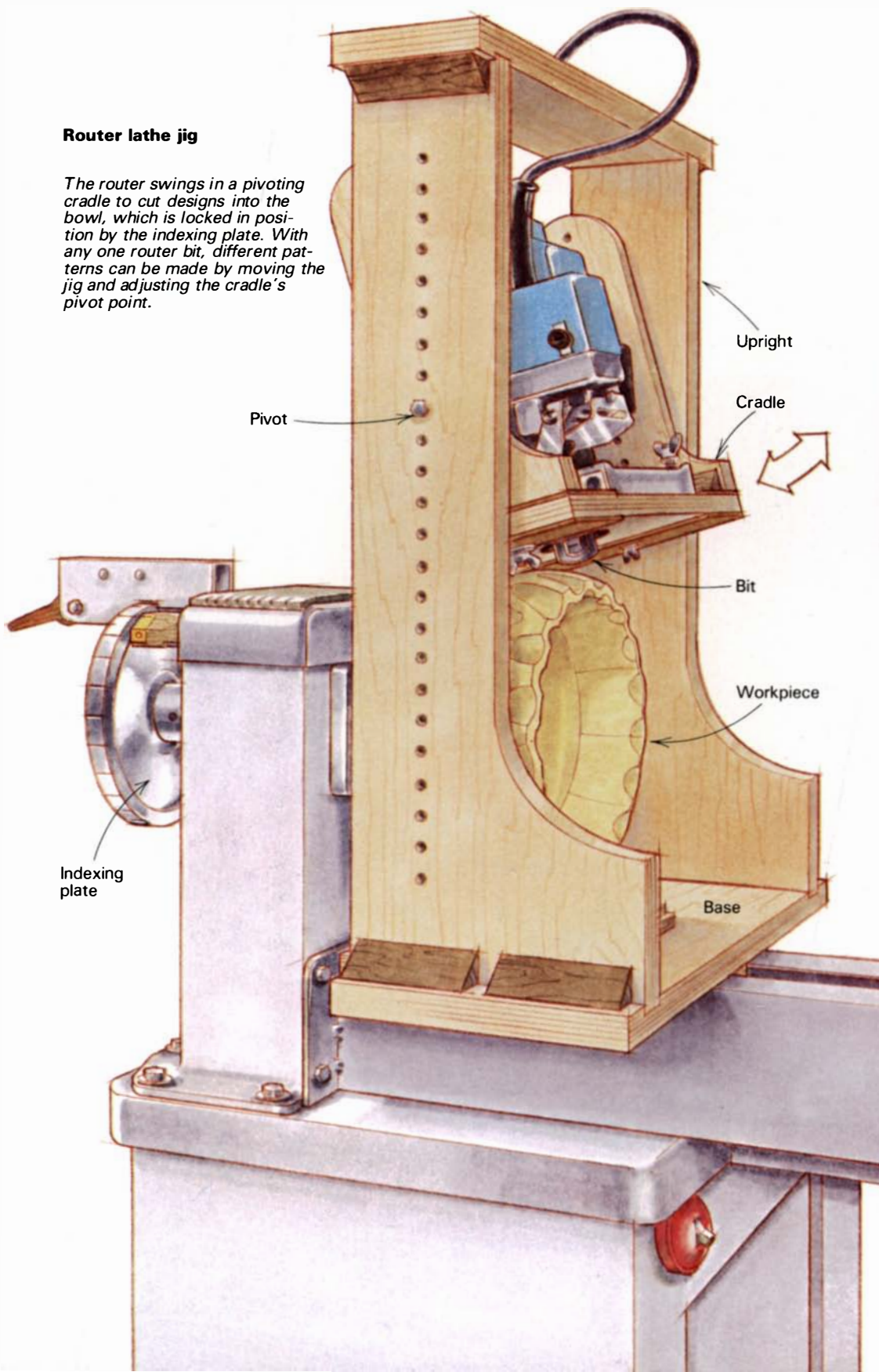
Decorative Turning

Plunging right into a bowl's personality

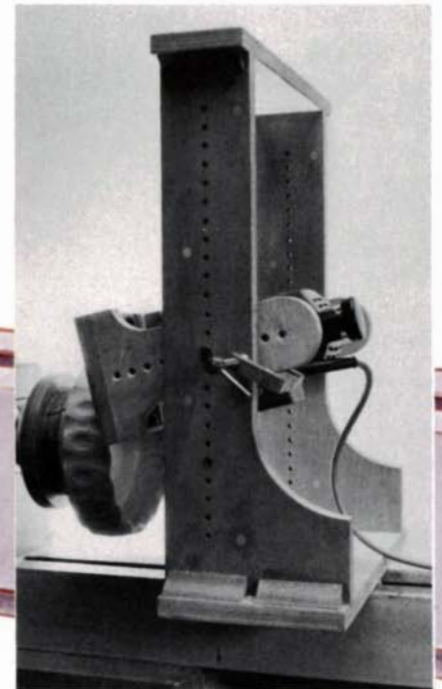
by Tom Alexander

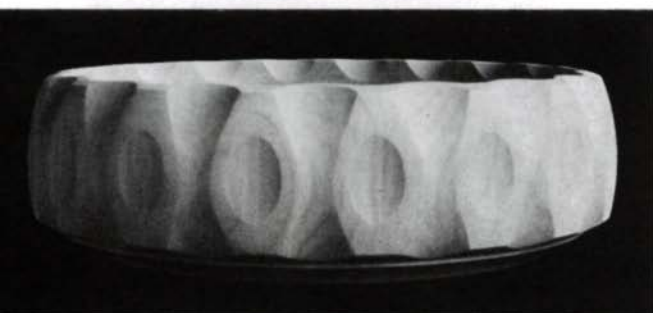
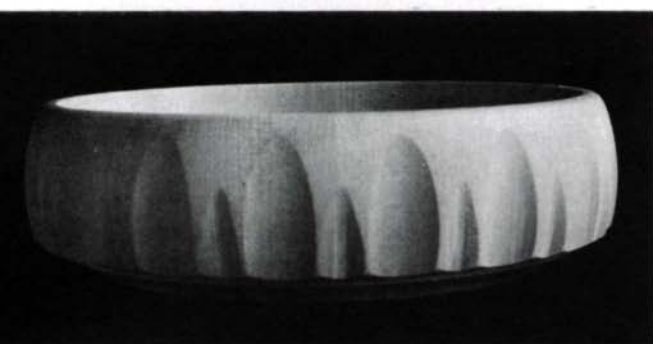
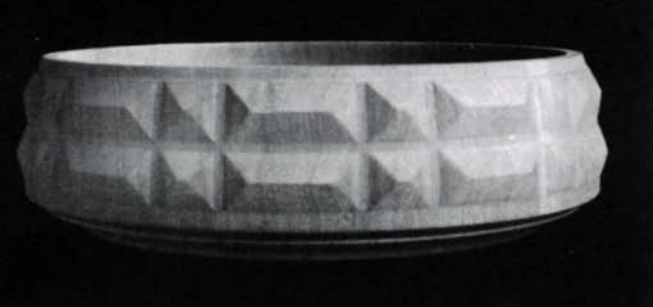
Router lathe jig

The router swings in a pivoting cradle to cut designs into the bowl, which is locked in position by the indexing plate. With any one router bit, different patterns can be made by moving the jig and adjusting the cradle's pivot point.

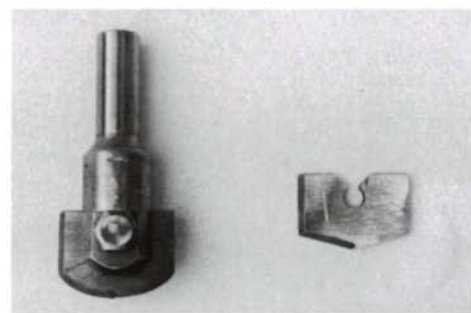


Convex cuts are made by reversing the router, as shown above. Note the safety stop clamped to the far upright. Below, the cradle is clamped in position for plunge cuts inside the rim.





These bowls were all stave-laminated on the same set-up jig before turning, a production process that keeps their basic size and proportions about the same. Yet the incised decoration makes each bowl unique. All cuts were made with the jig on the facing page, using the two router bits shown at right. Alexander grinds his bits from old planer blades and bolts them into a 1/2-in.-shank mandrel.



The bowls shown here are about 9 in. in diameter, and the patterns on them were sculpted by a router. The process works something like turning on a Holtzapffel lathe: The workpiece is first turned to shape, then the lathe is stopped and the work locked so it can't rotate. A cutting tool, in this case a plunge router in a pivoting cradle, incises an arced groove into the bowl's surface. The piece is then rotated a fixed amount and locked again, and another groove is cut. One or more series of such cuts complete the pattern.

The bowls shown here were turned from stock that was stave-laminated, that is, glued up like a barrel. The technique saves wood, and various jigs make it suitable for production turning. One limitation of using jigs is that all the bowls come out about the same size and shape, but the router's surface treatment gives each one individuality.

You can adapt the methods to any size bowl and to whatever router and lathe you have. I make my own router bits, as shown in the photo above, but standard bits could also be used.

If your lathe doesn't have an indexing plate, you'll have to buy or make one to lock the headstock at various positions. An indexing plate is a perforated wooden or metal disc fastened to the headstock spindle. A pin goes through a hole in the disc and prevents the spindle from turning. The indexing plate can be outboard or inboard—the location depends on the lathe and on whatever locking-pin arrangement is convenient. Some lathes have locking-pin holes drilled right in the pulley. Another option would be to drill holes in the back of the faceplate.

To make an indexing plate, turn a disc from plywood and mark a series of concentric circles on its face. Around each circle, drill a series of holes at fixed intervals for the locking pin (divide the number of degrees, 360, by however many stops you want the circle to contain, then lay out the holes with a protractor so they're evenly spaced). You'll also need a router cradle. As

shown in the drawing, the uprights are attached to a base that locks on the lathe ways and can be moved closer to or farther from the work. Inside the uprights, a pivoting cradle holds the router. A row of holes in the uprights allows you to position the cradle at various heights, and a similar row of holes in the cradle itself determines the radius of the arc of the cut. Fine adjustments are made by changing how far the bit extends beyond the baseplate, and most cuts are made in one pass.

In the drawing, the router is mounted inside the cradle and the cradle's pivot point is close to the router base. This arrangement results in a tight concave cut in the workpiece. For the opposite effect, a sweeping convex cut, mount the router as shown in the top photo on the facing page. The bottom photo shows the cradle locked by a clamp—in this setup, the router plunges forward to make patterns inside the rim. If your router doesn't plunge, you can make inside cuts by arranging the pivots so the router's swing is within the bowl instead of outside it, or by making a router cradle that slides rather than swings.

These variables, in combination with choice of bit, allow great versatility. In fact, it's unlikely that you'll ever make two bowls that look exactly the same, however hard you try. I try to visualize each cut before it's made, swinging the cradle to see the arc and sometimes substituting a dowel stub for the bit so I can better see its path. Even so, minor changes in depth of cut or in the profile of the workpiece add up to subtle differences from one bowl to the next. These surprises, fortunately, are usually pleasant ones. One final tip: It's a lot easier to deepen an existing cut than to try to make it a little shallower after the fact. So plan your cuts carefully. If you do go too deep, the only remedy is to turn down the whole bowl a little. □

Tom Alexander turns spinning wheels and bowls in Ashburton, New Zealand. Photos by the author.

Provincial Corner Cupboard

No-frills country joinery

by Carlyle Lynch



Corner cupboards have long been popular for transforming useless room corners into efficient storage areas that seem to blend right into the walls. Even though these triangular pieces were designed to be purely functional, early craftsmen couldn't resist turning them into beautiful showcases of their own skill. Often they added distinctive touches like the arched panel doors on the cupboard shown above, which is now in the Great Hall of the Tuckahoe Plantation in Richmond, Va.

The simplicity of this one-piece walnut and riftsawn yellow pine cupboard suggests that it was made by a country craftsman at Tuckahoe shortly after the plantation was built in 1712. Tuckahoe, now a national historic landmark, is noted for its architecture and furnishings, so it's not surprising that a cabinetmaker working there would have tried to make the cupboard special. Later, as the cabinetmakers' art flourished in America, corner cupboards were embellished with more intricate moldings, bracket feet and delicately framed glass doors.

My measured drawing and bill of materials (pp. 47 and 48) show the lumber thicknesses of the original, but more conventional stock sizes will work all right. The carcass sides and doors can be $\frac{7}{8}$ in. or $\frac{13}{16}$ in. thick. You could make the back panels from $\frac{1}{2}$ -in. boards and work the cornice from $\frac{3}{4}$ -in. stock.

While it's impossible to know exactly how the original maker went about constructing the piece, I think that this practical worker might have made the shelves, bottom and top first, then simply nailed or pinned the two sides and back center piece to them. This formed a rigid skeleton to which the rails, molding and doors could be added. Even though the cabinetmaker used nails (you can feel them if you insert a thin knife between the shelves and sides), it's difficult to see any nail holes on the sides. I suspect that he filled the holes with tiny plugs, carefully matching the grain of the sides—pretty sophisticated work.

Since the hexagonal shelf units are 19 in. deep, you'll have to edge-glue several narrower boards to get the required width. Saw the pieces a little longer than needed in case individual boards shift slightly in the clamps. You can trim the shelves to size after the glue has cured. For additional strength, or perhaps because the cabinetmaker didn't bother to thickness-

plane parts that wouldn't show, the waist shelf, top and bottom on the original are thicker than the other shelves.

The sides and back center piece are made from single long boards. On each side, bevel the front edge $22\frac{1}{2}^\circ$ so it can butt against the beveled door to form a 45° corner, and rabbet the back edge for the back panels. Bevel both edges of the back center piece to 45° . Now nail these pieces to the shelves—one way would be to prop up the hexagonal top on the floor and tack a side to it, then prop up the bottom and tack the side to it. All the shelves are permanent, so while the assembly is still on the floor, nail the remaining shelves to the side, then nail on the second side. The cupboard framing should now be rigid enough for you to flip it over and nail the back center piece to the shelves.

Next pin the top, waist and base rails to the cupboard. The rail ends are beveled $22\frac{1}{2}^\circ$ and appear butted to the sides, forming a 45° angle between them. I suspect, however, that blind tenons or splines (figure 2) may have been used for extra strength. Once the rails are in place, nail the shiplapped boards to the back center piece, shelves and sides.

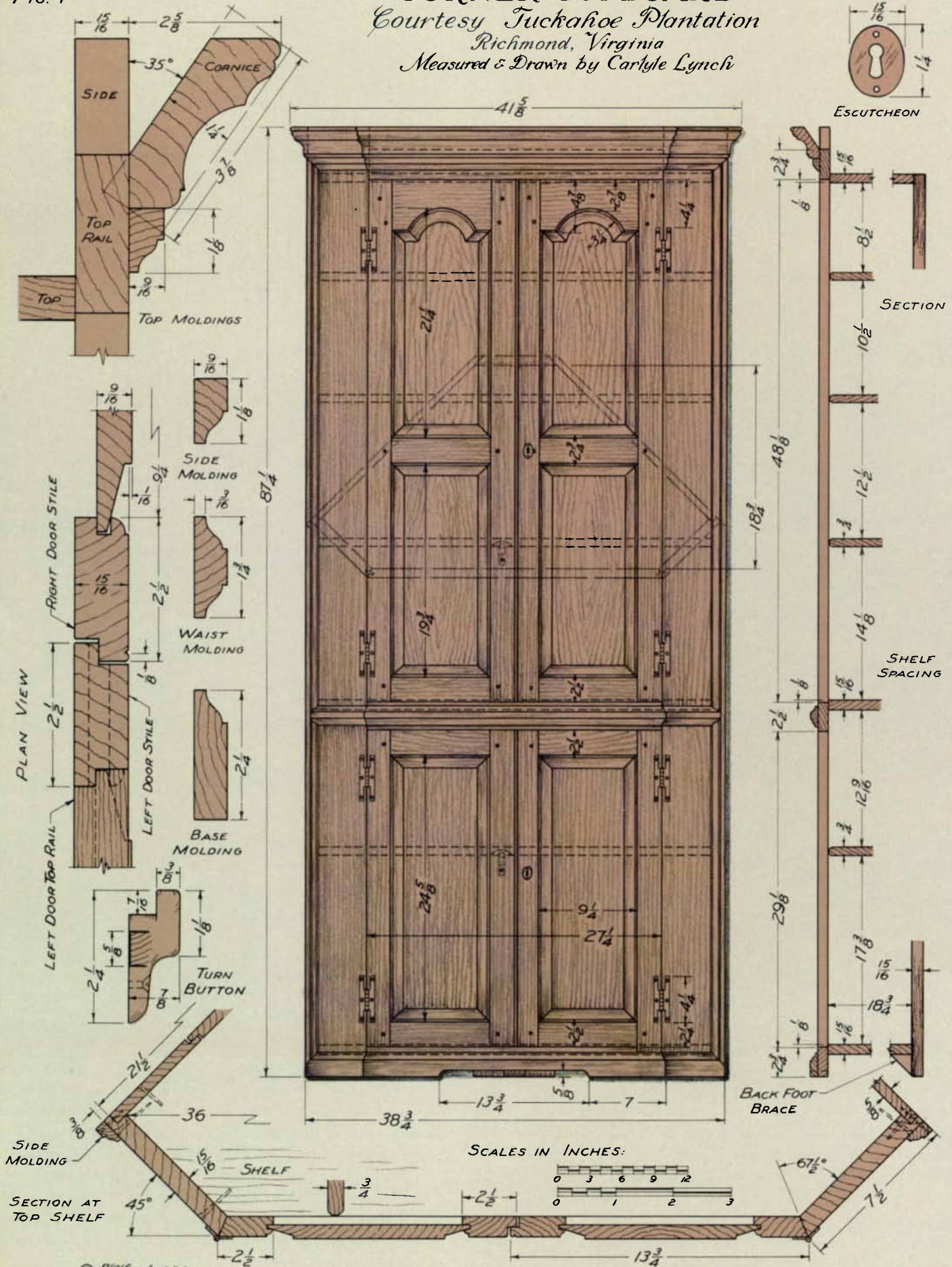
The basic cupboard is now ready for some decorative touches. Make and apply all moldings—the profiles used on the original are shown on the plan. Miter the waist molding to fit the 45° angles on the sides. For the cornice, make a coving cut on the tablesaw (FWW #35, pp. 65-67), then form the beads with a shaper or router. If you're really ambitious, you could also hand-carve or plane the molding. If you're less zealous, you may be able to find patterns close to the originals at a well-stocked mill shop.

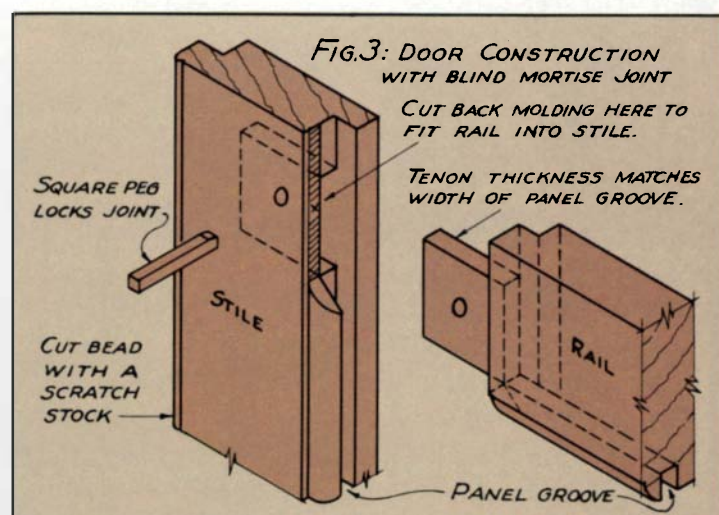
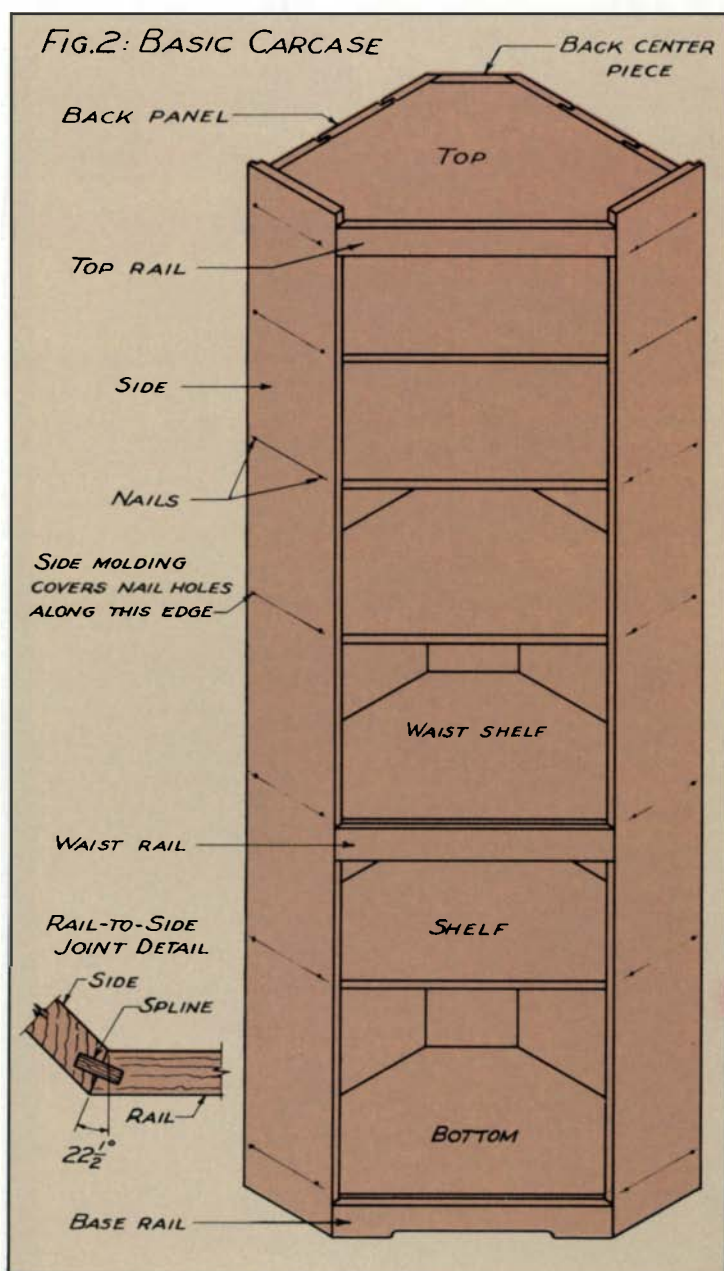
Next make the doors. Make sure you work carefully—it's too late to change the carcass, should you make the doors undersize (which is why some cabinetmakers prefer to make the doors first, then build the carcass to fit). Through mortise-and-tenons are used on the original door frames, but figure 3 on p. 48 shows an easier way to build the frames with blind mortises. Cut all the door stiles and rails to size, then mold and plow the inside edges to accept the panels before you lay out and cut the mortises and tenons. On the original, the grooves are about $\frac{1}{4}$ in. to $\frac{5}{16}$ in. deep. To assemble the frames, you'll have to miter the molded edges of the stiles so they can be fitted to the rails. A 45° guide block and a sharp chisel will work well to miter the mold-

FIG. 1

CORNER CUPBOARD

*Courtesy Tuckahoe Plantation
Richmond, Virginia
Measured & Drawn by Carlyle Lynch*





ing. (For more on scribed joints, see FWW #33, pp. 76-81.)

Once you know the size of the frames, you can make the panels. The straight ones can be cut with a shaper, with a table-saw and router, or by hand. The arched ones need handwork. Careful work with a chisel will raise the arch and give you a nice sense of accomplishment (see pp. 49-51 in this issue).

Assemble the doors with glue and clamp them to dry, making sure they're flat and square. Fit the panels loosely (don't glue them) so they'll have room to swell when the weather turns damp. To ensure a tight fit, peg the frame joints with square pins.

Before you install the doors, rabbet one edge of each right-hand door to fit over the left-hand one. With a scratch stock, make a 1/8-in. bead on the right-hand doors. Bevel the hinge edges of the doors to 22 1/2° to match the cupboard sides, and install the hinges with steel screws. After the doors are hung, remove the hardware, then sand and finish the cupboard. I recommend that you fill the grain with dark silica-base filler, then apply two coats of Minwax Antique Oil finish. When I rehang the doors, I usually substitute brass screws for the steel ones. □

Carlyle Lynch, a designer, cabinetmaker and retired teacher, lives in Broadway, Va. Drawings by the author.

BILL OF MATERIALS

Amt.	Description	Wood	Dimensions T x W x L	Amt.	Description	Wood	Dimensions T x W x L
2	Sides	walnut	15/16 x 7 1/2 x 87 1/4	4	Upper doors:		
2	Top and base rails	walnut	15/16 x 2 3/4 x 27 1/4*	2	stiles	walnut	15/16 x 2 1/2 x 48
1	Waist rail	walnut	15/16 x 2 1/2 x 27 1/4*	2	top rails	walnut	15/16 x 4 7/8 x 9 1/4 s/s
1	Cornice	walnut	1 1/4 x 3 7/8 x 50**	2	center rails	walnut	15/16 x 2 3/4 x 9 1/4 s/s
1	Waist molding	walnut	9/16 x 1 3/4 x 45**	2	bottom rails	walnut	15/16 x 2 1/2 x 9 1/4 s/s
1	Base molding	walnut	9/16 x 2 1/4 x 45**	2	top panels	walnut	9/16 x 9 1/4 x 21 1/4
2	Side moldings	walnut	9/16 x 1 1/8 x 84	2	bottom panels	walnut	9/16 x 9 1/4 x 19 3/4
1	Top molding	walnut	9/16 x 1 1/8 x 45		Lower doors:		
4	Shelves	pine	3/4 x 19 x 36 1/4	4	stiles	walnut	15/16 x 2 1/2 x 29
3	Waist shelf, top, and bottom	pine	15/16 x 19 x 36 1/4	4	rails	walnut	15/16 x 2 1/2 x 9 1/4 s/s
1	Back center piece	pine	15/16 x 7 3/4 x 83 1/4	2	panels	walnut	9/16 x 9 1/4 x 24 5/8
2	Back panels, shiplapped	pine	5/8 x 21 1/2 x 83 1/4	24	Tenon pins	walnut	1/4 x 1/4 x 1 1/4
				1	Back foot brace	pine	2 x 2 x 2
				2	Turn buttons	walnut	5/8 x 7/8 x 2 1/4

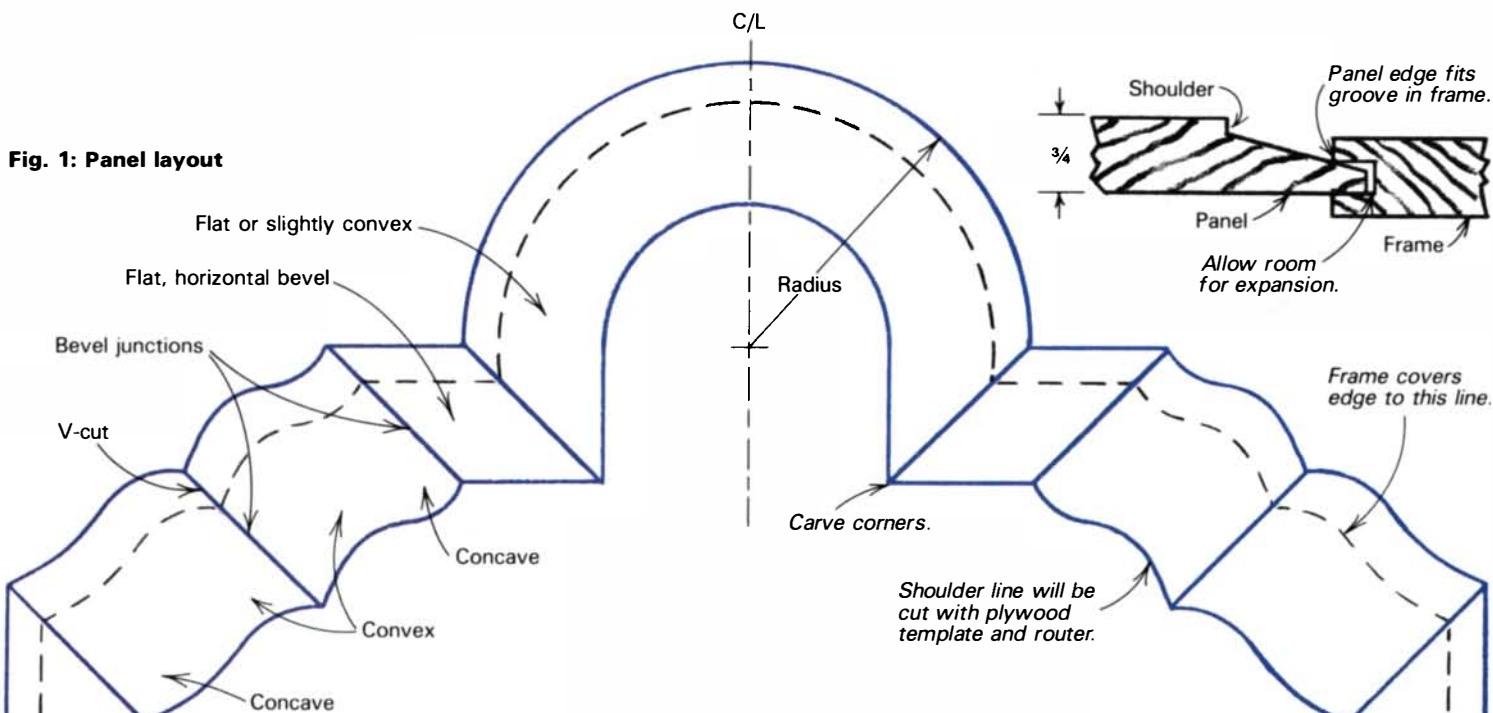
Hardware: Eight polished-brass H-hinges, 1 1/2 x 4 1/4; two wardrobe locks with barrel keys, 1 1/4-in. selvage to key pin; two polished-brass oval escutcheons.

* Long point to long point.

** Makes front and side moldings.

s/s = shoulder to shoulder. Allow 2 3/4 in. to 3 in. for through tenons.

Fig. 1: Panel layout



Fancy Raised Panels

Woodcarver has a field day

by Roger Schroeder

Decorative raised panels, such as the one shown here, give a piece of furniture visual snap, whether it's a linen press, a cupboard or a cabinet. If gracefully rendered, a shaped panel can also lend distinction to a door or a paneled wall.

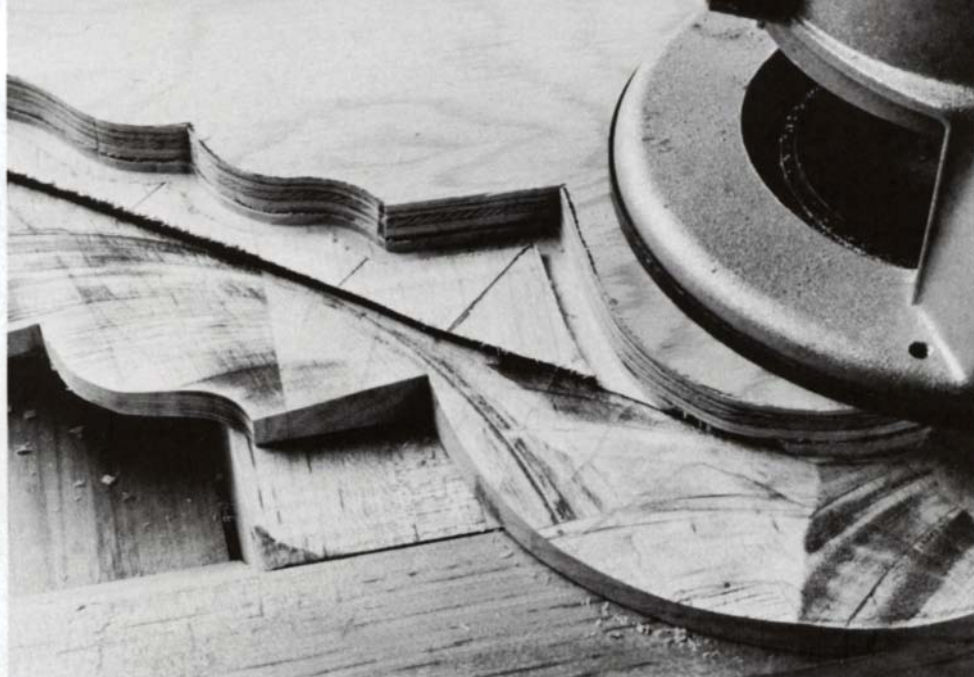
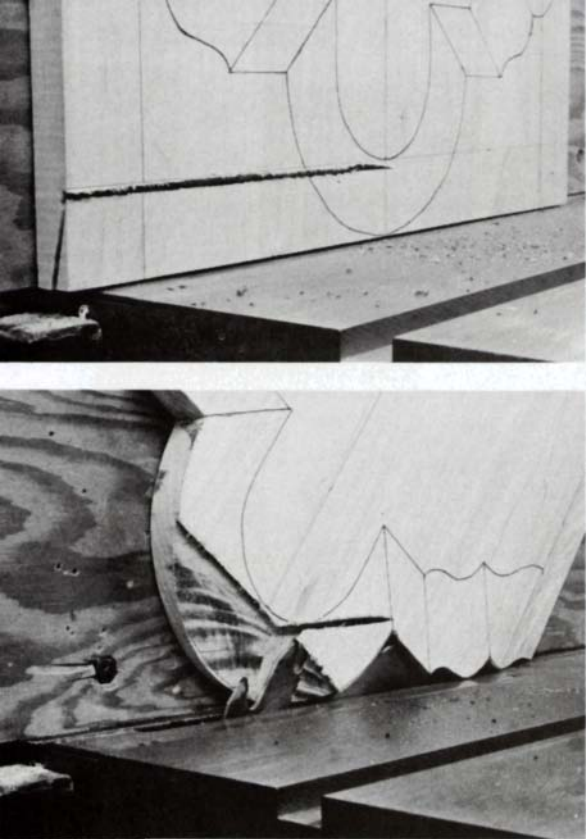
Commercial versions are cut on the shaper, which bevels the edges of the panel by following a curved template. But the shaper is restricted to gently curving, boring shapes. Old-timers working with planes and carving tools were able to shape an almost limitless variety of panels (some examples of period designs are shown in the box on p. 50). I figured that if they could do it, so could I, with a few modern time-saving procedures thrown in.

A panel's overall dimensions depend, of course, on the size of the cabinet door and the width of the rails and stiles the panel will fit

into. So I begin with sketches, adjusting the width of the rails and stiles and juggling the proportions until things look balanced.

You must figure out the exact width of the panel before you can determine the size and relationships of the curves. Determining the height of the panel comes later—you want a visual balance between the width of the top rail and the curves of the panel, and this relationship is best adjusted by eye after the curves have been laid out on a full-size drawing.

The raised center of the panel, called the field, is bordered by a shoulder that's about 1/8 in. deep, and from there the panel is chamfered out to the edges. In laying out the panel drawing, I try to keep the chamfers, both curved and straight, all the same width, and I work on the curves until they flow and reverse smoothly. I find it best to begin with a compass at the



First saw away the waste at the very top of the panel (top left), then chamfer the straight sides and bottom edge. Next bandsaw the top profile, and tablesaw some additional waste (left). A piece of Formica, slid under the rip fence, keeps the panel from slipping down between the fence and the blade. A router (above) with straight bit and pilot bushing cuts the top shoulder by guiding against a template derived from the layout drawing on p. 49. Square up the straight shoulders by routing along a straight fence.

centerline, to determine the central arch, then work out from there to the sides.

The frame will cover about $\frac{3}{8}$ in. of the panel when it's in the door, so I plot the rail line on the panel drawing at this stage—this lets me visualize what the panel will actually look like in place.

When the drawing looks right, I use machines to remove as much waste as I can, as shown in the photos above, and then rely on basic carving tools to shape the hollows and rounds. When I'm carving, I clamp the panel over a piece of

plywood on my benchtop, with the plywood projecting beyond the edge of the panel to protect the bench from errant chisels. I like to keep the clamps well out of the way, which is easy on a long panel. I usually hot-glue smaller panels to a larger backing piece and then clamp the backing to the bench.

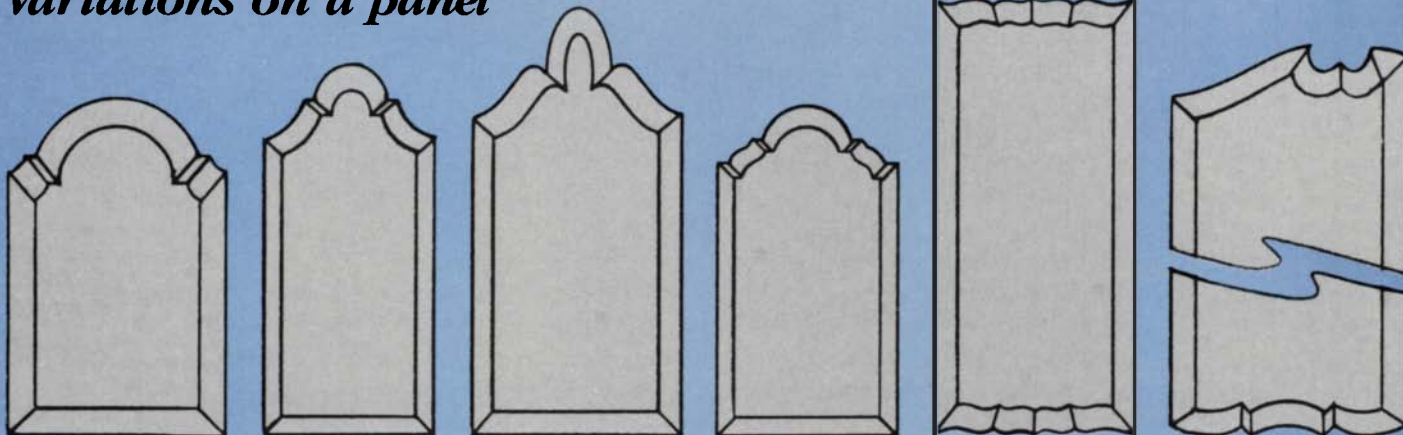
The rails and stiles of the frame are mortised and tenoned as usual, and a router—with a horizontal slotting cutter and a pilot bearing—makes the grooves for the panel. The router can cut most of

the groove in the bandsawn top rail; there's just a little cleanup with a chisel necessary at the sharp inner corners.

The panel shown in this article, incidentally, wasn't just an idle exercise—by the time you read this, it will be a door to a corner cabinet in my kitchen. □

*Roger Schroeder, of Amityville, N.Y., is a woodworker and author of *How to Carve Wildfowl* (Stackpole Books, 1984). He wrote about wooden locks in FWW #42. Black-and-white photos by the author.*

Variations on a panel



Panel types are named after things they resemble. There's the basic "tombstone" shape, such as the one on Carlyle Lynch's corner cabinet on p. 46. Variations are called ogee, arched, half-moon, quarter-moon, serpentine, cyma, linenfold-fan or whatever. Curiously, there doesn't seem to be a name for the entire class of raised panels with shaped edges.

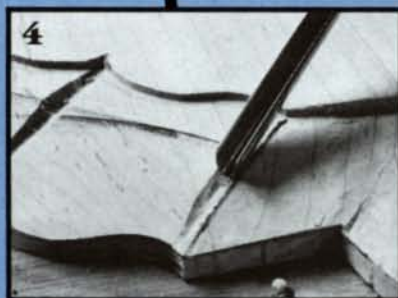
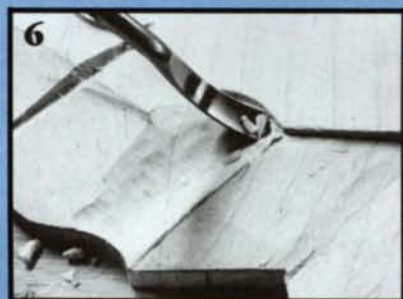
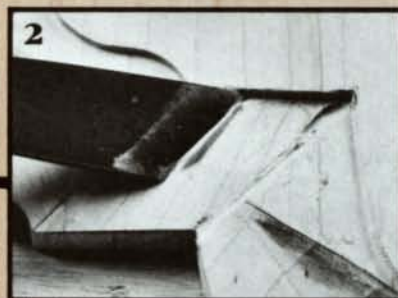
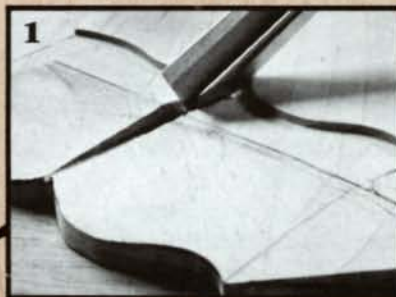
The first four panels shown here are from various period

pieces, most of them from Connecticut, where shaped-edge panels were particularly popular. The last two designs are my own, one for a curly-maple sideboard, the other for a pair of doors on a tall mahogany cabinet. There's virtually no limit to the ways a cabinetmaker can change the proportions of the curves and chamfers in a panel design to suit the mood and flavor of a project.

—R.S.

Carving the curves

This basic set of carving tools defines the shapes. First draw a gauge line on the edge of the panel to show the thickness where it will fit into the frame, then carve down to it smoothly from the shoulder line. Step 1 shows a V-parting tool, which cuts a sharp-bottomed groove that allows the other tools room to work. Broad, relatively flat or convex areas are shaped with a skew chisel (2) or a square-nose chisel (3). A narrow, deep gouge (4) scoops away wood next to high profile lines, while a broad gouge (5) makes the more gentle hollows. Cleanup cuts are made with a small spoon gouge (6) or a fishtail gouge (7). You can tap with a mallet or use a slicing knife action, but in either case, try to follow the grain downhill wherever possible. Then lightly sand. —R.S.



WOOD TYPE

Minding your p's and q's

by Simon Watts



hen a modern department store uses movable type to print a poster, it's continuing a tradition that goes back to Gutenberg, his wooden press (see back cover) and his famous Bible. Gutenberg developed the small, reusable cast-metal letters that first made book printing economical. But for poster-size type, letter blocks of hardwood are still as practical today as they have been for centuries.

One factory in Wisconsin, Hamiltons, turns out wood type to the tune of a million dollars a year. They slice maple logs like loaves of bread, then painstakingly dry and finish them to type-height tolerances of 0.002 in. The elaborate processing makes the wood so valuable that the factory even weighs offcuts to monitor the waste.

On a much smaller scale, a museum in Old Town, San Diego's historical district, demonstrates how wood type was manufactured in an 1868 newspaper office. I spent two days with the museum's curator, Richard Yale, a cheery, unpretentious man of 73 who sports a black string tie and looks like a small-town lawyer or editor of 50 years ago—an appearance he cultivates to the point of being frequently mistaken for a reincarnation of Colonel Sanders. Yale, a master typographer, has patterns for 36 different type faces, and can produce an astonishing variety of letter designs and sizes—all with fairly simple equipment and in a very small space.

Demonstrating the process in his garage workshop, Yale pulled out a 6-in. high letter pattern, a mirror image of the actual letter (the blocks are reversed in printing). I'd always thought that the expression "mind your *p*'s and *q*'s" meant watching your pints and quarts when making merry. Yale, however, interprets it as a warning to apprentice printers—a lowercase *p* is a backwards *q*. Yale also told me that for hundreds of years all wood type was carved by hand. It wasn't until 1834 that a new invention, the router, was combined with an old device, the pantograph, to allow large-scale production.

To produce a letter, Yale mounted the pattern in the pantograph and traced the stylus around its outline. At the other end of the machine, the router's high-speed cutter exactly duplicated the design on a smaller scale. By changing the mechanical link-

age of the pantograph, Yale can use the same pattern to cut letters from ½ in. to 4 in. high. The style we chose for the block letters shown here is named after circus magnate P.T. Barnum.

Yale then took a homemade trimming knife and deftly cleaned the inside corners of each letter, the tight spots where the router bit couldn't reach. As he worked, he explained that all wood type in the smaller and medium sizes, 1 in. to 7 in. high, is made from blocks of end-grain hardwood. This is because flat grain wears unevenly, summer wood being denser than spring wood, and also because fine details such as serifs (the small lines that finish off the main stroke of a letter) are fragile and tend to break off. End grain has high compression strength, and since shrinkage along the grain is negligible, the blocks, and therefore the heights of the letters, do not vary with changes in humidity.

Pear, maple, alder, cherry and applewood all make strong, durable type. Letters more than 2 in. high are known as "Second Coming" type—used only for drastic news. Although it's feasible to make large end-grain type, it's impractical to make these letters much more than 7 in. high because perfect stock this big is hard to find. Instead, large type is made from flat grain, which often is mounted on plywood or particleboard to reduce shrinkage and warping. An alternative to routing out the letters is to cut them from heavy veneer and then mount them on particleboard. The only tools needed are a fretsaw or jigsaw and wood files to clean up the rough edges.

Every day, all over the country, small businesses print posters and ads on modern presses that accept combinations of wood, metal and plastic type. These usually work by rolling the paper over the inked type. Yale's 1841 press, in contrast, works by forcing a flat platen down onto the type, more like Gutenberg's original model. As I watched Yale prepare to pull a proof, he locked the letter blocks in a metal frame called a chase, inked them with a roller, and laid paper on top. Then he slid the chase into the press and pulled the action lever. At the first attempt, some of the letters printed fainter than others. These he shimmed up with slips of paper, then ran a second proof. This time it was letter-perfect. □

Simon Watts teaches wooden boatbuilding and is the author of Building a Houseful of Furniture (Taunton Press, 1983). Photos by the author.



Richard Yale, who runs a newspaper-office museum in San Diego, guides the stylus on a pantograph/router around the outlines of a 6-in. pattern to cut a fancy letter A (above). To trim places where the router bit can't reach, such as the inside corners of a P (top right), he uses homemade knives. Yale made the letters used for the headline on the facing page, then pulled a proof on an 1841 Washington press, a working exhibit at the museum (center and bottom right). Shown below are samples of wooden type styles still used for posters by supermarkets and other small businesses.



Starting Out

Simple bookcase joints

by Roger Holmes

I can't remember the last time I rented a house with bookshelves (or enough closets for that matter, but I own a lot more books than shirts). So for years I've lived with makeshift shelves—planks on bricks and brackets, planks wedged into alcoves. Confronted with another shelfless house recently, I finally decided to make some permanent shelves that could move with me from house to house. The result, a stack of two simple boxes, one shallow, one deep, is shown in the drawing at right.

Boxes—called carcasses in traditional parlance—are the cabinetmaker's basic building blocks. Stripped down to essentials, most casework isn't much more than a box-like container, usually filled with boxy drawers. In fact, most of the furniture in my house is made of simple rectangular boxes. For example, scale down the shallow box shown on top in the drawing for a spice rack or knickknack shelves; add a mirrored door and you've got a medicine cabinet. Slide a stack of smaller boxes into the deep bottom box and you've got a chest of drawers (I'll show how to do this in a subsequent article).

I made my boxes of pine, tailoring the depth of the upper box to the width of the boards I had on hand. I started with 10-in. wide boards for that box, but tapered the sides to add a little stability and to break the monotony of all those rectangles. The wider sides, top and bottom of the lower box had to be edge-joined and glued up.

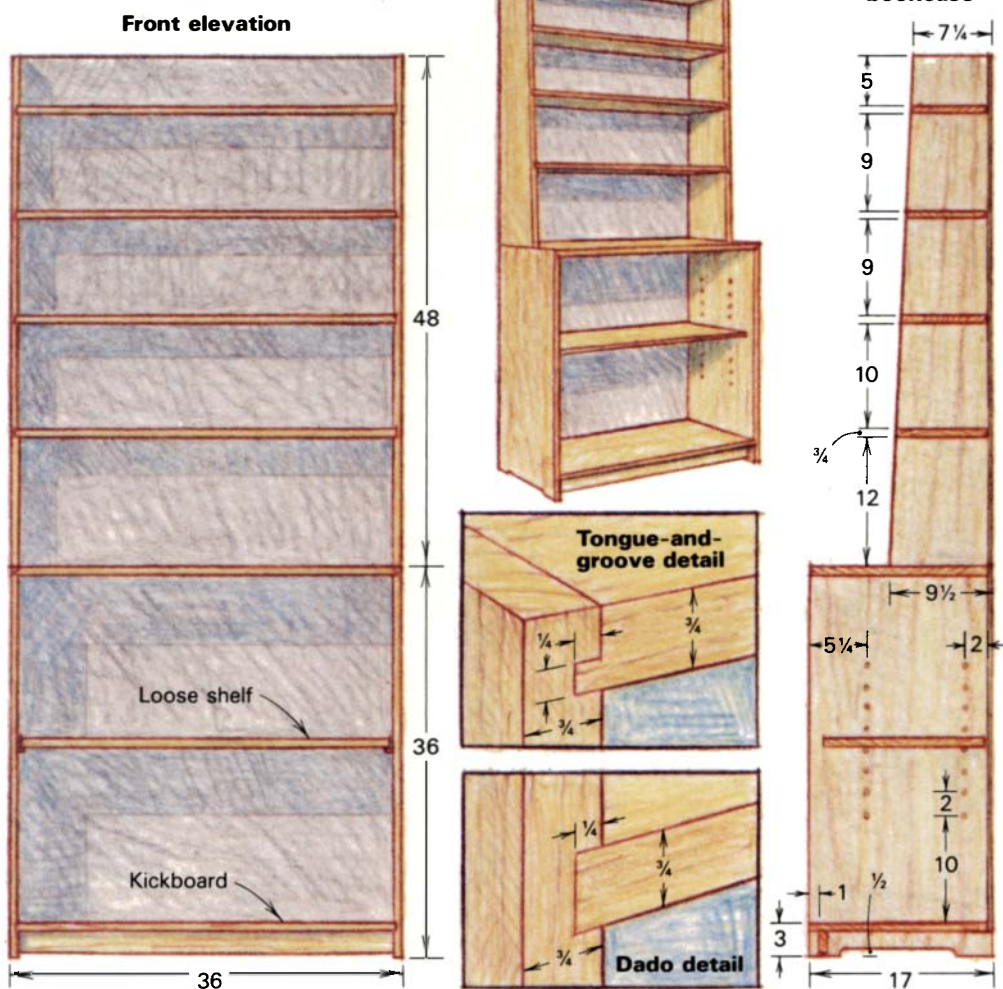
Box joinery can be as simple or as complex as your skill and patience permit. Anybody can nail a butt joint together, and for some things that's joint enough. Secret mitered dovetails are at the other end of the scale, and I don't know many people who use them regularly. For my bookshelves, I wanted more strength than

a simple nailed butt joint would give, but I didn't want to spend a lot of time getting it. The upper box, therefore, was put together entirely with dados—strong, easily cut joints in which the full thickness of each shelf end is housed in a groove in the side. (If you want adjustable shelves, just dado the top and bottom shelves and support the others on dowels as shown in the adjustable shelf in the lower box.)

Because the lower box had to have a

flush, flat top, the top couldn't be dadoed into the sides. You could nail the ends of the top in rabbets in the sides, but the tongue-and-groove shown in the drawing locks together, which makes the joint stronger and much easier to assemble. The carcass bottom dados into the sides. Eighth-inch tempered Masonite backs strengthen both boxes, an important factor if you want adjustable shelves in the upper box. Whether you nail the back

Beginner's bookcase



over the back edges or into a rabbet affects only the looks, not the strength. I reinforced all the joints with finishing nails; screws would add even more strength. If the joints fit snugly and the boxes have backs, simply gluing them will be enough.

The carcass joints I've described can be cut by hand or machine. I'll explain the hand methods here, and the router and tablesaw alternatives on p. 58.

First prepare the parts. Flatten, thickness and glue up the boards, either by hand as described in the first article of this series (*FWW* #48, pp. 46-51) or with a jointer and thickness planer. Try to make all the parts at least $\frac{3}{4}$ in. thick. The exact thickness of the shelves of the upper box and the bottom of the lower box depends on the width of the dados. I cut a test dado in scrapwood and thickened the boards to fit it snugly. Tight joints present a dilemma: The tighter the joints, the stronger the box, but the harder it will be to glue up. You should have to apply some pressure to assemble a joint dry, but you shouldn't have to hammer it home. If anything, make the shelves too thick for now—it's easier to make a board thinner than to shim a loose joint.

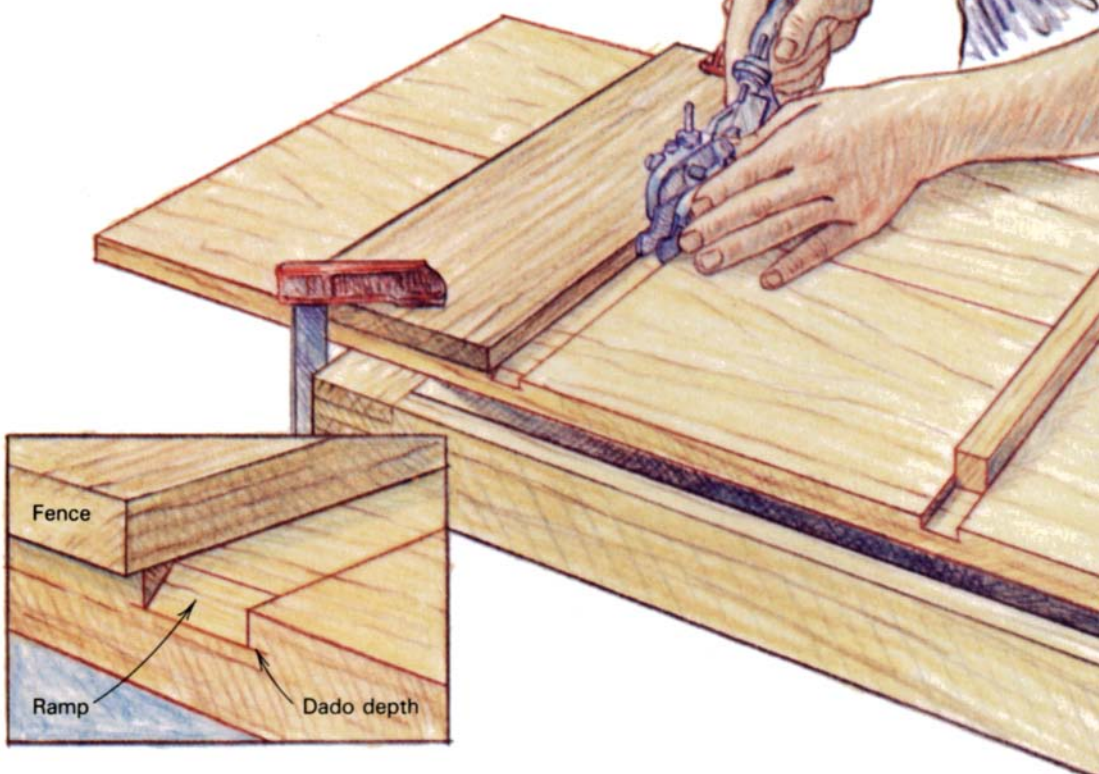
Next rip the boards to width and cross-cut them to length. (Since the back is let into a rabbet in both boxes, the shelves have to be narrower than the sides, so that their back edge will be flush with the bottom of the rabbet.) Mark the good face and good edge. From now until you cut the joints, the top and bottom of the lower box are worked in the same way as the shelves of the upper box, so I'll just lump them all together and call them shelves.

The ends of all the shelves should be square to their edges, and the shelves should all be the same length. Your tablesaw or radial-arm saw may be very accurate, but mine leave the pieces slightly off, so I finish the job with a jointer plane. Stack the shelves so you can pick out the shortest one to square up first.

Planing end grain isn't particularly difficult, and the techniques are similar to those for planing edges (again, see *FWW* #48). Check the end against the good edge with a framing square or a try square, and mark the high corner. Put the board end-up in the face vise. If the board is short enough, position the end only a couple of inches above the bench to cut down on chatter. Adjust the plane to take a thin shaving, then plane in from the high corner—to avoid splintering the edge, don't run the plane off the far corner. Un-

Plowing dados

Guide the plow plane against a fence. Pull the plane backward to score the walls with the spurs, chisel a ramp at the end of the dado (shown below) to prevent splitting, then plow to full depth. If you dado two sides at once, slide a batten in the first pair of dados to keep the sides aligned.



less your saw is way out of whack, a couple of shavings should square the end to the good edge. The end needn't be dead square to the face, but if it's too far off, the joint won't be as strong. With the shortest shelf square, use it as a template for the rest, stacking it and the next shelf, then feeling with your fingertips for discrepancies in the ends. Square the box sides the same way.

Before I cut any of the dados, I pencil in their positions on the sides. Place the good edges of the paired sides together, ends flush, and simultaneously mark the locations of both walls of each dado on the two inside faces to ensure that the shelf spacing is exactly the same on both. Extend these marks across each inside face with a framing square, holding the square against the good edge. Also clearly mark the bottom of the inside face of each side. The spacing shown in the drawing on the facing page accommodates most of my books, but alter it to suit yours.

The depth of the dado isn't critical, but it shouldn't be more than half the side's thickness. A deeper dado would be stronger, but too hard to assemble. One-quarter to one-third the thickness of the side is plenty. Scribe the dado depths on the edges with a marking gauge.

Dadoing by hand is satisfying work if you're not in a hurry. You'll need a plow plane—a straightforward tool that requires a little practice. A simple metal plow plane consists of a handle attached to one of two fairly thin runners that form the body. The handled runner holds the blade and is fitted with two bars on which the other runner slides. The outer faces of the runners are set flush with the edges of the cutter, which can be one of a variety of widths. A fence, which also fits on the bars, can guide the plane along the edge or end of the work. I've had good luck plowing easy-to-work woods like pine or mahogany; harder woods are tough going. Most mail-order tool companies carry simple plow planes or slightly more complicated, and more expensive, combination planes. Prices vary—from \$60 to well over \$100—so shop around. The plane shown above is a Stanley #45, a more complicated molding plane that can also be used as a plow plane. I got lucky and picked it up at a garage sale for \$25.

To set up the plane, make sure that the blade is razor-sharp and that the outside faces of the runners are flush with the edges of the blade. When plowing across grain, use the small spurs housed ahead of the cutter in each of the runner faces. They

score the wood, which keeps the fibers from splintering on either side of the dado. The spurs should be knife-sharp and long enough to score the wood cleanly, but not so long that they tear it.

Narrow box sides are easily dadoed in pairs. Place a pair on the benchtop, inside faces up, bottom ends aligned, good edges butted together. Then clamp a wooden straightedge across them, flush with the mark for the first dado wall. Set the plane on the far edge, tight to the fence, and draw it carefully back toward you to scribe the walls with the spurs without engaging the cutter. Then chisel a ramp in the waste at the end of the dado to prevent splintering. The first few strokes establish the dado, so make them carefully—set a shallow depth of cut and keep the plane tight against the fence and perpendicular to the board's face. After two or three strokes the plane will follow its own path, so you can remove the straightedge. Most plow planes have depth stops, but I use mine only for a rough gauge; when I get down to the scribe marks on the edges, I check the depth of the groove with a steel ruler. Slide a piece of scrap into both dados to keep the sides aligned, and reset the fence for the next cut.

Plow-planing takes practice, so dado a

few pieces of scrap before tackling the real thing. The fussiest adjustment is aligning the edges of the cutter, the faces of the runners and the spurs to cut the dado walls cleanly. As you become familiar with the tool, you'll develop little dodges to make the job more accurate and efficient.

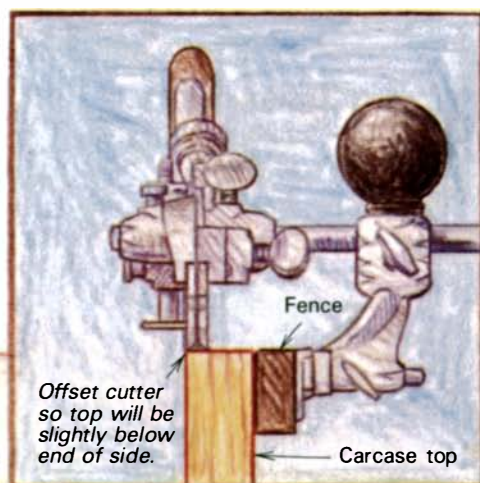
Tongue-and-groove corner joints are not much more difficult to cut than dados, just a little more time-consuming. I make the tongue about one-quarter to one-third as thick as the board, whichever matches the plow-plane cutter, router bit or dado head to be used for cutting the groove. The top and bottom of the lower box are the same length as the upper-box shelves, so the length of the tongue (the groove depth) is the same as the depth of the dados.

Make the groove first—it's easier to plane the tongue to fit it than vice versa. Since the tongue has a shoulder, you can make the groove just slightly deeper than the tongue length to avoid having the tongue bottom out at assembly. I plow the groove by running the plane's fence attachment against the end of the side. You could also run the plane against a clamped-on fence as you did for the dados. Make sure that there are no high spots on the

bottom of the groove that would keep the joint from going together completely.

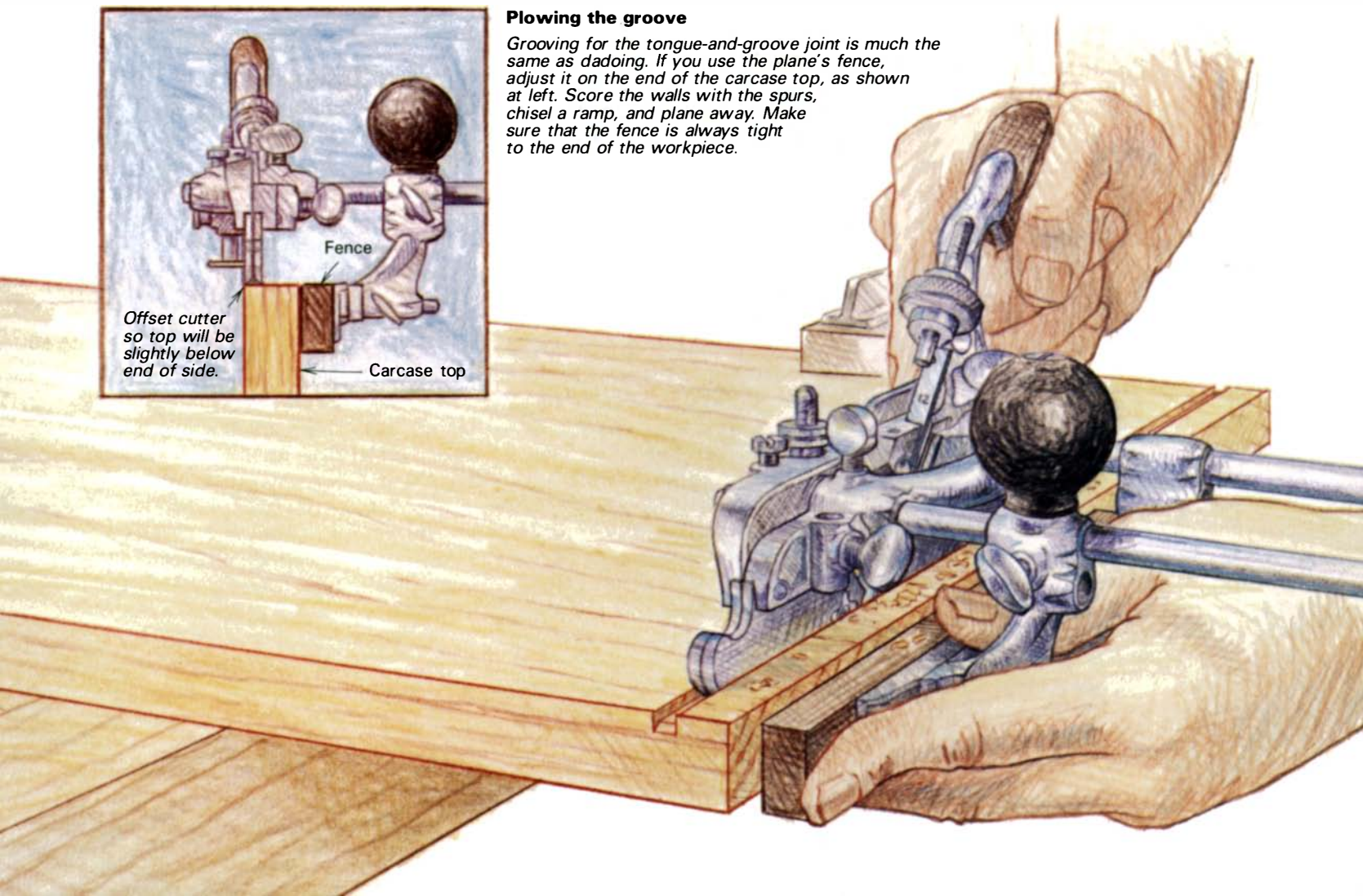
The tongues, created by rabbeting the ends of the top, should fit snugly in their grooves. I cut them with a rabbet plane, a narrow plane with a blade that extends completely across the sole and with faces perpendicular to the sole. One face has a spur like that on the plow plane. (You can also rabbet with a plow plane or a shoulder plane.)

First gauge the shoulder line and tongue thickness on the ends. Use a cutting gauge (a marking gauge with a small knife instead of a pin) if you've got one, because it makes a cleaner line across grain. Position the top on the bench and clamp a wooden straightedge fence on the shoulder line to guide the plane. Alternatively, set the plane's adjustable fence to run against the end of the board. Make sure that the blade and spur are sharp, and that the blade is flush with the spur face—if it's shy of the face, the rabbet will be stepped; if it's proud of the face, the shoulder will be ragged. Draw the plane backward as before to scribe the shoulder with the spur, make a ramp at the far end of the rabbet to prevent tearout, then plane away. When I'm close to the gauge lines, I try the tongue in the groove and



Plowing the groove

Grooving for the tongue-and-groove joint is much the same as dadoing. If you use the plane's fence, adjust it on the end of the carcass top, as shown at left. Score the walls with the spurs, chisel a ramp, and plane away. Make sure that the fence is always tight to the end of the workpiece.



Rabbeting the tongue

As when dadoing, score the rabbet with the spur and chisel a ramp in the waste before planing. Keep the fence tight to the end, and the plane's machined spur face perpendicular to the work.



take the final cuts to fit the joint with a sharp, finely set shoulder plane.

Cutting the rabbets for the backs is the final bit of joinery required. I cut them just slightly deeper than the $\frac{1}{8}$ -in. back and about three-quarters the thickness of the sides. I rabbeted only the sides of the boxes, and butted all the horizontal pieces against the back. Rabbet the top of the lower box if you want to hide the top edge of the back. Because the rabbet runs parallel to the grain, you needn't knife the shoulder line or use the spur cutter. If you're tapering the bookcase sides, do it now.

To make sure everything fits, put the boxes together dry before gluing up. If the shelves are all the same thickness, dry assembly should go quickly. If they're not, now is the time to fit them individually to the dados. I thin the ends with a sharp, finely set jointer plane, planing

with or across the grain. Be careful not to take too much off—if you're not confident with the plane, it might be better to sand off tiny amounts. You should be able to assemble the joints by hand, though it may take some wiggling to get the ends to seat all along the length of the dado. If you're fitting the joints individually, mark the end/dado pairs clearly.

When you're sure the boxes will go together, clear a space in the shop and organize the things you'll need for gluing up. You should have at least two pipe clamps and a pair of stout cauls for each box—scrap hardwood at least 1 in. by 3 in. and just a bit longer than the width of the sides will do. Plane a slight crown in the cauls for the wide sides; pressure on the ends will produce pressure in the middle. I use a white glue like Elmer's Glue-All because it sets up more slowly than yellow glue.

I lay the parts on the bench to spread

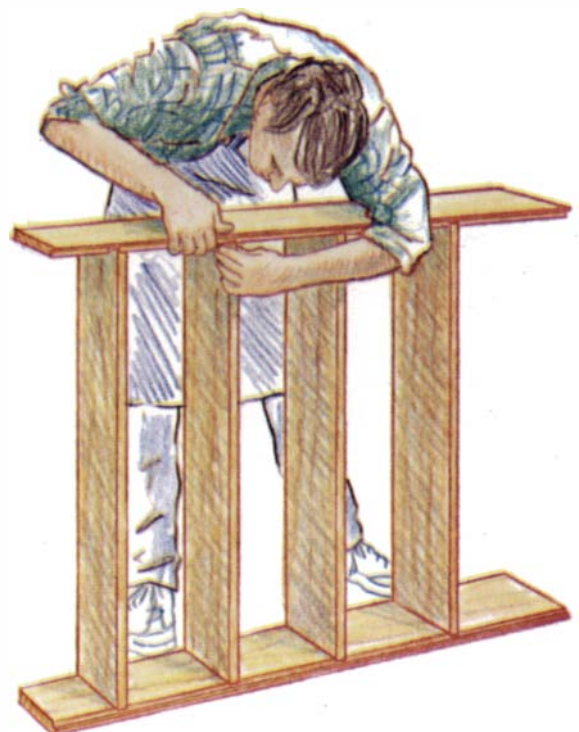
the glue, then build up from a side on the floor. Protect the surface by laying the side on a clean piece of plywood or particleboard. Spread glue in all the dados (and grooves) in one side with a stick or a flux brush (available at most hardware stores), making sure that the dado walls are covered. Then stick the shelves in place. Align the back edges and the rabbet before you push the ends home—it's impossible to slide an end sideways in a tight joint. Work quickly, seating each end as best you can, but don't worry if they don't go down completely; you'll pull the joint tight with clamps in a minute.

When the shelves are housed in the first side, glue the second and push it down on the shelf ends, aligning the back edges and the rabbets before driving the joints home. The second side is harder to wiggle into place—a shelf or two always wants to pop out. So I get them started, then drive them down with a hammer padded by a thick hardwood block. As you've already made sure all the joints fit, you shouldn't have any nasty surprises.

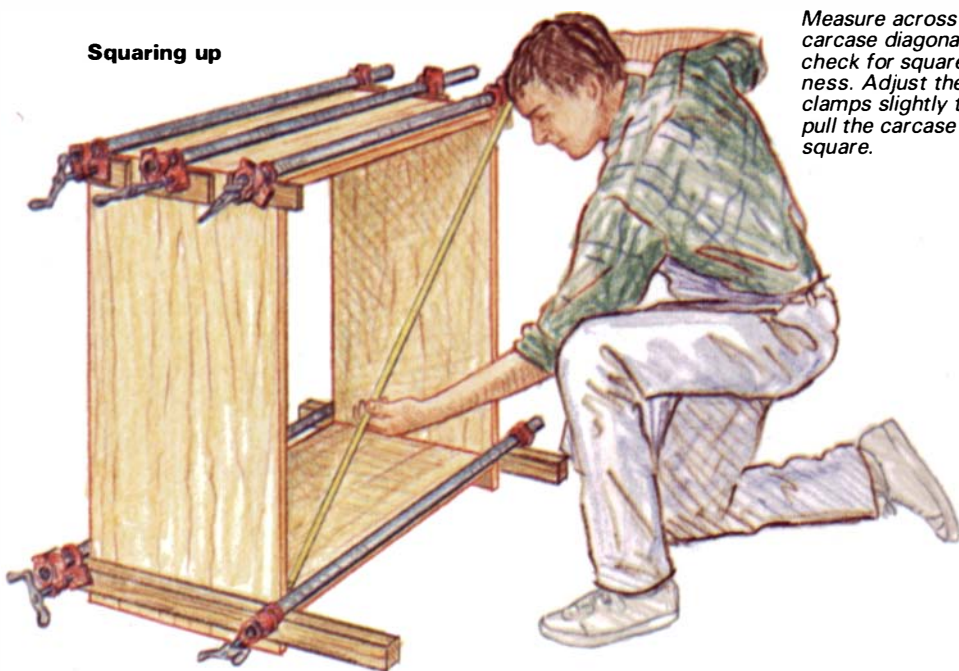
Now draw the joints tight with clamps. Getting two clamps and two cauls in place on a shelf all by yourself is exasperating—enlist a friend if you can. If you can't, figure it out dry beforehand. The top of the lower box is easier to pull tight because you can rest the clamps on it. Tight joints usually will stay in place after you've

Gluing up

Getting the shelves started in the second-side dados can be trying. When you've succeeded, drive them home with a hammer and wooden block.



Squaring up



Measure across the carcase diagonals to check for squareness. Adjust the clamps slightly to pull the carcase square.

pulled them home; if they don't, just leave the clamps on while the glue dries.

Check the squareness of the box by measuring diagonally from corner to corner. If the diagonals aren't equal, you can adjust by pulling across the longer diagonal by hand or with a clamp (on wide boxes, clamp front and back to keep the box from twisting). Sometimes just perching the box on the floor on one corner and leaning into the diagonal corner will correct the problem—don't lean too hard, though.

When all the joints are pulled tight, carefully set the box on its side on the floor for nailing. Nails help keep the joints tight while the glue sets, and they add a certain amount of strength, particularly if the joints are at all loose. (If the joints are less than a friction fit, I'd reinforce them with screws.) Check for squareness, then drive in some finishing nails at a slight angle. Flip the box over and nail the other side.

If you're adding a back, do it now before the glue sets. A square, well-fitted back will help square up most boxes. Flush any uneven joints between shelf edges and rabbets with a chisel or plane. I painted the inside face of the back before assembly. To assemble, run a bead of glue down the rabbets and across the edges of the shelves—not too much or it will squeeze out—and nail the back in place. If the box is out of square, nail along one side first, then force the other side square as you nail it down. For extra strength, I nailed a 1-in. by 2½-in. kickboard to the sides and bottom as shown on p. 54.

Let any squeezed-out glue set to a rubbery consistency, then pare it off with a

sharp chisel. If you don't want to hang around waiting, swab off squeeze-out with a damp rag, but remember that finish won't take on those areas without thorough sanding. When the glue is dry, flush off the joints with a sharp plane. I chamfered the edges and corners of the boxes with a piloted chamfer bit and router; files and a block plane will do the job as well, if more slowly. The floors in our house are like roller coasters, so I routed out a segment of the bottom ends of the lower-box sides to make four small feet. A coping saw and spokeshave would work, too.

Adjustable shelves perch quite adequately on ¼-in. dowel shelf pegs. I made a Masonite template for the holes in the lower box; resting it on the bottom and flush with the back ensured that the holes would be in the same locations on each side. A piece of tape wrapped around the twist drill or auger bit serves as a dandy depth gauge to keep you from inadvertently drilling through the sides. I chamfered the holes with a countersink bit because I think it looks nice and it makes inserting the dowels easier.

Like all simple, quick projects, this one took me about twice as long as I had expected, so I was in no mood to apply a complicated finish. Which was just as well, because I think film finishes (varnishes and lacquers) generally make pine look terrible. A couple of coats of Johnson's Paste Wax seem to protect the surfaces well enough, and I could enlist the whole family's help in putting it on. □

Roger Holmes is an associate editor at Fine Woodworking.

Machines do it, too

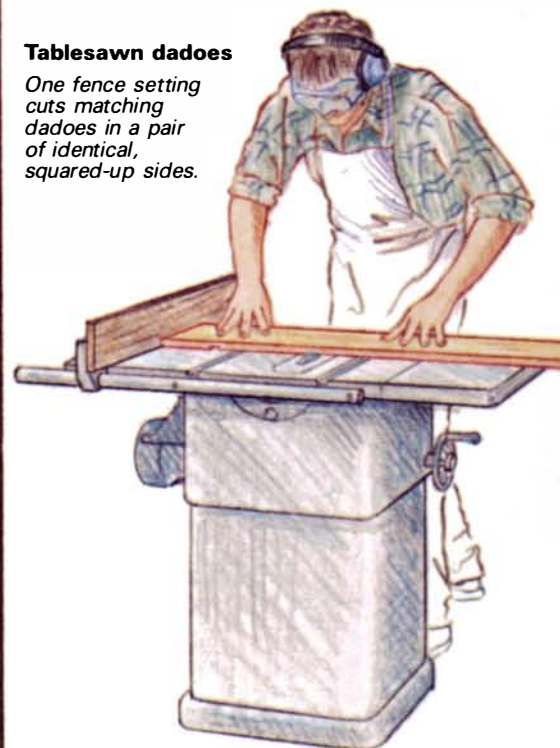
Dadoes: To dado the sides on a table saw, set up the dado head to match the thickness of the shelves (or you can thickness the shelves to match the dado). Dado a piece of scrap and try the shelves. I fine-tune the dado width by adding donut-shaped paper shims of various thicknesses between the cutters. Set the depth for about one-third the thickness of the side.

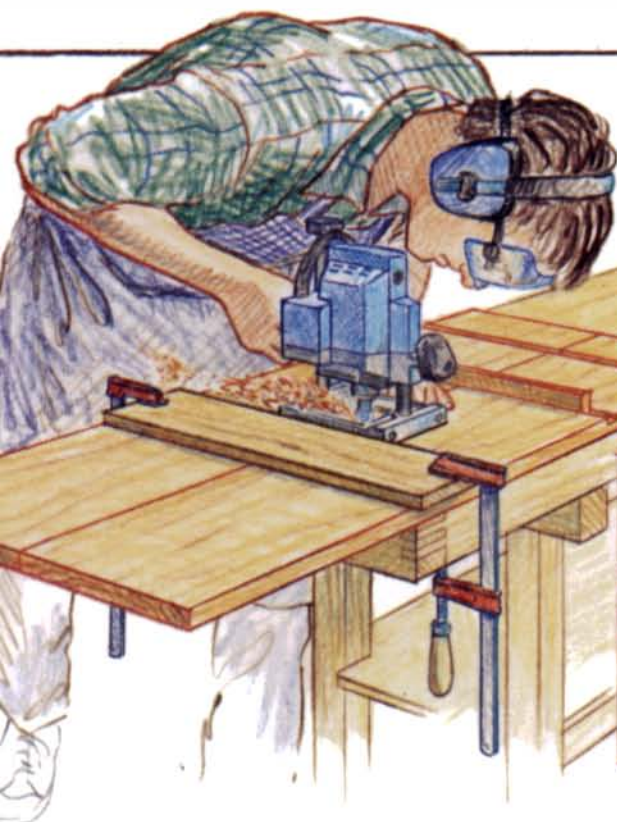
I run the ends of the sides against the rip fence to cut the dadoes—one setting cuts the two dadoes for each shelf. I find this a faster method than using a miter gauge, and it ensures that the shelves are square to the ends. Use a miter gauge for dadoing boards less than 6 in. wide, and for dadoes in the middle of sides too long to be passed against the fence.

With the dado head set up and the fence positioned for the bottom shelf, dado both carcase sides. Most saw guards have to be removed for dadoing, so work carefully, keeping your hands well clear of the blade. Narrow boards can be tricky because there isn't much surface bearing against the fence. I find that placing my right hand near the fence as shown in the drawing below helps overcome any tendency of the board to pivot during the cut. If you're at all uneasy with this procedure, use a miter gauge to steady the board. Push the board's inside face down

Tablesawn dadoes

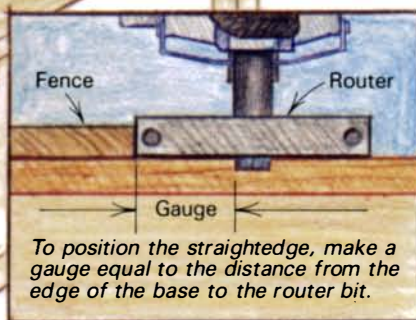
One fence setting cuts matching dadoes in a pair of identical, squared-up sides.





Routed dados

Rout a pair of carcass sides (or one) by running the router base against a straightedge, positioned with the gauge shown below. A batten keeps the two sides aligned while you rout.



on the table so the dados will be uniformly deep. (Waxing the table and fence also helps.) After cutting the first pair of dados, reset the fence and cut the next pair and so on. (If you're making adjustable shelves, dado for the top shelf now and you're done.)

I work off one end to about the middle, then work from the other end. If the sides are square, this shouldn't cause any problems. Most tablesaws can clear up to 24 in. between the blade and fence, so this procedure will work for bookshelves up to 4 ft. tall.

Dados can be routed by guiding the router base against a straightedge. First make a gauge for positioning the fence, as shown in the drawing above. Narrow sides can be routed in pairs. Lay them inside-faces-up on a flat surface, aligned and tight together. Clamp the straightedge below and parallel to the first dado, positioning it with your scrapwood gauge. Rout the first dado, slide a scrapwood batten into the grooves to keep the sides aligned, and repeat the procedure for the next dado. If your router base is round, always run the same spot against the fence unless you're sure the base is concentric with the bit.

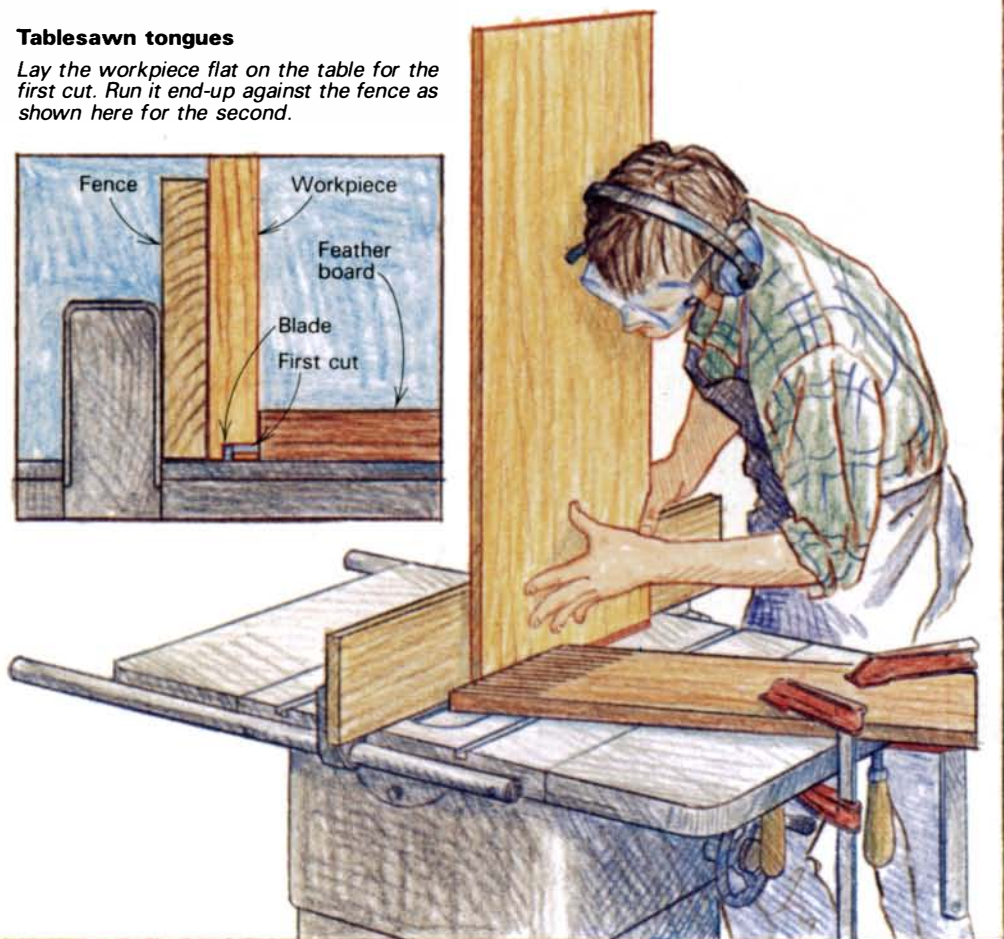
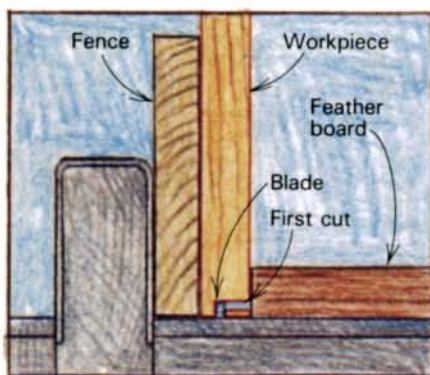
With a little thought, you can figure out various easily made jigs to speed up the process. Without them, however, I think the tablesaw is faster—it's a ready-made jig for positioning the cuts.

Grooves: On the tablesaw, set up the dado head to the right thickness and height, and run the end of the side against the fence as for dadoing. Position the groove slightly farther from

the end than the thickness of the top so you have only to plane off a little end grain to clean up the joint after assembly. If you rout the groove, guide the router base against a clamped-on fence as for dadoing, or use the adjustable fence that comes as an accessory on most routers.

Tablesawn tongues

Lay the workpiece flat on the table for the first cut. Run it end-up against the fence as shown here for the second.



Tongues: You can rout the rabbet that creates the tongue by running the router base against a straightedge as for routing a dado. Rabbet a piece of scrap exactly the same thickness as the top to check bit depth. The tongue should be a snug fit in the groove, as for dados.

The drawback of this method is that if the top isn't uniformly thick, the tongue won't be either. The tablesaw method shown below overcomes this problem. Set up the saw with a single sharp cross-cut or combination blade. Cut the shoulder first, running the end against the fence, the outside face down on the table. Make the same cut in several pieces of scrap to use for setting up the second cut.

For this second setup, the distance between the fence and the blade should equal the tongue's thickness, which eliminates the need for uniform thickness. Adding a tall wooden fence to the rip fence will help you keep the top perpendicular to the table. Few boards are dead flat, so I clamp a wide feather board to the saw table, positioned so the pressure it exerts will push the top flush to the fence for several inches on both sides of the blade. Test the setup on the scrap, then cut the real thing. (Stand to one side as you complete the cuts, in case the saw kicks the waste back.) —R.H.

Tips From a London Carving Shop

A sharp pencil cuts through the problems

by Ben Bacon

Carving is one of the most difficult woodworking skills to acquire, so it's not surprising that many craftspeople find it frustrating to try to carve scrolls, foliage and other ornaments on furniture. Lack of experience is part of the problem, but the major factor is that most woodworkers go about carving in the wrong way: they start at the end, carving fine details first, instead of at the beginning of every carving job—drawing.

While there's no magic way to make carving easy, you can simplify the process by dividing it into five steps, with each step laying the foundation for the next. The most basic step is to do a good detailed drawing, as shown in figure 1. Drawing makes you think concretely about the carving and decide what it should be, then the next four steps—making a model in clay or plasticine, basic construction, rough carving, and final carving or “improving”—can reduce to manageable tasks the complexities of bringing your ideas alive in wood.

Many inexperienced carvers avoid drawing, saying “it stifles creativity” or “I’d rather do real work.” Actually the reverse is true. If you skip the drawing, you’ll always have the “what exactly is it that I wanted to make?” feeling, which leads to mistakes, confusion and wasted time. Remember the old axiom that carving is 75% drawing, 15% sharp tools and 10% manual dexterity—learn to draw, either by attending classes or by sketching furniture. For most people, carving without drawing is like sawing without measuring.

To illustrate this five-step approach to carving, I’ll describe how I carved an ornate wall mirror in a style popular in early 18th-century England, but the process can be applied to any carving. I picked this piece because I like 18th-century carvings and had never done a mirror in this style. I don’t make exact copies, however. Here in England, one-of-a-kind antiques are treasures because they are unique, and making exact copies is considered unethical. So for this project, I combined elements from several mirrors to develop a new design. You can also study a particular period until you know enough about its fashions and techniques to think like a craftsman of that period, and design a new piece in an old style. Knowledge is important here—otherwise you might design something that never would have been made in the period you’ve selected. I found most of the information I needed on mirror construction and style of carving in furniture books and museums. I also consulted my sketchbooks, which contain drawings I’ve made of some of the period pieces we’ve restored in the London carving and gilding shop where I work.

Once I’ve completed my research, I usually do a detailed line

drawing. Unless I’m working in a style that’s new to me, I make one drawing and modify it until it’s right, rather than develop a whole series of intermediate sketches. First I study the old pieces until I understand how the original makers handled problems of design, composition and construction, then I build on these ideas when I do my drawing. I prefer full-size drawings, unless the piece is 8 ft. to 10 ft. high, in which case I reduce it to $\frac{1}{10}$ or $\frac{1}{12}$ scale, with some full-size detail drawings where necessary.

For the mirror, I drew a rectangle the size of the frame and divided it into three areas, corresponding to the carved pediment on top, the bottom plinth, and the mirror glass and pilasters in between. Then I roughly sketched the ornaments to get an idea of the feel of the piece. You often have to move the ornaments around or make them larger or smaller so they work well together. A good way to do this is to draw the ornaments on separate pieces of tracing paper. When I was satisfied with the rough sketch of the mirror, I refined it by drawing in all the fine details.

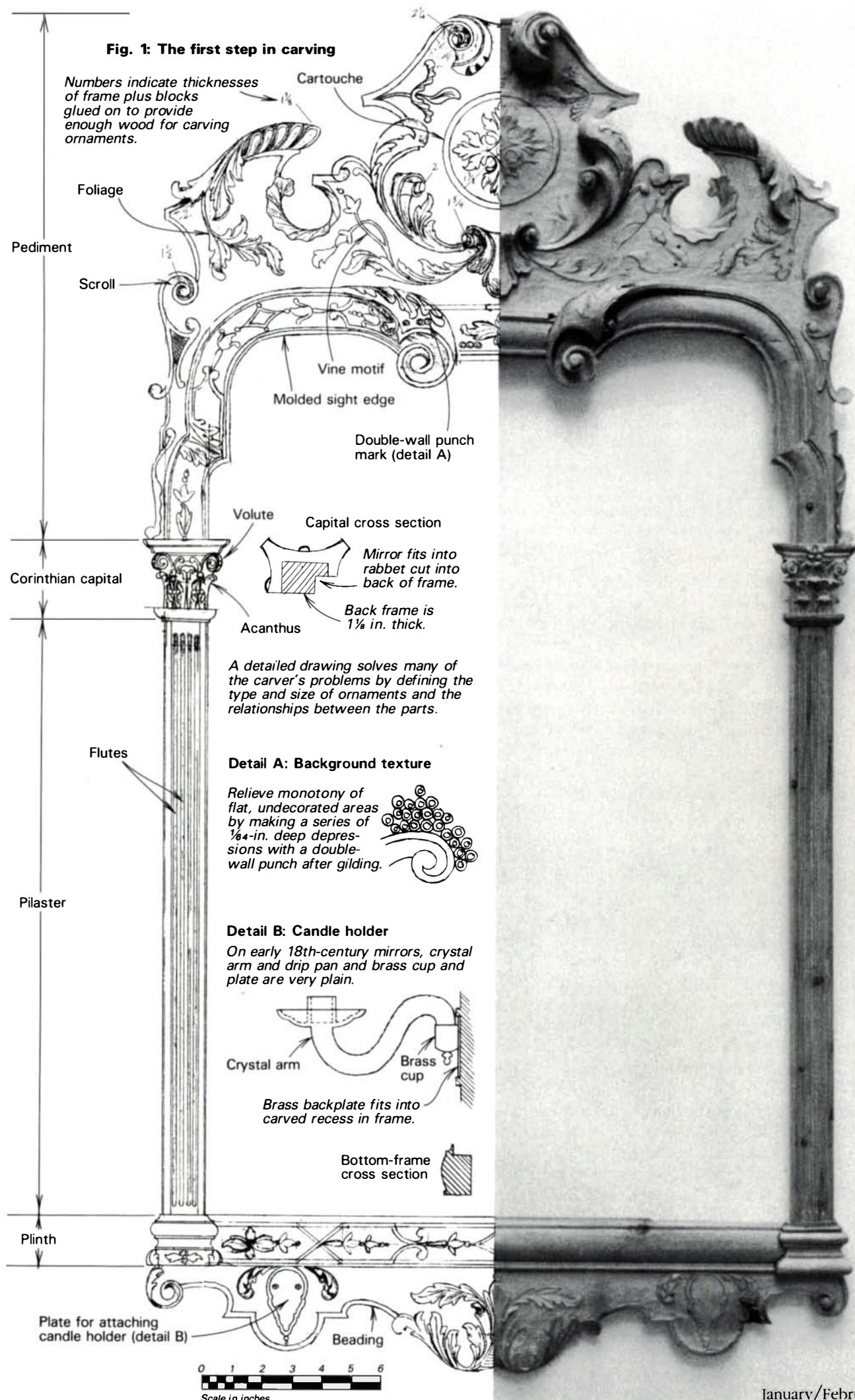
Before you go any further, step back and make sure all the components fit together well. Is the piece in proportion? Is there enough detail? Are the curves regular and flowing? Does the whole have unity? It’s easier and cheaper to resolve these questions on paper now rather than in wood later.

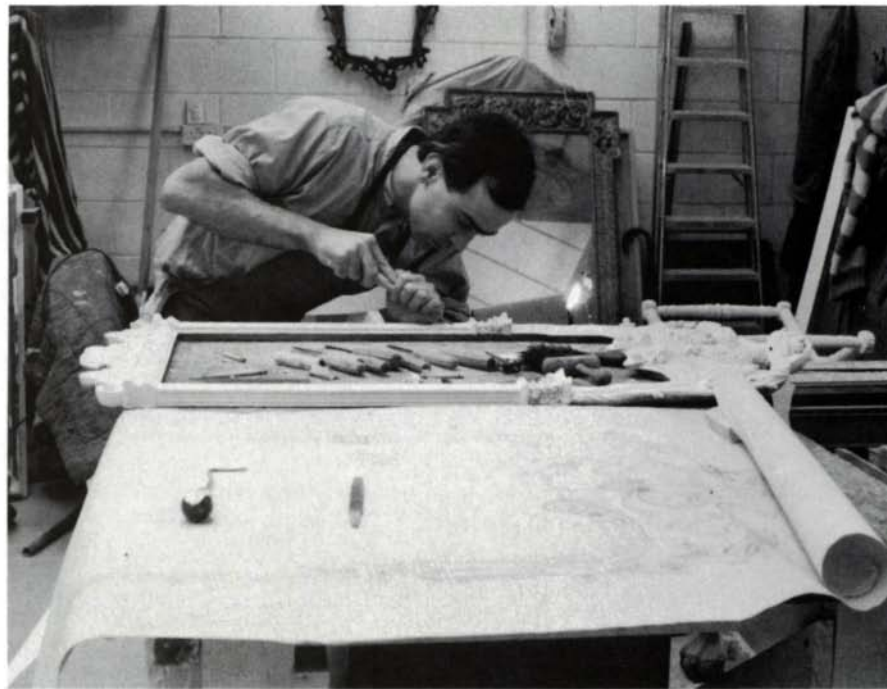
Even when you’re finished drawing, you still may be confused about how to begin carving. This is where step two, modeling in clay or plasticine, comes in. Drawings, even with full front and side elevations and a plan view, are still two-dimensional. You can’t draw undercutting or all the subtleties of texture and depth that are essential to a good carving. If you can’t visualize these three-dimensional characteristics exactly in your mind, you should model. Usually, you have to model only the areas that confuse you, but you can do the whole thing. Modeling is easy—just put the clay on a board and shape it with your fingers or the modeling tools available at most art supply stores. You could also make an extra copy of your drawing and work the clay right on it to establish the initial outline. If you need only a rough guide for elevations, model roughly; if you need to work out all the details, model finely. The object of drawing and modeling is to remove doubt, so do whatever is necessary to establish the shape of the carving in your mind so that you can tackle the wood with confidence. Once you’ve done that, it’s time to work in wood.

If you’re making something small such as a statue from a single piece of wood, you can begin carving right now. If you’re doing a large sculpture or a piece of furniture, you’ll probably have to do some construction work or cabinetmaking first. Most

Fig. 1: The first step in carving

Numbers indicate thicknesses of frame plus blocks glued on to provide enough wood for carving ornaments.





Shaped wooden blocks (above left) make the basic frame thicker in areas where ornamentation will be carved. When the frame is nearly finished, Bacon uses a small veining tool to recut the fine fluting into the gesso (above right).

traditional mirror frames are simple constructions. For a gilded or painted frame, clear pine is fine; if the frame is to be waxed or treated with some other clear finish, walnut, oak or mahogany will look better. For the mirror shown here, I first made a 1½-in. thick, half-lapped frame and assembled it dry. Then I transferred the outline of the drawing, bandsawed the frame to shape, and cut the rabbet for the glass before gluing up the basic frame. Since this frame is flattish with projecting ornaments, you can glue on ½-in. to 1½-in. shaped blocks where you need more wood for carving scrolls, capitals, or column tops and foliage. The frame will be gilded, so the gluelines won't show.

Now you're ready to start the rough carving. Next to making the initial drawing, this is probably the most daunting moment—there's something intimidating about taking the first cut. But forge on. And don't be discouraged at the amount of time it has taken to get to this point—your preliminary work will soon bear fruit in speed and ease of carving. As you begin, remember that there are two carving steps, rough carving and final carving. Don't ever try to combine the two and plunge right into the final details. That would be similar to dovetailing a drawer before cutting the sides to length. Beginners carving a leaf often carve the stem first, or if they're carving a head, they carve the nostrils first—only to find that they have to recarve the piece because the stem is in the wrong place or the nose is too long.

Rough carving deals with *big* shapes. I generally use #2 through #6 gouges, 20mm to 35mm wide, and form the shapes quickly. You should carve big areas, thinking exclusively about elevations, dominant forms, relationships of planes, and overall appearance and feel. Carve as if you were looking at the piece from five to ten feet away. This is somewhat difficult to explain in terms of foliage and ornaments, so you might be able to visualize the process better if you think in terms of more human shapes. If you were carving a head, for example, at this stage you'd do the general shape of the skull and hair first; you'd carve the details into these bold forms later. On the mirror, I started at the top and worked down, first knocking the corners off the bandsawn shapes and establishing all the impor-

tant heights, such as the slightly domed cartouche and other ornamentation at the center of the top, and the overall shape of the two capitals on the pilasters. Then I roughed in the molding that surrounds the glass and all the scrolls. Measuring carefully with dividers and calipers, I checked the positions of the ornaments against the drawing, and I used a depth gauge to ensure that paired ornaments were the same height.

Still thinking in terms of rough carving and big shapes, refine your forms slightly. If you were carving a head, at this stage you'd rough in the eye sockets but not the eyelids or eyebrows. You're still looking for an overall feel, not minute detail. On my mirror, this involved lowering and shaping the background behind the ornaments, more clearly defining the molding and scrolls, and giving overall shape and flow to the leaves.

Now stand back from the piece and ask yourself if you like the proportions and balance. Do the overall shapes and directions of the various parts work well individually and as a group? Remember that the immediate impact of a piece most often sells it visually and financially. This impact is not achieved through fineness and detail of carving, but by overall harmony and cohesiveness. This is the whole point of rough carving, and why traditionally it was considered the most difficult part of any job and was assigned to the most experienced workers with imagination and foresight. If you're not satisfied with the general look, carve a little more. Since you haven't carved any details yet, you'll be refining and adapting, not ruining any good work.

Don't be afraid to experiment at this stage, either. Often you can improve your drawing by exploiting the grain, color and other characteristics of the wood to give your work more direction, liveliness and flair. If you encounter major problems, though, you've probably skimmed on the initial steps.

Once you're pleased with the overall form, you're ready to start the last stage, final carving or "improving." Here carving irregularities are smoothed out and the final detail carved, at last. Concentrate on the finish of the piece: remove all tool marks, clean each surface, and make sure that the curves and lines are sweetly flowing. In a sculpture of a head, you would

now carve the eyelids and eyebrows and do the final modeling of the mouth. In furniture carving, you'd give the leaves and ornaments their final shape and do the fine modeling, fluting and undercutting.

For this style of gilded mirror, this final detail-carving isn't done in the wood, but in a thick layer of gesso (a liquid made from powdered chalk and animal sizing, which is the consistency of cream when wet and like plaster when dry). The gesso is brushed on the unfinished wood before gold leaf is applied. This is what I did for the mirror, but the carving steps would be the same if you wanted to do all the carving in wood.

Most of the fine detail on the mirror involves flat foliage work, such as the carved molding around the sight edge or the foliage around the large ornaments on the top. To be effective, this shallow, $\frac{1}{8}$ -in. deep foliage must be fine and delicate. After drawing on the foliage, use a fluter or a V-tool to carve around the outside of the pencil line to a depth of about $\frac{1}{8}$ in., thereby separating the foliage from the background. Then recess the background area about $\frac{1}{8}$ in. so the foliage is proud. This is a tedious process, especially in this style where the background must be smooth and regular so that the foliage appears to float on top.

After the background is lowered, you can "set in" or redefine the pattern outline with a variety of shaped carving tools. Take a tool with a shape similar to the section of the outline you're shaping, and press the tool straight into the surface at about a 90° angle to create a crisp, vertical wall between the outline and



Well-cut leaf flows smoothly.

the background. The trick to setting in details is to match the curves and transitions of one tool shape to the next to create a smoothly flowing, harmonious shape. If marks left by the carving tools show, each detail will seem awkward and asymmetric. Once the outline is set in, model the top surfaces by carving in the flows, swells and dips that give the leaves life and movement. This setting-in and

modeling procedure is always followed in flattish foliage work, be it on frames or furniture, and is also used in low-relief work, such as the carving on drawer fronts in 18th-century American lowboys and highboys.

When the final carving is completed, set up the work again and have another look before you do any finishing. Is the detail harmonious throughout? Do the forms and detail read well? Are there any unsightly walls or areas of excess wood, especially around the edges? This is your last chance to tidy up the piece before you or someone else has to live with it for a long time. If you're happy with it, carry on.

Most traditional work is gilded or covered with a clear finish, but finishes for carving are pretty much a matter of personal choice. A word of caution, though: Most high-gloss or thick finishes such as polyurethane, varnish and lacquer make carving look harsh and brassy. It's much better to bring out carving's soft look with thin shellac, wax or oil. I water-gilded the mirror shown here in the traditional way (*FWW* #46, pp. 82-85). After applying and burnishing a $23\frac{1}{2}$ -karat gold leaf, I punched the background areas with a $\frac{1}{4}$ -in. double-wall punch (available from Wood Carvers Supply Co., 3056 Excelsior Blvd., Minneapolis, Minn. 55416) to visually relieve the monotony of the large, undecorated surfaces behind the carving. This background



Author's gilded 18th-century-style mirror frame is a new design based on careful study of original pieces in museums and furniture anthologies.

texturing is done after gilding so the gold will be forced down into the ring impressions. I then toned the mirror (photo, above) to simulate aging, and fitted the brass and crystal swan-neck candle holders and the beveled glass.

The steps I've outlined won't solve every problem you encounter—carving is too vast and subtle a craft to be bound by a few rules. But they do work in most cases; in fact, they're still taught to apprentices in traditional carving shops, where planning and foresight are considered as important as hand skills and tools. Approaching work systematically will always reduce problems, or at least present them in such a way that they can be tackled more effectively and with a minimum of heartache. It's the difference between having a street map in an unfamiliar town and relying on strangers for directions. □

Ben Bacon is an American carver now working in London, where he completed a five-year apprenticeship in carving, gilding and framing. Drawings by the author.

Driftwood Finishes

Weathered wood in an hour or two

by Jim Cummins



When I got into the picture-framing business 19 years ago, most framers could dash off a variety of wood finishes. One of the most popular was the barnwood or driftwood finish, usually applied to common pine. Fresh from the lumberyard, kiln-dried pine can be textured and colored in an hour or two to imitate wood that has gracefully weathered 20 years. I've seen the same finish used on trim moldings and on rustic indoor furniture, on hardwoods and softwoods both.

If you're framing a picture, my article in *FWW* #35 will show you how to make many molding shapes on the tablesaw. The next step, for a driftwood finish, is to texture the wood. Then you add layers of contrasting stain and paint so that the darker color ends up in the low spots, the lighter on the high. You can vary the look quite a bit, so the final result may be dark or light, warm or cool.

Most framers today buy pre-finished driftwood moldings, and many of these don't look like wood at all. Some are garish, others dismal. I believe this happens because manufacturers try to imitate each other's successful products instead of imitating wood, and each imitation gets further from the truth. Yet a good driftwood finish isn't difficult. All you have to do is mimic nature's own weathering.

Texture—Wood has hard grain and soft grain in alternating layers. When wood ages, the soft grain on the surface breaks down and disappears, leaving a craggy texture. Finishers duplicate the process by removing the soft grain with a wire brush. I have a 6-in. dia. wire brush mounted on the shaft of a bulky, old 1/8-HP motor. When I have a lot of frames to do, I haul the motor out and clamp it to my workbench. But for just a frame or two, I usually use a straight wire brush or chuck a

small round one in my electric drill. In addition to the brush, I sometimes use an old table fork to incise long, wandering scratches that imitate surface checking. If you want a few wormholes, try an awl. Be sure to sand any sharp edges, as these break down quickly in natural aging.

If the surface gets fuzzy, I either sand it with a coarse grit or burn off the splinters with a propane torch, depending on whether I want to keep the wood light or allow it to become darkened by charring.

Color and value—Natural wood *color* ranges from hot reddish-browns to cold bluish-grays. Any color also has *value*, the degree of lightness or darkness it would have if seen in a black-and-white photograph. The final color and value of a driftwood finish can be anywhere in the natural color and value range.

Nature's palette is broad, but it's used with discretion. One side of a weathered board may age warm and very dark, while the other side is a pale silvery gray. But you're not likely to find such extremes on any one side exposed to the same conditions. This is a guideline for a successful driftwood finish: choose similar colors and values for both the bottom coat and the top coat. Don't try to put a cold gray top coat over a hot brown base—you'll end up with a finish that's visually "jumpy." And remember that a wood surface ages dark or it ages light, not both at the same time.

My general advice is that warm pictures look best in warm frames, and light pictures look best in light frames. Avoid too much contrast. As a rule, choose warm or neutral tones rather than cool ones, except for very cold pictures. But if you're planning to hang a warm picture on a cool wall, pick frame colors that will provide a transition, or the picture may look out of place.

To my eye, the most beautiful finishes,

whether light or dark in value, occur when one color is slightly warm and the other slightly cool. If neither is extreme, the two harmonize and sparkle.

Painting—The picture framer's standby used to be casein paint sold in quarts and gallons, but I haven't been able to get any for years. Milk paint, which dries too hard, is a poor substitute. I've tried artists' casein paints in tubes, but they aren't formulated to flow well from a large brush, and I mostly use them just for tinting. So, keeping up with the times, I've turned to latex paints, poster paints and watercolors. Almost anything will work. A wide range of grays can be made by mixing white or off-white latex with raw umber and yellow ochre artists' colors, either acrylic or casein. Watch out for black, though—it's deceptive. If you use any in making a gray, the color may look warm while wet, but it will dry cold.

The sample in the color photo was made with one coat of Minwax stain, followed by latex paint tinted with artists' acrylic color. I applied the stain to the textured wood, and blended in the latex while the stain was still wet. This simultaneously lightened the dark stain undercoat and darkened the latex coat, to reduce the contrast and bring the two closer together. The wet-on-wet method is somewhat hit-or-miss and takes some practice. But there's a more methodical way that guarantees good results every time: Give the textured wood a thin toning coat of paint or stain. When that's dry, seal it with a thin coat of shellac. When this is dry, apply a top paint coat that contrasts slightly with the base coat. Remember the advice about color and value, and choose colors that won't fight with each other.

When the top coat is dry, steel-wool through it, down to the base coat. The top coat will remain in the valleys, while



the base coat peeks through on the high spots, accentuating the grain. The shellac between the two coats will provide some luster and highlights.

That's really all there is to it, but here are some variations of the technique. After applying the base coat and the shellac sealer, lightly wax the high spots of the frame before you apply the top coat. While the top coat is still wet, use a rubber squeegee to force the paint down into the unwaxed fissures and wipe it from the waxed high spots at the same time, saving yourself the steel-wooling step. You could also use a dry-brush technique to apply the top coat: Wet the brush as usual, then spread the paint on a sheet of newspaper until the brush is nearly dry. Now lightly drag the brush over the frame so it hits just the high spots.

Fine-tuning—Now is the time to step back, compare the result with what you were aiming for, and add whatever last touches seem necessary. At the very end of the process, you can introduce a little strongly contrasting color and value to produce visual tension. If a warm brown finish looks dull, add a tiny bit of light green to the high spots. Or add orange to cool gray. But if the result draws attention to itself, it's too much. A decorative finish should sing, not shout.

If you're working on a picture frame, you can use children's crayons for the highlights. On a finish that needs more durability, you can use oil paints, barely touching the high spots. Coating the entire job with wax will make the top coat more transparent and thereby make the finish more uniform in color. Keep in mind that the finish will be seen, usually, from several feet away. □

Jim Cummins is an associate editor at FWW. His shop is in Woodstock, N.Y.

A stiff wire brush can simulate the craggy texture that occurs in natural weathering. If the wood is still bland, add graining with a table fork. The sample at right shows progressive 'aging' of a molding stick, compared with a naturally aged block.





Terry Karpowicz constructs his wood sculptures, many employing traditional windmill joinery, in a spacious Chicago loft.

Monumental Sculpture

Speaking the language of wood

by Stephen Luecking

Sculpture should sound beyond itself and reverberate through the world's shared memories and experiences. Wood provides an eloquent language to accomplish this. In contrast to structural steel and aluminum, wood carries a long and varied history, the distillation of centuries of intimate association with people all over the world.

Modern sculptors, rather than creating traditional monuments like generals on horseback or nymphs in ponds, test the expressive possibilities of structures in space. They've moved sculpture off the pedestal and into the real world. Upscaled works, some rivaling the size of architecture, occupy the expansive public spaces of governmental, institutional and commercial centers.

The three midwestern sculptors whose work is shown here all make large-scale, public sculpture in wood. The pieces exemplify the exploration of meanings, both personal and cultural, that

can be generated when artists embrace wood technologies. Crucial to Terry Karpowicz's structures is his direct use of the centuries-old forms and processes of English millwrights, while Martin Puryear improvises on his wide-ranging knowledge of wood technologies to produce sculptures that join primitive and modern traditions. Edward Mayer's installations, by contrast, seem to eschew all methodology.

The exploding technology of the 20th century, with its plastics, structural alloys, new adhesives, and scores of physical and chemical processes, has expanded the traditional sculptural repertoire of metal casting and wood and stone carving. New or old, each medium, like a language, carries its own vocabulary of associations and effects and its own grammatical logic. Steel and aluminum, for example, embody industry, and their high structural strengths allow explorations of form impossible with wood

When Terry Karpowicz was a graduate student at the University of Illinois, he built sculptures designed to respond to wind and other environmental elements. When their most common response was collapse, Karpowicz decided to abandon his "butt joint and ten-penny nail" method and seek a sturdier approach. Memories of midwestern farm windmills led him to seek a method in traditional millwrighting.

A year's apprenticeship in England under millwright James Davies of R. Thompson & Sons taught Karpowicz the value of tradition as well as how to make joints that would last hundreds of years. Operating in a rigorously old-world manner, the 180-year-old firm has the job in this century of maintaining and restoring some of Britain's remaining 600 windmills. When these millwrights run into problems, they consult a 300-year-old journal owned by the firm, where formulas and other information continue to be carefully noted for future millwrights. For Karpowicz, this sense of history stuck. Today, when he describes the motif of revolving wheels in his sculpture, he suggests in one long, rolling sentence the image of history as a giant wheel trundling across time and space.

Many of Karpowicz's sculptures are as big as his ideas, and he fabricates them in a 3,000-sq.-ft. industrial loft just west of Chicago's Loop. He builds largely with uncured red-oak and white-oak timbers, joining them with pegged mortise-and-tenon, bridle and lap joints reinforced with steel. Where the traditional millwright prefers cast-iron hardware, Karpowicz chooses custom-welded steel plate and contemporary industrial hardware.

Circular shapes are constructed with millwrighting methods. His most com-



Karpowicz based 'Inertia Antenna' on the drive mechanism of a windmill.

mon approach is to butt-join thick band-sawn arcs, reinforcing the joints with ½-in. Baltic birch plywood splines, then flanking them with steel plate or inlaid wooden butterflys to reduce the effects of the green timbers' movement. Butterflys are also used throughout the construction to control splitting. Revolving parts pivot on steel pins and bearings set into the timbers.

The sculpture's final erection must be done on site, usually with the aid of a crane. The green timbers often require

last-minute finishing with drawknives, chisels and planes as the wood adapts to the outdoor environment. Despite this, Karpowicz prefers green oak because it is cheap, works easily and ripens as it ages.

Most of Karpowicz's pieces are simple machines in which one major part rotates, but a recent sculpture merely implies motion. Shed of the sometimes distracting rotating device, the evocative symbols in Karpowicz's sculpture take center stage. "Inertia Antenna" (photo, above) is mod-

or stone. By grinding out welds and over-painting, all marks of fabrication can be removed to push sculpture as close to a statement of pure form and color as possible. Seemingly unchangeable and obdurate, these works are to many the ideal symbols of contemporary culture.

Wood, on the other hand, offers the sculptor qualities that sleek new materials do not. Drawing on the rich history of wood construction, for example, the sculptor can shift the overtones of a composition a hundred years in time or add another layer of meaning merely by changing the joinery. To the viewer, wood also seems more accessible. We identify with it, often reading human qualities into trees or wooden objects. Even at large scale, the hand of the maker is evident in most wood sculpture, and the joinery necessary for structurally sound engineering places emphasis on individual parts of more human scale. These factors

allow the sculptor to make a monumental sculpture intimate as well.

Finally, wood, like people, changes with age. Karpowicz, whose outsized constructions demand open space, will return year after year to a piece to observe its changes and reacquaint himself with it, much as one might visit an old friend. George Nakashima's statement that trees desire to live again through the woodworker also holds true when they are resurrected as sculpture.

The architectural scale of the works shown here requires the sturdiness of knowledgeable woodworking, but the prime motive of these sculptors is to use wood as an expressive language. Chicago woodworker Glenn Gordon (*FWW* #48, p. 63) sums up the attitude well: "Each way of putting two pieces of wood together means something, like part of a vocabulary. Woodworking is a language, and there is still a lot out there to be said."

eled on the actual drive mechanism of a windmill, but instead of wind-catching sails, the drive shaft is fitted with a device that catches the winds of imagination. Five planks, 8 ft. long, 1 ft. wide and 3 in. thick, radiate from the hub, suggesting the legs, head and outspread, receptive arms of a titanic person, or the blades of a huge fan. Aft is a wheel that clutches the shaft with dual sets of crossed braces. The three-point stance makes the sculpture stable, but it seems bent on moving, its blades ready to slash the air. Tension between the threatening blades and the poised calm of the crossed wheel charges the sculpture with intense energy.

Martin Puryear improvises on a wide variety of craft forms to create sculptures that retain nature's elegant directness amid a surprising array of carefully chosen construction techniques. During a late-night roundtable at Puryear's Chicago studio, for example, a casual reference to yurts (the felt-on-wood-frame housing of nomadic Asians) triggered an avalanche of books and pamphlets on the topic. From his storeroom, Puryear then produced an actual yurt he had built from ash and cedar. Yet earlier that same evening, he had shown me a pine-plank sofa bed he'd made in the most rigorous modern design.

Formally trained in art as a printmaker, Puryear gained his woodworking knowledge informally, through extensive travel and study. Two years in West Africa, for instance, gave him respect for sturdy, direct joinery; visits to furnituremaker James Krenov's Swedish studio in the late 1960s

Lois Hoberman

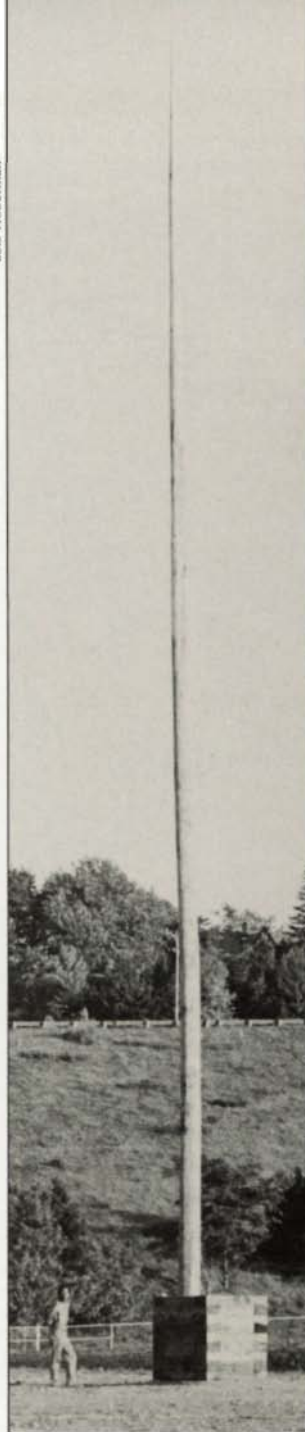


Photo courtesy of the artist



Martin Puryear draws on numerous woodworking trades and traditions for his sculptures. Below, Puryear works on an enormous Japanese splice joint to connect the 50-ft. long halves of the pole for 'Box and Pole,' erected at Artpark in Lewiston, N.Y., in 1978 (left). 'Cedar Lodge,' above, was made in 1977 for a specific room in Washington's Corcoran Gallery.

Photo courtesy of Artpark



introduced him to fine joinery. In one place or another, Puryear has rubbed elbows with shipbuilders, patternmakers, wheelwrights and coopers, and he often enlists craftsmen to help execute his pieces.

His contact with Japanese joiners surfaced in 1978 in "Box and Pole" (photos, facing page), where he improvised on a traditional Japanese splice to join the two segments of the 90-ft. long pole. Designed to resist bending stresses in the beams and lintels of a building, the splice stands up to similar stresses imposed by the wind.

In 1982, Puryear combined techniques gleaned from boatbuilders and wheelwrights in a large indoor sculpture. At its center is an airy, basket-like pedestal of crisscrossed strips of Sitka spruce boatbuilding veneer. (The quarter-sliced, not sawn, veneer is conventionally used to lay up a curving plywood hull.) The pedestal supports a turned cedar pivot, from which a lightly curving axle twines across space to meet the poplar hub of a large wheel with thin wooden rim and spokes.

The look of Puryear's sculptures is often that of primitive shelters where ideas are stored or finely made tools that shape expression. "Cedar Lodge" (photo, facing page), an installation created for the Corcoran Gallery in Washington, D.C., recalls simultaneously a wickiup and a domed church or mosque. Red cedar shakes lapped like feathers or fur and held by laminated fir tie-rings form the structure's walls. Light from a Corcoran skylight passed through the domed crown of lashed and woven rods and then through another "skylight" of stretched rawhide to fall, soft and golden, on the structure's tanbark-covered floor. By walking through the small door, visitors passed from a shrine of culture to one of nature.

When Edward Mayer arrives at an exhibition site, all that exists of his sculpture is a pickup truck full of wooden plaster lath and a good idea. At the exhibit's end, he hauls the same truckload of lath away. In between, though, Mayer creates some of the most intriguing and elegant wood sculpture being made today.

Employing the most basic construction technique and the crudest wood product available, Mayer painstakingly stacks up spheres, towers, ramparts and domes over large exhibition areas—whole environments of precarious architecture. (Before construction at the exhibition site, Mayer, who now works in Albany, N.Y., builds and rebuilds the composition in his studio to get it right.) The temptation to prod

and test the structures is unavoidable, but the accumulated weight of the lath and the friction of its rough surfaces produce a surprising tenacity. Other than a few easily replaced sticks jostled loose during the course of an exhibition, Mayer's structures survive well.

But, eventually, they'll come down, and Mayer also plays on this. When installing "Apistolica" (photo, right) at the Hartford Art School in Connecticut, for example, he stacked a 12-ft. tower only to topple it and build another on its ruins, leaving scattered vestiges of the first tower to remind the viewer of the fate of the second—and by extension, the fate of most things in the course of history. His archetypal building forms tap the subconscious cultural recollections we all carry. Simultaneously they recall Moslem, Roman, Medieval and Modern architecture—not so much specific buildings as buildings shuffled and recombined out of time and place, as if seen in a dream.

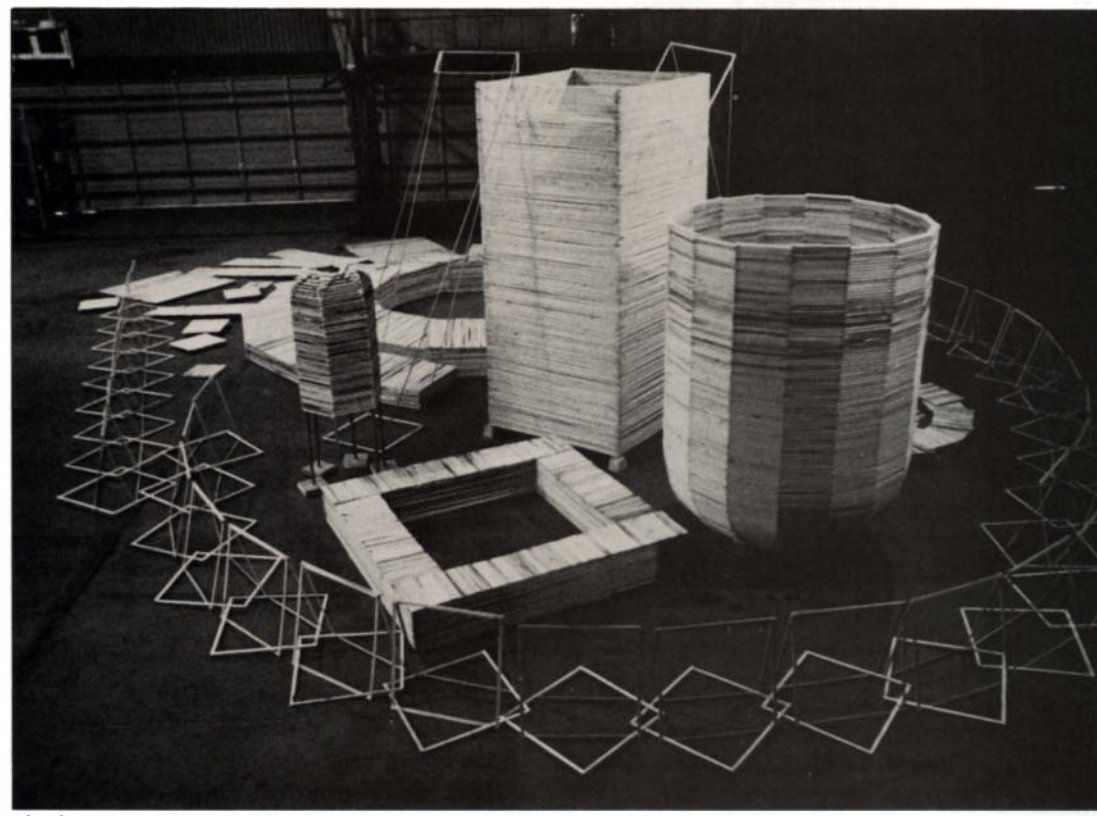
Stacked-lath sculptures might, at first glance, seem anti-craft—there's little evidence in them of mastery of tools, techniques or material. If, however, the central function of craft is to give an idea life by the most effective means, then Mayer's installations don't ignore craft, they affirm it. □

Stephen Luecking is a Chicago sculptor and teaches art at DePaul University.

Edward Mayer

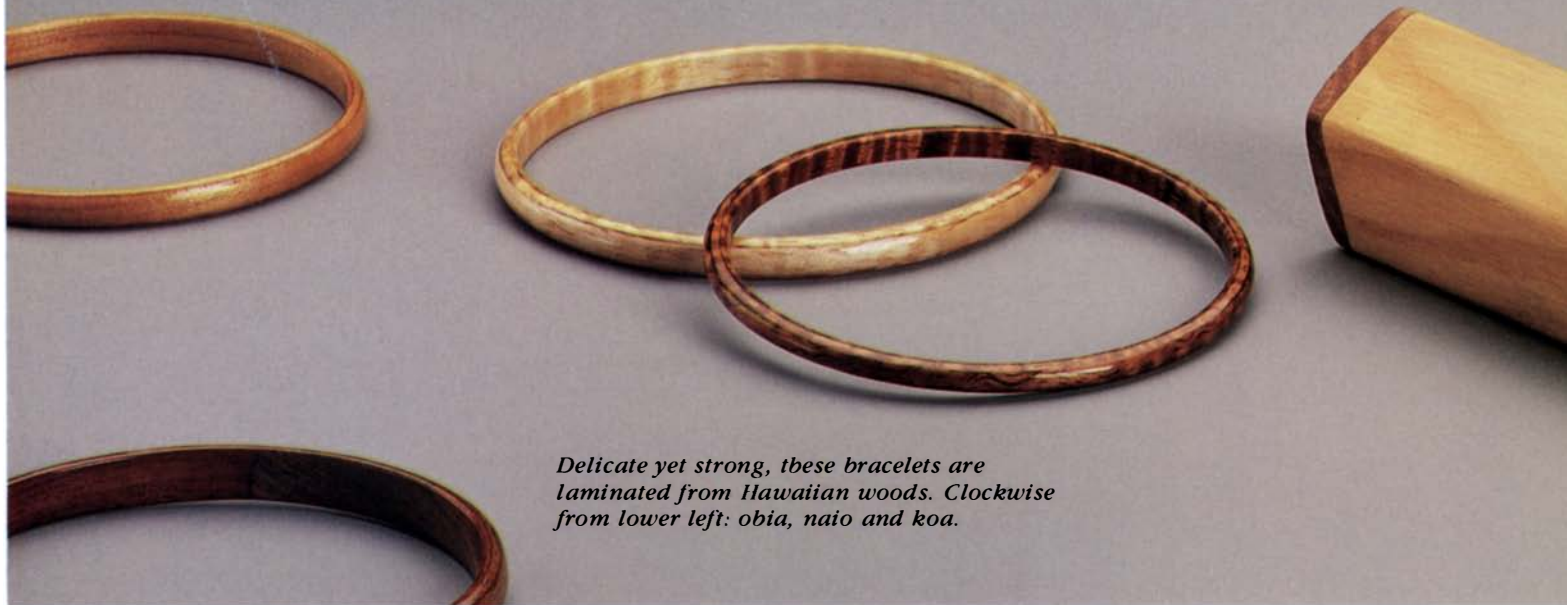


Edward Mayer rebuilt one tower of 'Apistolica' (above) on the ruins of a previous one for a 1982 gallery installation in Hartford. He stacked 'Sascha' (below) at Chicago's Navy Pier in 1983.



Edward Mayer

Two Small Projects



Delicate yet strong, these bracelets are laminated from Hawaiian woods. Clockwise from lower left: obia, naio and koa.

Laminated Bracelets

by Lawrence Trombly

After nine years of puttering and perfecting, I've come up with a way to make turned wooden bracelets that are light, delicate and surprisingly strong. If you think a woman's bracelet doesn't require much strength, you're wrong. A small bracelet takes a lot of punishment when it's squeezed over a large hand, and it isn't long before most one-piece wooden bangles split in half right along the grain. My bracelets are laminated, so there isn't any weak cross grain. To get started, you'll need three simple jigs: the spiral puck, split ring and expanding plug.

I fashion my bracelets from scraps of local woods. "Local" for me is Hawaii, so I use woods such as koa, ohia, naio, mango, macadamia and eucalyptus. You probably won't have easy access to these woods, but no matter. Any hardwood with nice color and figure will do.

Whatever wood you choose, rip it into $\frac{3}{4}$ -in. strips about $\frac{1}{16}$ in. thick and 10 in. long. (My bandsaw has a fence with a vernier adjustment, which allows me to take really fine slices, but rough dimensions aren't critical—just cut the strips as thin as you can.) You'll need three strips to glue up a $\frac{3}{4}$ -in. wide bracelet blank. Depending on how slim you make the finished bracelets, you can get as many

as four bracelets from one blank.

Fasten the strips to a scrap board with double-sided tape, then sand them until they're only about 1mm ($\frac{1}{25}$ in.) thick. You can do this on a belt sander, or you can turn the board upside down and sand against a sheet of sandpaper placed flat on the bench. Do one side just until it's smooth, then flip the strips over and sand the other side to thickness.

Steam the strips for about 10 minutes in a large pot—I use a rack to hold the strips about 8 in. above the boiling water. Immediately after steaming, wind three strips around the spiral-shaped puck, with the prettiest strip on the outside. I wrap a piece of 80-grit cloth-backed sandpaper against the outermost strip before winding. The abrasive gets a bite on the wood and makes it easier to bend the strips. Tighten a hose clamp around the strips and allow them to dry overnight.

Wax the inside of the split-ring jig to prevent the bracelet blank from sticking later during glue-up. Two hose clamps around the circumference of the split ring will hold the halves together. Now join each strip into a circle with a scarf joint: Bevel one end of the pretty outside strip (I do this on a small disc sander chucked in my lathe) and place the strip inside the



Wrap a strip of 80-grit sandpaper around the outermost strip of wood, then bend three steamed strips around the spiral puck. A hose clamp holds the strips in place while they dry.

split ring. Press it tight against the ring's inside circumference and mark the bevel on the other end as shown in the drawing. Remove the strip, bevel the end you just marked, and place the strip back in the split ring. Use the same method to fit the second strip inside the first, and the third strip inside the second.

Now you're ready to glue. Coat the strips with epoxy and place them in the

Kaleidoscope

by Robin Kelsey

Wood, glue and mirrors roll up into a pocket-size kaleidoscope that will turn whatever you look at into geometric patterns.



White Light

My friend Janet, who works in stained glass, showed me three long strips of mirror glass she had leaded into a triangle. It made a simple kaleidoscope, and I was fascinated. I bought it, took it home and looked through it, and thought, "Why not make these out of wood?"

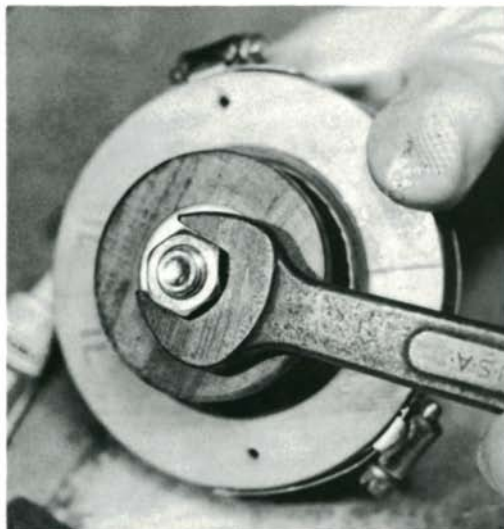
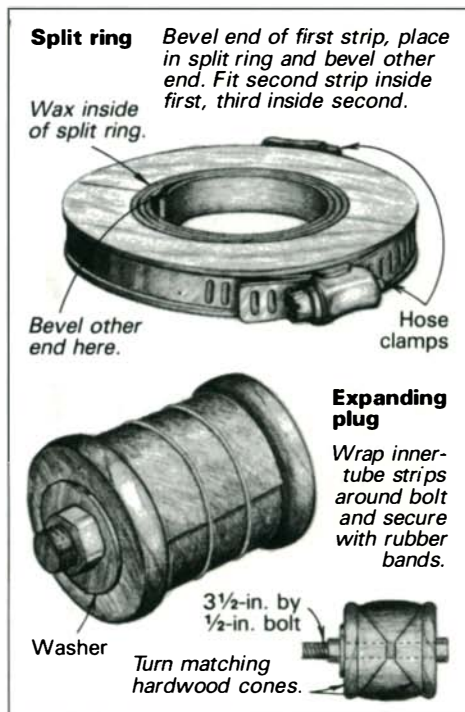
Janet didn't mind; kaleidoscopes weren't her idea anyway. "If you're going to put wood on the outside," I said to myself, "there's no reason to solder the glass together; you could just glue it to the wood and assemble." How simple. It might be my "Holy Grail," that mythic \$5 item that would be captivating and fun to make—and profitable.

Having forgotten high-school geometry, I drew an equilateral triangle on paper to get the miter angle, and went to set the bandsaw table—but it wouldn't tilt that far.

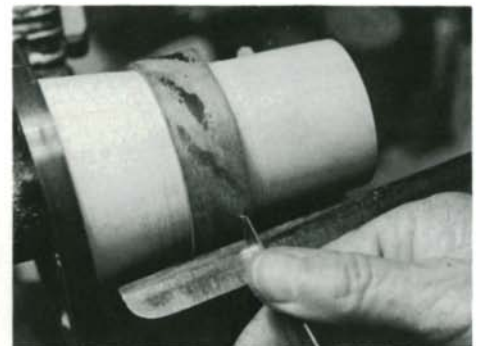
"Okay," I reassured myself, "I'll use

six sides instead. That should be even nicer than three, a little more complex, but still within reason." It's easy to draw a hexagon. Just mark off the points on a circle with a compass set to the circle's radius. I set the angle on an adjustable bevel gauge and tilted the saw table roughly to it. Then I prepared a bunch of pretty wood $\frac{1}{4}$ in. thick and cut some test strips. They didn't quite fold into a hexagon, but I left the table-tilt locks a bit loose, and some persistent hammer tapping got the adjustment right.

I locked the saw table up tight and got ready to cut lots and lots of long strips, before the settings somehow changed. (In the risky world of short-run production woodworking, you have to strike while the iron's hot, else entropy sets in and nothing will work again—ever.) But before I could cut the strips, I needed to fig-



Epoxy the strips and place them in the split ring with the scarf joints 120° apart. Insert and tighten the expanding plug (above) and let dry. Mount the cured blank on a tapered lathe mandrel (top right), and part the bracelets off the tailstock side. A wire holder (bottom right) makes finishing easier.



waxed split ring. For maximum strength, space the joints 120° apart. Insert the expanding plug and tighten the nut to compress the strips against the inside of the split ring. When the glue is dry, remove the plug and the hose clamps, and pop out the bracelet blank. Clean up excess glue on the inside of the blank with a small drum sander.

I turn my bracelets on a lathe, but if

you don't have one, you could saw the blank into thin sections, then sand or whittle these to shape. I slip the blank over the tapered mandrel shown in the top photo above. Then with a narrow parting tool made from a hacksaw blade, I part off several bracelets, one at a time, starting at the tailstock end. One stays on the mandrel.

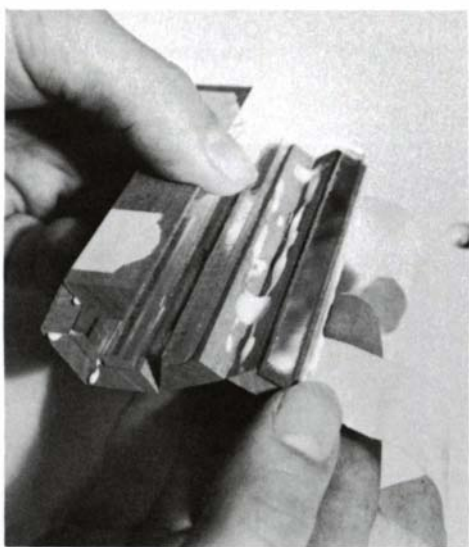
To finish, I shape and sand each brace-

let on the mandrel, then sand the inside on a 2-in. dia. drum sander. I spray on four coats of Deft with an artists' airbrush, sanding lightly between coats. Supporting the bracelet on a wire holder allows you to spray the entire thing at once. □

Laurence Trombly is a retired communications engineer. He lives in Kamuela, Hawaii.

ure out the width, so I went back to my pencil and paper to make a real scale drawing. I could tell from looking through Janet's triangle that it was best to keep reality to a minimum in this object; that is, the open space you look through shouldn't be very big. I chose $\frac{3}{8}$ in. for the inside width of the strips and set up a fence on the saw. I left figuring out the size of the glass until later. Always leave the hard stuff until later.

I cut all my odds and ends of pretty wood into long strips with the proper angle on their edges to make a hexagon (60°), then I had to think about the glass. It wasn't that hard to figure out on the drawing, but I knew the reality of cutting the mirror strips would be different. If the glass came out a touch too big, the kaleidoscope might not assemble at all; if it was too small, gaps would show. I couldn't see any way to build in a com-



Six mirrored strips, stuck to a masking tape clamp, fold up into a kaleidoscope.

fortable margin of error, so I went for "just right."

I didn't cut a zillion strips of glass, not right then. I wanted a prototype. I figured that the glass strips needed to be a smidgen more than $\frac{1}{4}$ in. wide and $3\frac{3}{4}$ in. long. I wanted the kaleidoscope to be 4 in. long, to keep it in proportion with its diameter, and so it would fit in a shirt pocket.

I cut six strips of mirror tile, the cheapest sort of mirror there is. Then I crosscut all the long strips of wood to 4-in. lengths. Even though it was prototype time, once the saw was set up for that length I wasn't going to take any chances of anything changing.

Now it was time to assemble the prototype. I went right to it in that exalted

creative state where nothing, not supper, not war, not love, could interfere with *finishing the first kaleidoscope*. I had read in *Fine Woodworking* about clamping miters with masking tape, and I was anxious to try it. I laid out six strips and put masking tape on their backs, leaving enough overhang to tape the last joint. Then I turned the whole thing over and contact-cemented the bits of mirror to the wood.

I had only to clean the glass and I was ready for assembly—how quickly this project was going! I knew from experience that Windex wouldn't remove contact cement, so I swabbed down the glass with kerosene (my all-purpose cleaner) and wiped it off.

To assemble the kaleidoscope, I squirted a thin bead of white glue into each joint, rolled the thing up and stuck down the tape overhang to hold the last joint tight. The glass grated a bit, but settled into place with the help of some judicious hand pressure. Then I went and made myself a cup of coffee and waited for the glue to dry. I was pretty excited.

Ten minutes before I could reasonably have expected the glue to be dry, I peeled off the tape. The kaleidoscope held together okay. I peered in and saw the reality hexagon in the end—not too obtrusive. Around that was a ring of perfect hexagons, and an exciting world of long strips and shadow hexagons reaching all the way to my eye. I'd made magic out of wood and glass and tape and glue.

I trued the ragged ends of the hexagon on the disc sander. The neat little hexagon miters were nice, but they looked unfinished, so I thought I'd better stick on end pieces, with holes in them to look through. I drilled some trial holes in $\frac{1}{4}$ -in. stock to get the size. It was obvious that to see hexagons, which I liked seeing, the hole had to be bigger than all of the glass— $\frac{9}{16}$ in. in this case. And if the hole intruded at all on the glass, I got circles, which were kind of nice, too. So I decided to put a $\frac{7}{16}$ -in. hole on the other end. Now I could see hexagons through one end and circles through the other.

It occurred to me that kaleidoscopes might not come in under \$5, and might in fact be more finicky work than they were worth. But I was hooked enough to plunge ahead. I rushed to the hardware store, which was just closing, and got a $\frac{7}{16}$ -in.-twist drill. "Charge it!" I cried, and raced back to the shop to make some kaleidoscope end pieces.

I couldn't imagine *clamping* all those end pieces, and speedy cyanoacrylate glue

doesn't work well on end grain, so I opted for contact cement. It was already out on the bench anyway. Besides, it's important to center the end pieces properly, and contact cement is just the thing. I brushed it on, waited a few minutes, fidgeting, then peered through while aiming the end piece. When the piece was just right, I clapped it on and squeezed it a moment with my fingers (to be safe, you could also snug it up in the vise).

I lopped off the overhanging corners of the end piece on the bandsaw, then sanded the kaleidoscope smooth on my stationary belt sander, using all the usual bag of tricks—rolling the corners over to get them a bit round, nicking off the sharp end points, and so on. It didn't take long. The kaleidoscope was a nice, smooth, heavy little thing to hold in your hand. I pulled a rag through to get out the sanding dust, gave the thing a rub with 220-grit garnet paper, and put on some oil to finish it up. I was captivated anew, and popped it in my shirt pocket to show people.

That first generation of kaleidoscopes was pretty nice, but when they were all done, I had time for a breather and a bit of thinking. As you can see from the photo on p. 70, I decided to switch from a six-sided configuration to a five-sided one (where the strip angle is 54°), for less symmetry and a bit more speed, and I cleaned up a few details that had been bothering me, like making the whole gadget $4\frac{1}{4}$ in. long so the mirrors could be 4 in. and I could get three of them out of a 12-in. mirror tile with no trimming. These things matter to the short-run production woodworker, who must live in a world of stolen seconds. I also got the glass to work out so it was exactly $\frac{5}{16}$ in. wide, instead of "a smidgen more than $\frac{1}{4}$ in." If you're going to make several hundred of something, it ought to be truly repeatable.

I like this product because it appeals to just about everybody. It really is sort of fun to have one in your shirt pocket so you can take it out and look at things that way, for a little while, if you want to.

Price? Well, it didn't get in under \$5. It looks like it's worth more than that anyway, being sort of heavy and complicated and made out of wood. I charge \$9 for them. I think they'd even sell for \$10. It's not the "Grail," but it's a nice little thing to make. □

Robin Kelsey lives in Maynooth, Ont. He wrote about making hand mirrors in FWW #46.

Making and Modifying Small Tools

Small-shop methods for those special cuts

by Howard C. Lawrence

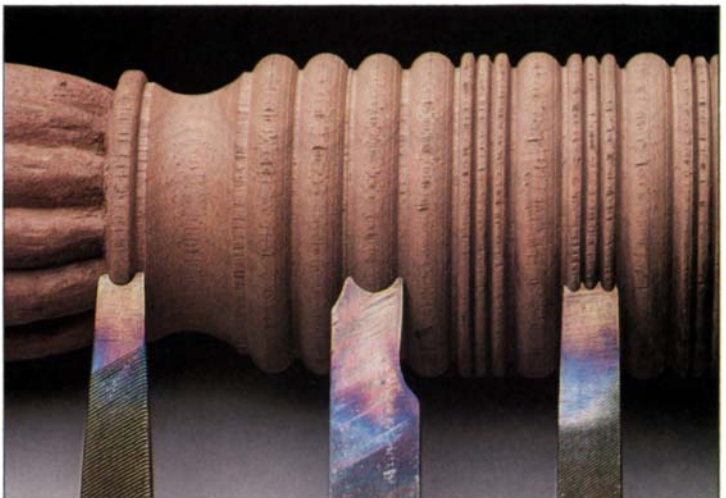
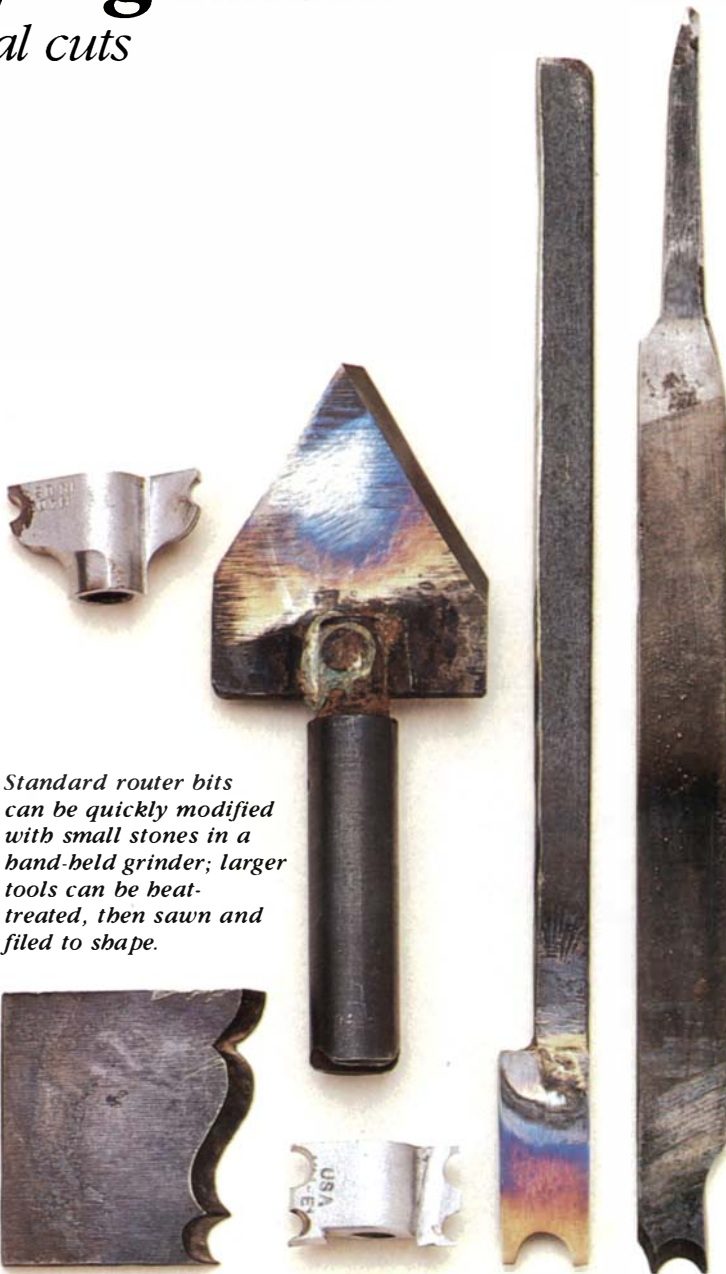
There are times, especially when making period furniture and trim, that a woodworker can't conveniently find a commercial molding cutter, router bit or shaped lathe tool that will produce the exact profile the work calls for. Sometimes we make do with the nearest stock cutter, and often regret it after the piece is finished—a period reproduction just doesn't look right unless its details are authentic. Yet the problem is easily solved. Even a weekend woodworker probably has enough equipment already to be able to make a tool that will do the job right, either by modifying an existing cutter or by starting from scratch.

There are two different approaches to working tool steel, regardless of whether you are reshaping an existing cutter or making a new one. You can choose to work the steel in its hardened state, which requires that you do all your shaping with grindstones (much as you would sharpen a hardened tool's edge), or you can work the steel in a softened state. This second method allows fast, precise shaping with files, and there's no danger of overheating the cutting edge. It does, however, involve some heat-treating to harden and temper the tool for use.

Working hardened steel—For small changes or fine detail, simply touch up the shape with a high-speed hand-held grinder such as the Dremel, using some of the variously shaped stones available. This technique makes it relatively easy to modify router bits such as the ones shown in the photo at right. For larger jobs, you can use your regular bench grinder, or you can use the sort of stones that fit an electric hand drill. These stones are inexpensive and come in a variety of shapes and widths, and you can shape the stones further with a grinding-wheel dresser (available from most stores that sell grinders). Hardened tool-steel stock can be cut to size, and some shaping done, with an abrasive cutoff wheel mounted on a grinder or a tablesaw. Such wheels occasionally shatter, so exercise care—don't stand in line with the wheel, and be sure to wear heavy gloves and goggles.

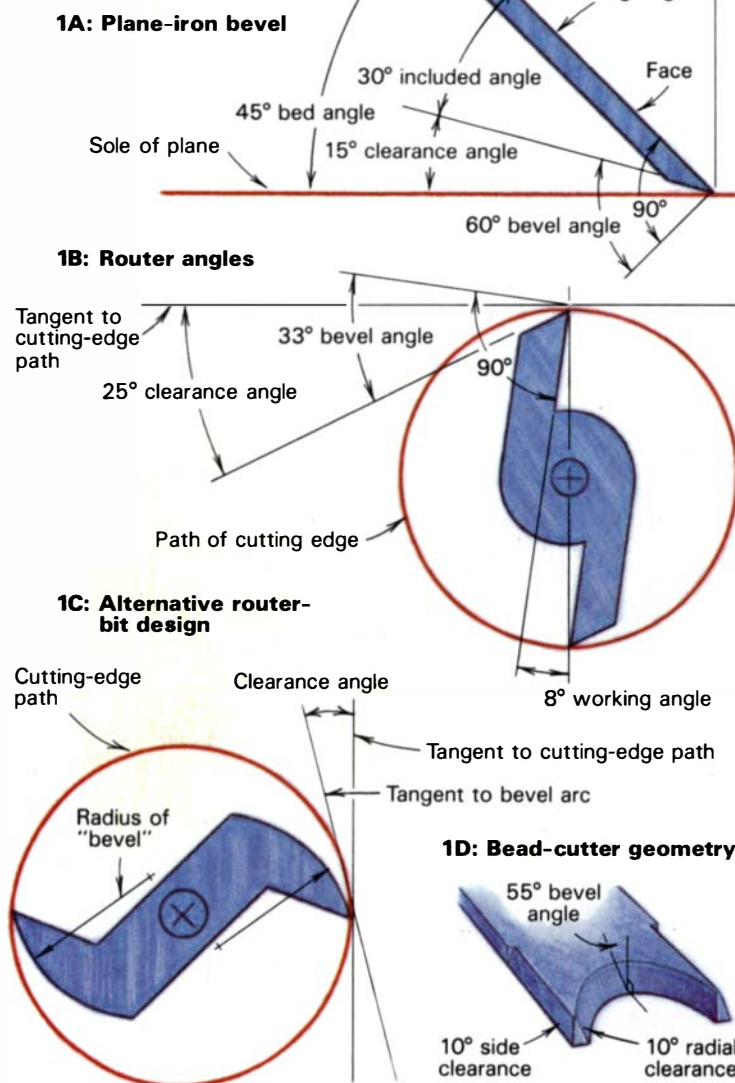
Basically, for hardened steel, that's it. If you take the same care to avoid overheating that you would when grinding a cutting edge, you won't affect the temper of the steel. As soon as you've honed your edge sharp, you can go put it to work.

Working soft steel—When you have a lot of steel to remove, I think it is much easier to work the steel in its softened state. If you don't want to learn heat-treating, you can buy soft tool steel and file it to the shape you want, then have it hardened and tempered by a local machine shop, which will have special ovens, temperature-measuring equipment, hardness testers, etc. But



Shopmade scrapers simplify repetitive patterns. The once-brittle file steel was toughened for safety by tempering with a propane torch. Most of the reeding was cut with a reshaped router bit.

Fig. 1: Determining clearance angles



unless such a shop is close by, it is usually more convenient to do the heat-treating yourself, using simple procedures that were once the general practice for all toolmaking. You don't even have to begin with soft steel. You can take a hardened-steel tool, soften it yourself, file it to shape, and then reharden and temper it, all with the low-tech methods and equipment described in this article. Admittedly, a metallurgist or a precision toolmaker could come up with a long list of "buts." Yet for a small shop, the old methods are adequate.

Determining clearance angles—It's best to work out cutter designs on paper before starting to grind or file. The edge of the cutter must have a bevel behind it to provide clearance to the wood surface as the leading edge makes its cut. If you are modifying an existing cutter, it's usually best to keep the original bevel angle. If you are making a new tool, you should aim for a clearance angle to the work surface (not to the tool surface) of somewhere between 15° and 25° (for hardwoods and softwoods, respectively). Figures 1A, 1B and 1C illustrate how to determine the grinding angle. In 1A, for example, a plane iron is set at an angle of 45° to the work surface—this is called the working angle. A 15° clearance angle to the work surface therefore requires a bevel angle of 60°. Notice that I'm using machinists' terminology. Machinists measure bevel angles from a line perpendicular to the face of the tool. To a machinist, the

bevel angle represents the material being ground away from the tool. Woodworkers, on the other hand, usually measure the included angle—the amount of steel left in the blade—and call this the bevel angle. The two different viewpoints sometimes cause confusion between woodworkers and machinists, though a good drawing will solve the problems.

To determine the clearance in a rotating tool, first draw it accurately to scale. Around its axis, draw a circle to show the path of the cutting edges, as shown in 1B and 1C. The work will lie on a tangent to this circle, and the working angle of the cutting edge is the angle between the face of the cutter and the radius. In 1B, the face of the cutter is offset 8°, and to get a 25° clearance angle you must grind at 33°. In 1C, the back of the cutter is ground as an arc, and the clearance is the difference between the tangent of this arc and the work surface. This second design has the advantage of allowing a stronger cutter, but if you are modifying such a tool, it is much easier to grind a straight bevel than to try to match the curved one.

Provide a side clearance angle of about 10°. One of my bead molding cutters, for an old molding head, is shown in 1D. Note the clearance angles on the outside edges of the tool and on the nearly radial parts within the bead. Keep in mind that what I've labeled as a 55° bevel angle is from a machinist's viewpoint; most woodworkers would call it a 35° bevel.

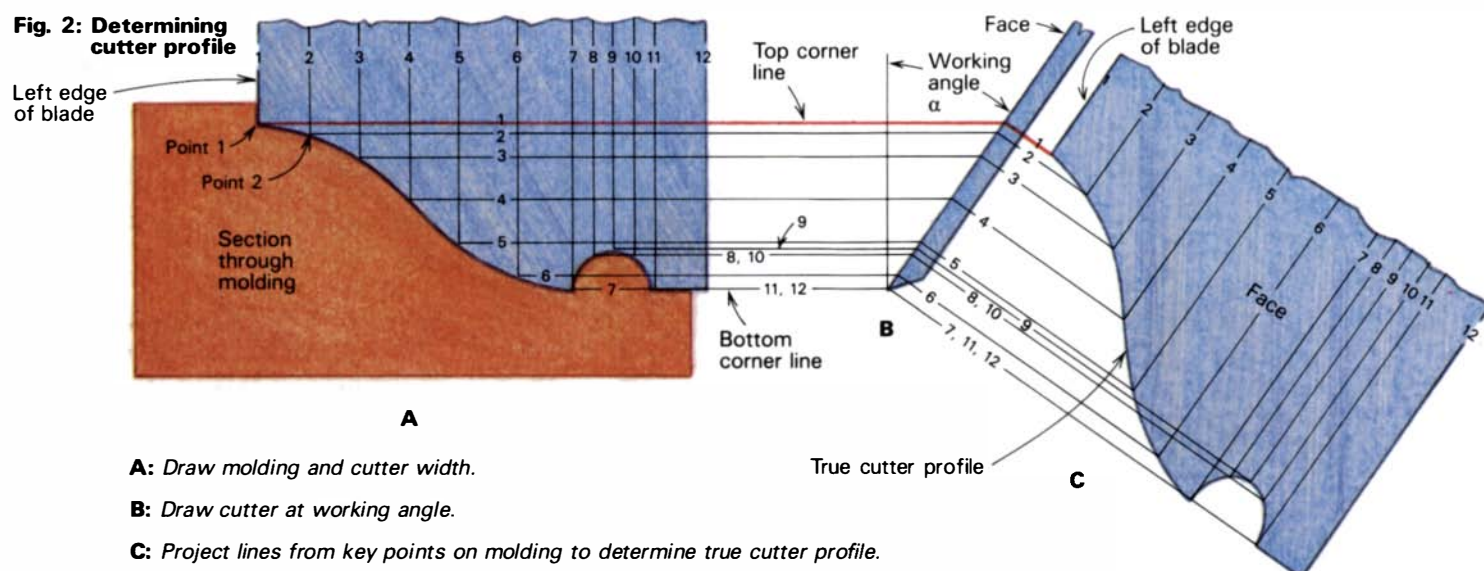
Cutter profiles—Shaped lathe tools, such as those shown in the photo of the table leg on p. 73, are used as scrapers: after most waste has been cut away, they are held perpendicular to the work. Thus their cutting edges are essentially the negative of the desired finished shape. Other tools, such as molding heads, router bits and plane irons, cut at an angle to the wood, and it is necessary to first draw a projection of the desired wood shape on the angled tool to determine the profile of the cutter itself. Draw the molding shape as shown in figure 2A, and show the blade in cutting position. This view shows the true cutter width, but since the working blade is not perpendicular to the molding surface, it doesn't show the true edge profile. To determine the true profile, next draw a side view of the cutter, 2B, at its working angle α , which can be determined as shown in figure 1.

View 2B shows the cutter's true thickness. It is possible to use views 2A and 2B to determine the actual shape of the cutter's face, which is shown in 2C. Begin view 2C by drawing the left and right edges of the cutter. The edges should be parallel to the face of the blade in 2B, and at the same width as in 2A. Next draw horizontal lines from 2A to 2B to show the locations of the cutter's corners on the face in 2B. Working perpendicular to the face in 2B, extend these lines over to 2C to show the corners of the blade in this view. For example, point 1 in view 2A has been transferred along the line drawn in red to point 1 in view 2B, and from there over to point 1 in view 2C.

Plot additional reference points along the cutter's profile in view 2A and draw a series of vertical lines from the molding profile up to the top of the cutter. The lines need not be equally spaced, but they should start at points important to defining the shape. Draw the lines on 2C with the same spacings they have in 2A, and transfer each point as you did for the corners. In the illustration, 12 points were used in all. The more reference points, of course, the more accurate the cutter profile will be. After all points have been transferred to view 2C, sketch in the full shape.

When the shape of the tool has been determined, paint the surface of the steel with machinists' layout fluid, a quick-drying

Fig. 2: Determining cutter profile



A: Draw molding and cutter width.

B: Draw cutter at working angle.

C: Project lines from key points on molding to determine true cutter profile.

blue or purple paint that can be purchased in an aerosol can from an industrial hardware store, or made by coloring a little alcohol with a piece of carbon paper and adding a small amount of shellac. When the paint is dry, scratch in the pattern with a fine-pointed scribe.

Shaping the cutters—I usually rough in the shape with a saw and bench grinder. If the profile has intricate curves, much of the waste can be removed using metal-cutting blades in a jigsaw, provided that you are working softened steel. To refine the shape, clamp the part in a vise and work with a hand-held grinder or files (depending on whether the steel is hard or soft). I use Swiss pattern needle files to get into tight places, plus whatever other files conform to the shapes. Double-cut files remove metal quickly when roughing out, and single-cut files leave a smooth surface.

Keep in mind that it is not necessary to make the entire cutter from tool steel. The plane blade in the photo on p. 73, for example, consists of a tool-steel cutting edge brazed to a mild-steel tang. The large router bit is similarly brazed, making it much easier to fabricate. But don't plan such brazed joints in a part of a tool that will be under much stress in use.

First shape the profile of the cutting edge square to the face of the tool, then add the bevel. If grinding, keep the metal cool by dipping it in water frequently or by spraying it.

When grinding or filing the final touches, after you've roughed in the bevel, position the cutter in the vise at an angle such that you can see both the back and the face. Work carefully from the back toward the face, holding a piece of white paper against the face periodically as an aid to seeing the edge. When you've almost reached the face, position a light to give a reflection from the unfinished edge, and carefully file until the reflection just disappears.

Keeping cutters uniform—If you have to make more than one identical cutter blade (for a molding head, for example), first make a template out of thin brass or aluminum and scribe around it onto the blanks. Shape all the profiles square, then bevel each one in turn. Repeating the steps this way helps ensure uniformity. A single bit with matched cutters, such as the average router bit, is an exception. I find it best to grind one blade to shape, bevel and sharpen it, then scribe its shape on a piece of thin brass or aluminum cut to fit so it bears against both the

face of the cutter and the shank at the same time. You can then use the template as a gauge to check the length and profile of the other cutter.

It is not always necessary to have matched blades. If you plan to run only a small amount of wood, you can shape just one blade to cut, and grind back any other blades so they don't cut. Be careful to maintain balance in the cutter by leaving enough steel in the short blade or blades so that each weighs about the same as the blade that is cutting. With only one blade cutting, of course, the work must be fed to the cutter more slowly. Don't use the cutter if it is so out of balance that it vibrates.

Heat-treating—If you heat tool steel hot enough, it glows, and the color gives a rough idea of its temperature. Once the steel is heated above a certain critical temperature and then cooled very slowly (a process called annealing), it is left in a relatively soft state and can be worked with saws and files. If cooled quickly, the steel is hardened. It will be too brittle to make a good cutting edge, but if it is then reheated to just the right temperature (a step called tempering), it is slightly softened again to arrive at a balance that gives a good, tough tool edge. You can gauge tempering by colors, too: if steel is polished and heated, colored oxides that form on its surface indicate the temperature.

You can judge the hardness after any of the heat-treating steps by trying to file an edge with a sharp smooth file. The file will easily cut soft steel, will slide over very hard steel, and will just barely cut tool steel tempered to the desired hardness.

Keep in mind that we are talking about tool steel. You can't harden and temper mild steel such as I-beams and angle irons in this way. But if you start with a tool-steel blank or with an existing tool, regardless of which particular tool-steel alloy it is made from, you should succeed using the following procedures.

Flat-ground tool steel, sometimes called die steel, can be purchased soft in various sizes from an industrial-hardware or other machine-shop supplier. Its chemical analysis and heat-treatment requirements are shown on the wrapper or can be supplied by the seller. A typical temperature for both hardening and annealing is 1450°F to 1500°F. At this temperature, the steel glows a light red color, a little brighter than full cherry.

You can heat-treat small tools with a propane torch. Larger tools require more heat, but a MAPP gas torch, sold by Sears and others, will handle most small woodworking tools. In borderline cases, reduce air drafts by placing fire brick, pieces of

asbestos shingle or other high-temperature insulating material around the tool as it is heated. Large tools may require an acetylene torch with a large tip.

Figure 3 lists two color spectrums: one for hardening steel, the other for tempering. Nobody would claim to be able to tell exact temperatures by observing colors, but the range is close enough for most small tools. Experience helps. The chart lists the glowing colors as seen in moderate light. In bright light or in very dim light, different temperature/color relationships apply. Higher-than-necessary temperatures may distort thin sections, so be sure to direct the flame at broad surfaces, not at sharp edges. Brazed cutters, like the two shown on p. 73, should be held at the brazed point with pliers while heating to lower the temperature there so that the braze will not melt.

Annealing—If you want to modify an existing tool by filing or sawing, the steel must first be softened by annealing. Heat the steel with the torch, hold it at a temperature of about 1450°F for a minute or so and then cool it slowly. If the steel is cooled too rapidly, it will not be softened. Test it with a file, and if the file won't cut easily, try again.

For most complete softening, the steel should be held at the elevated temperature for as much as an hour and then cooled in a container filled with ground soapstone, fine sand, ashes from which all carbon has been removed, or a similar insulating material that will keep air away and cause the steel to cool over a long period of time, perhaps 10 hours. Large tool shops have special ovens for this. For softening small tools, it is usually adequate to heat the steel to a light red for a minute or so, and then slowly reduce the heat by gradually withdrawing the flame. When no color can be seen in dim light, the temperature is below 1000°F and the tool can be set aside until cool enough to test with a file. You can now shape the tool.

Hardening—Hardening is accomplished by heating the steel to above its critical temperature (the same temperature as for annealing) and then quickly cooling it, usually by plunging it into a liquid. This is called quenching. The rate of cooling affects the hardness, the depth of penetration of the hardness, and, especially in large tools, the possibility of cracks forming. The most

common quenching liquids are water and oil. Water cools the steel faster than oil, but because of this faster cooling, water is more likely to cause cracks and distortion. Cracking isn't often a problem with small tools, though. Oil-quenching gives a softer core to the tool, and thus a tougher tool. Any kind of oil can be used for quenching, as long as it is thin and does not become gummy. Kerosene was often used in the past. Common salt (NaCl) added to water, making brine, also reduces cracking.

The quenching solution should be warm, 125°F, although for small parts the temperature is not critical. Just make sure there is enough solution to allow you to completely immerse the part without appreciably raising the liquid's temperature. When the steel glows at the desired temperature, plunge the part into the quenching solution, cutting edge first, aiming to wet both sides of the tool at the same time. Agitate the tool and keep it in the solution until the bubbling stops.

The cutter will now be so hard and brittle that a smooth file won't cut it. In use, such an edge would soon chip.

Tempering—When a hardened tool is reheated to a particular temperature, it is softened to a predictable degree, toughening it. You can control the temperature by heating the tool in a household oven, or you can estimate the temperature by observing the oxide colors. The degree of tempering is partially a preference of the person doing the tempering. If the tool is too hard, it will chip easily; too soft, and it will dull too soon. Tools are usually drawn to between a light straw color (quite hard) and a dark blue (softer). A sharp file will just barely cut steel drawn to a light straw. I prefer a light straw for shaper blades, and have never had one chip.

Polish the face of the tool with fine sandpaper or emery cloth. Holding the tool with pliers as far back from the cutting edge as possible, apply low heat from the propane torch well back from the cutting edge. The polished metal will show a sequence of colors as the flame heats it, starting with a light yellow. As this color moves toward the cutting edge, it will be followed by darker shades of yellow, straw colors, purple, blue, etc. When the desired color reaches the cutting edge, plunge the blade in water to prevent the edge from absorbing any more heat from the body of the blade. The plane iron in the photo on p. 73 shows what a typical tool will look like at this stage.

When tempering, heat the steel slowly to ensure even penetration into the tool and to prevent the color progression from moving to the cutting edge so fast that it would be difficult to stop it at the proper time. The desired final temperature is only about 450°F for straw, 560°F for blue. When the edge is properly tempered, a smooth file will be just barely able to cut it.

Further reading—For more about modern toolmaking as done in industry, consult the *Tool Engineers Handbook* (American Society of Tool Engineers, published by McGraw-Hill). Some of the older tool engineering books, such as *High-Speed Steel* by O.M. Becker (published by McGraw-Hill in 1910), discuss in greater detail the simpler, then more often used methods. These and other useful and interesting books can be found in the industrial-arts reference section of a large public library, or in the reference section of an engineering college library. □

Howard Lawrence is a retired aerospace engineer whose avocation was house and small-boat building and who now makes period-style furniture. He is a member of the Society of Philadelphia Woodworkers.

Fig. 3: Colors observed in heat-treating

Glowing colors:

Lowest red visible in light 890°F	Dull red 1020– 1160°	Full cherry 1300°	Light red 1550°	Full yellow 1750– 1830°	Light yellow 1900°
---	----------------------------	----------------------	--------------------	-------------------------------	-----------------------

Oxide colors:

Faint yellow 420°F	Light straw 440°	Medium straw 460°	Dark straw 490°	Purple 530°	Blue 560°	Pale blue 600°
Approximate hardness, Rockwell C scale						
60	59.5	59	58	57.5	57	56



Steel glows in the temperature range required for annealing and hardening, and the colors progress as in the top table, providing a built-in approximate temperature gauge. The temperatures required for tempering are much lower, and can be judged by observing the colored oxides that form on polished steel when it's heated. Colors are listed as they appear in moderate light—bright or dim light will change the relationships, and you may find that other authorities have their own names for the colors. No matter, hardness is easy to test, and experience brings consistency.

Designing With Veneers

Illusion can be as strong as structure

by Ian J. Kirby

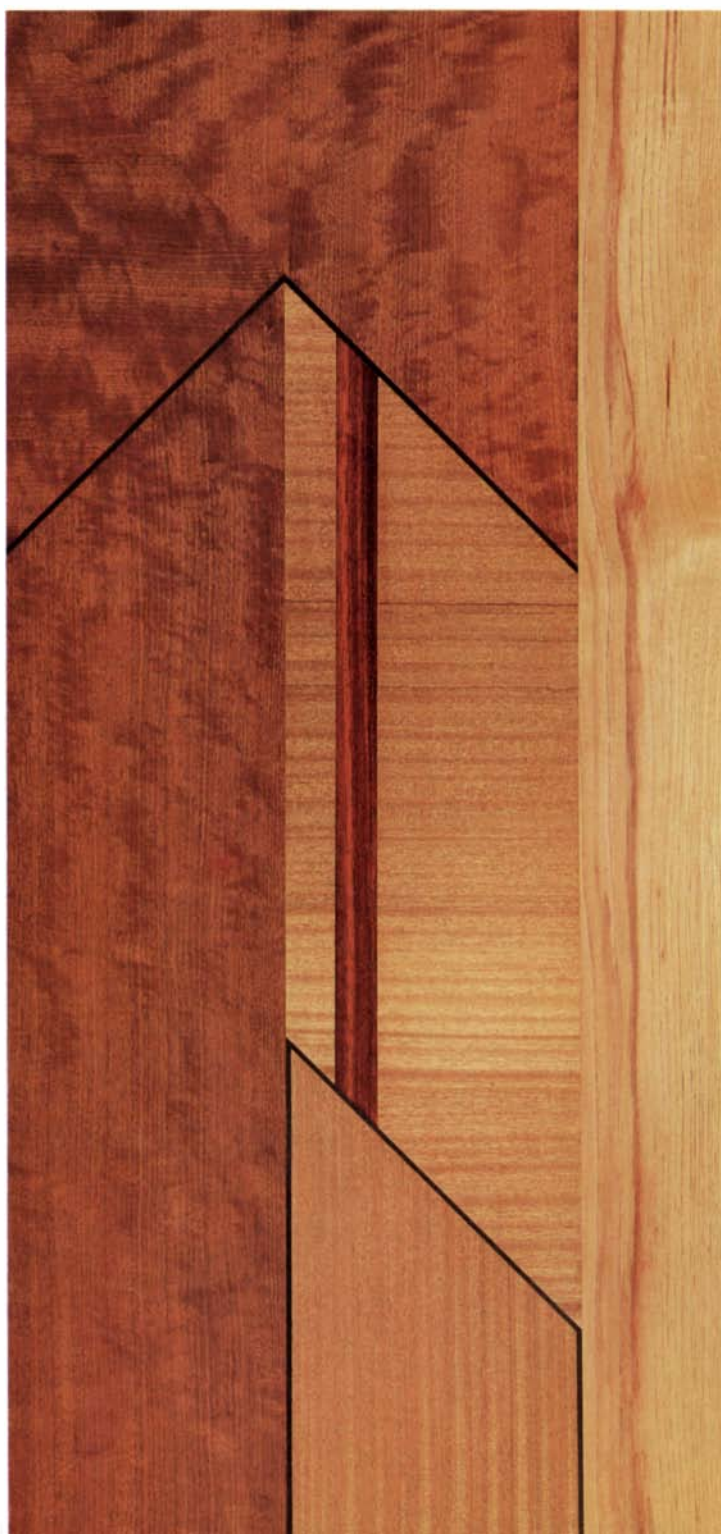
There's more to veneering than technique; in fact, the essence of veneering is design and actually using the material to create real furniture and pleasing visual effects. The series of buffet tables shown here are the result of class problems aimed at developing the design and craft skills of students at my school near Atlanta. A look at how these students handled the assignment shows you what is possible with veneers, and also gives you a glimpse at the whole process of designing.

The students already had learned to make torsion boxes and to handle basic veneering techniques, but some of them had never attempted a major piece of furniture. The buffet therefore seemed an ideal first project. It has a simple form and function—a food counter when a buffet meal is being served—but since it just stands idle in a room most of the time, it must also be an attractive piece of furniture. After discussing these requirements, I recommended that the students start with a basic table form and make it elegant by varying the proportions of the components. Then, if they could enhance their design with the visual

Five different veneers—padauk, ebony, African walnut, makore and pecan—used in proportion to their visual intensity create an eye-catching highlight on the top of de Alth's buffet.



Carefully joined sections of veneer make George de Alth's buffet appear to be assembled from blocks of solid wood, rather than from sheets of medium-density fiberboard.



details that can be created with veneers, they would be well on the way to successful pieces of furniture. Torsion boxes (FWW #32, pp. 96-102) were included in the assignment because they capitalize on modern, dimensionally stable substrates to create strong structural elements with smooth surfaces perfect for showcasing the visual drama and movement of veneers.

Don't be put off by the apparent complexity of these designs. You don't have to be a trained designer to experiment with veneer arrangements and proportions. Everyone, whether he or she realizes it, has an eye for visual relationships. You can increase your awareness of these relationships by looking carefully and by thinking about what details make a piece of furniture work in terms of appearance or function. That's mainly what it takes—there's nothing magical about visual design.

One word of caution. Even though you may develop many good ideas for using veneers, don't immediately run off on some grandiose project. If you have never done any veneering, my advice is to make up two or three 9-in. by 12-in. practice panels, using mahogany or some other easy-to-work veneer; avoid anything that's badly buckled. Following the methods I've discussed in the last two articles (see FWW #46 and #47), prepare the substrate and apply the veneers. By the time you've finished the panels, you'll have learned enough to confidently use veneering technique on a real project.

As you study these pieces, you'll see two types of form: structural and visual. The torsion boxes establish the structural form of the buffets, and veneers create the illusion of form as they visually pull the components of the piece together. A good example of this type of visual unity is the buffet by George de Alth, shown on p. 77, in which he arranged the veneer grain patterns to flow from the top to the sides, linking the two surfaces into what appears to be one continuous, solid structure.

No amount of playing around with surface decoration or structural detail, however, will compensate for any miscalcula-

tion in the basic proportions. Although proportion may be discussed as a mathematical concept, complete with formulas to guide you, it's mainly something you learn to sense and feel through practice and a great deal of drawing. There is no substitute for drawing—it's the most effective way to explore proportions and the interaction of line, pattern, color and other visual effects until you've created relationships that please you. The product of this work at the drawing board—a graphic design—is later translated into a three-dimensional structure, first a model, then a full-size piece. The model can be anything from a small-scale replica to a full-size mock-up, complete with colors or shapes pasted or taped on, but it should be as accurate as possible. Otherwise, you won't have any real feel for what the completed piece of furniture will be like.

The buffet by de Alth shows how a graphic design can be converted into veneers. By far the jazziest of all the pieces shown here, its visual power is concentrated within one area of the top. Five different veneers were used, each in proportion to its visual strength and color. For instance, the smallest area of veneer—5 sq. in. of ebony—acts as the highlight. It draws the eye right to it and has great impact.

In the teak and ebony buffet shown in the photo at right below, John Sherman developed a strong visual relationship between the top and the elliptical legs, which appear to be coming through the top. In reality, what shows is a piece of ebony veneer cut to the exact section of the leg. The illusion is compounded by ebony strips running across the edges of the top and down the legs, seemingly connecting the two pieces. The legs are oval torsion boxes. The ebony was veneered to a piece of bendable 3mm plywood, which was then glued onto the oval leg. Sherman's buffet also features inlay—a technique which is almost as old as veneering itself. In this case a teak and ebony laminate is inlaid around the edge of the top to highlight its shape. To accentuate this configuration even more, the ebony

A long strip of purpleheart ties the asymmetric form of Carter Sio's buffet table together visually (below left), while a veneer-deep illusion lets John Sherman's top grip his table's legs, which are oval torsion boxes.





The mitered chamfer on Joe Wilson's padauk buffet is accentuated by satinwood inlay, which joins the chamfer, leg and top. Satinwood is also the primary wood in the raised window-like grid.

center panel mirrors the slightly bowed edges of the top.

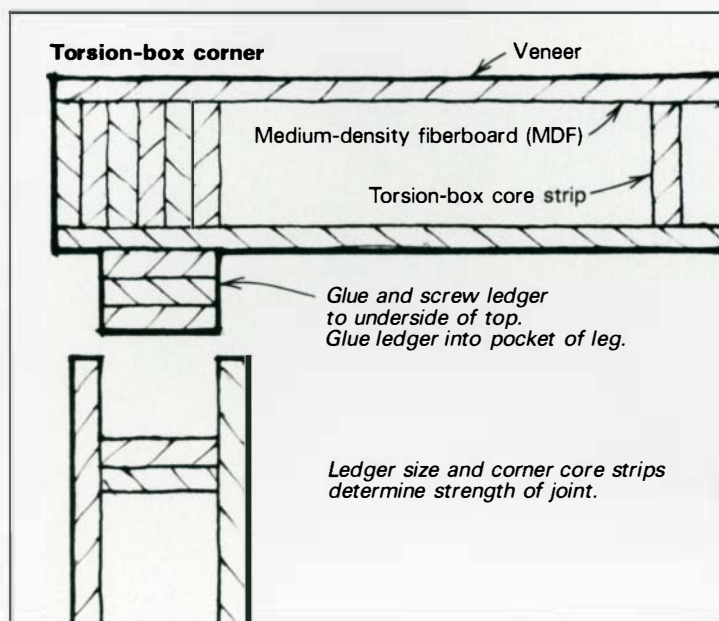
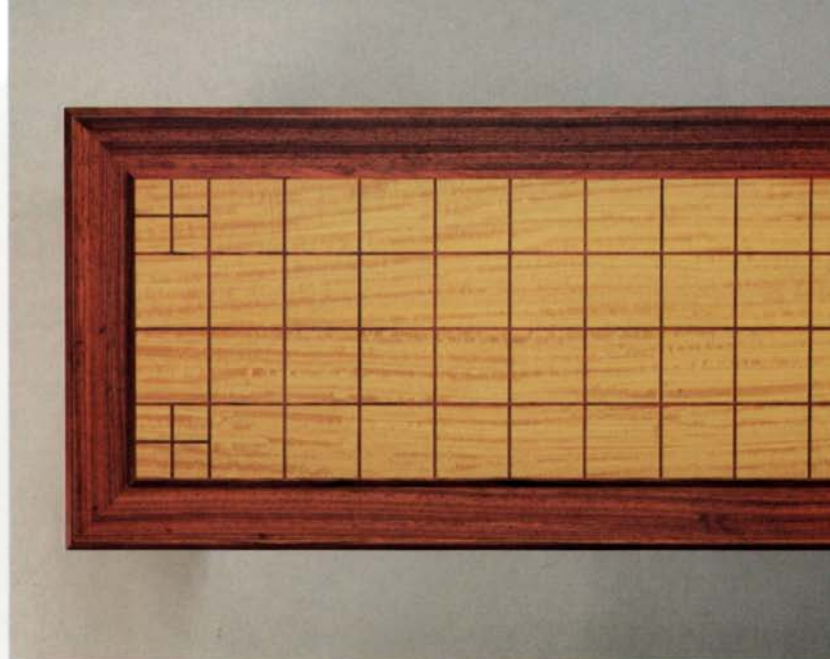
Another example of how veneers can unify a piece is Carter Sio's buffet, shown at left on the facing page. Its form is asymmetric, but the components are held together by a long band of purpleheart veneer.

Joe Wilson similarly united his padauk and satinwood buffet (photo, above) with a detail: a chamfer highlighted by a satinwood inlay. This makes clear the relationship between the parts—chamfer, leg and raised top—and gives the piece much of its power. The legs are joined to the top very simply with a ledger and pocket on the leg, as shown in the drawing at right.

The grid on the top of Wilson's table is formed by solid padauk strips inlaid into satinwood veneer, which is raised above the mitered padauk border. This might somewhat limit the use of the buffet, but Wilson decided that the visual effect gained was worth what might be lost in function. The pattern looks good and seems right because of its proportions. The side of the square equals the width of the border, the number of squares makes sense, and the small squares emphasize the corners. The success of this piece is the result of careful thought at the drawing board and many developmental drawings.

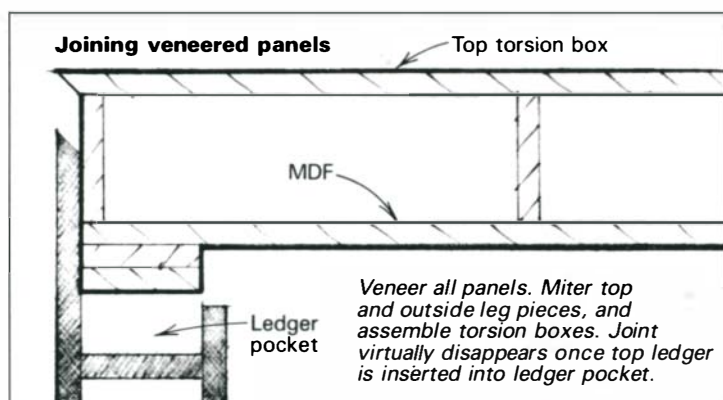
Scott Jenson's buffet (top photo, p. 80) is a good example of the selection and clever mixing of superb materials. The heavier pillar appears to be 5-in. rosewood cubes stacked one on top of the other. The effect is in fact created by applying the veneer so that every 5 in. the direction of the grain is turned 90°. This understated detail is discovered only when you get near the object, and then it comes as a surprise and a joy.

Jim Allen's buffet (bottom photo, p. 80) is a torsion-box structure built with medium-density fiberboard (MDF) skins over an MDF core. The principal veneer is fiddleback teak; the secondary veneer is rosewood. The legs are slightly thicker than





The larger pillar on Scott Jensen's glass-top table is veneered to look like a series of stacked 5-in. rosewood cubes.



Jim Allen's table, below, appears to be inlaid with slices of solid-wood cylinders.



the top, giving the piece a comfortable feel. (If the legs were the same thickness as the top, they would look spindly.) An interesting pattern is obtained by applying some of the fiddleback veneer at right angles to the grain direction of the main flow of veneer. On the top surface, the pattern is based on seven different-size rectangles, which create interest in the way that each juxtaposes to the next. The circle motif on the front edge is carried over the top, giving the illusion that the inlays are slices of a solid-wood cylinder. Circles also appear at the corners, where the rosewood veneer emphasizes the relationship of the legs to the top. There is a fairly important lesson to be learned here—the relationship of the parts, that is, the architecture of the piece, should be developed first. From these architectural lines come our first ideas about variations or decoration of the piece.

Allen worked within the architecture of the table to create illusions. How are the legs and top joined? Is the leg one piece, the top another piece, and the rosewood corner a third? What trickery holds the top to the leg, if the two pieces barely touch at the corners. Is there a tube of teak running through the center of the rosewood? To further suggest that the rosewood corner is a separate piece, Allen could have run a grooved line through the area where the rosewood contacts the teak. This would have created a shadow and a distinct gap on the surface.

Anybody can develop a sense of design. But keep in mind that complexity for complexity's sake is not good design. I find that new students tend to include their whole arsenal of techniques in each project, while more experienced workers generally refine a theme, then develop it fully. You should be aware of this difference as you start thinking about design. With attention to detail and practice, you can make your first major piece of veneered furniture something special. □

Ian J. Kirby is a designer, cabinetmaker and educator in Cumming, Ga. He wrote about veneering in FWW #46 and #47. Drawings by the author.

Matchmaking

A good way to begin designing with veneers is to imagine that you are a graphic designer working with lines and color, pattern and rhythm, rather than a woodworker dealing with bits of wood. Veneer is so rich and varied that you can design in much the same way as an artist paints, with an entire palette of visual effects to accent, define or enrich a piece of furniture.

As you begin matching veneers, you'll find that the variations are almost endless—certainly there are more combinations than the conventional bookmatch, slipmatch and herringbone patterns you see diagramed in old veneering books. Such cataloging seems to indicate that there are rules or set patterns for veneering. Nothing could be further from the truth. When veneering, the only rules are visual, although you should realize that if you flip sheets of veneer you will have the tight side of one sheet next to the loose side of the next sheet (see *FWW* #46, p. 39). This will affect the looks of the panel when polished. There isn't a garish difference, but the two sheets will absorb finish differently and will reflect light differently. Other than that, don't be afraid to arrange veneer in any way you choose.

Figure 1 gives a glimpse of the kind of patterning that's possible. A single sheet of veneer is fairly uninspiring, unless it happens to be a particularly exotic species. Put it side by side with another sheet in a simple slipmatch (1A) and the effect is a little livelier. Arranging two consecutively cut veneer sheets to create a bookmatch (1B) is even more intriguing, but the four-sheet pattern in 1C just vibrates with life.

Finding good grain patterns for these more exotic matches takes a good eye and some careful searching. A simple but handy device is a homemade viewing window (figure 2A), which consists of stiff cardboard with a window cut to the shape and size of the sheet of veneer to be matched. It's quite extraordinary how grain and color come into focus when you isolate a section of a sheet through the window. Once you've found the section you like, you can find matching sections in the same position on successive sheets in the veneer stack and arrange them in a four-way match (2B).

To see what repeat-left, repeat-right or end-on-end matching will look like, hold a small mirror (an 8-in. by 5-in. mirror works well) at one end or edge of the window. If you want to see what a four-way match will look like, use two mirrors taped together to form a right angle (2C).

A pattern need not be complex to be

Fig. 1: Matching for effect

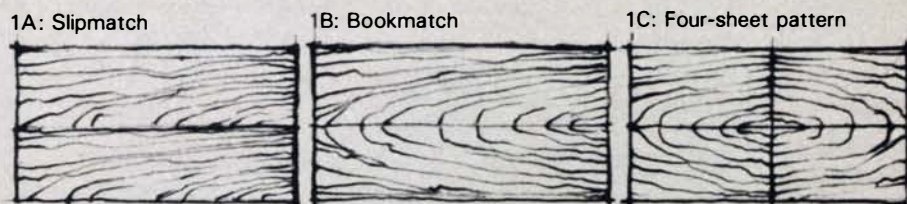
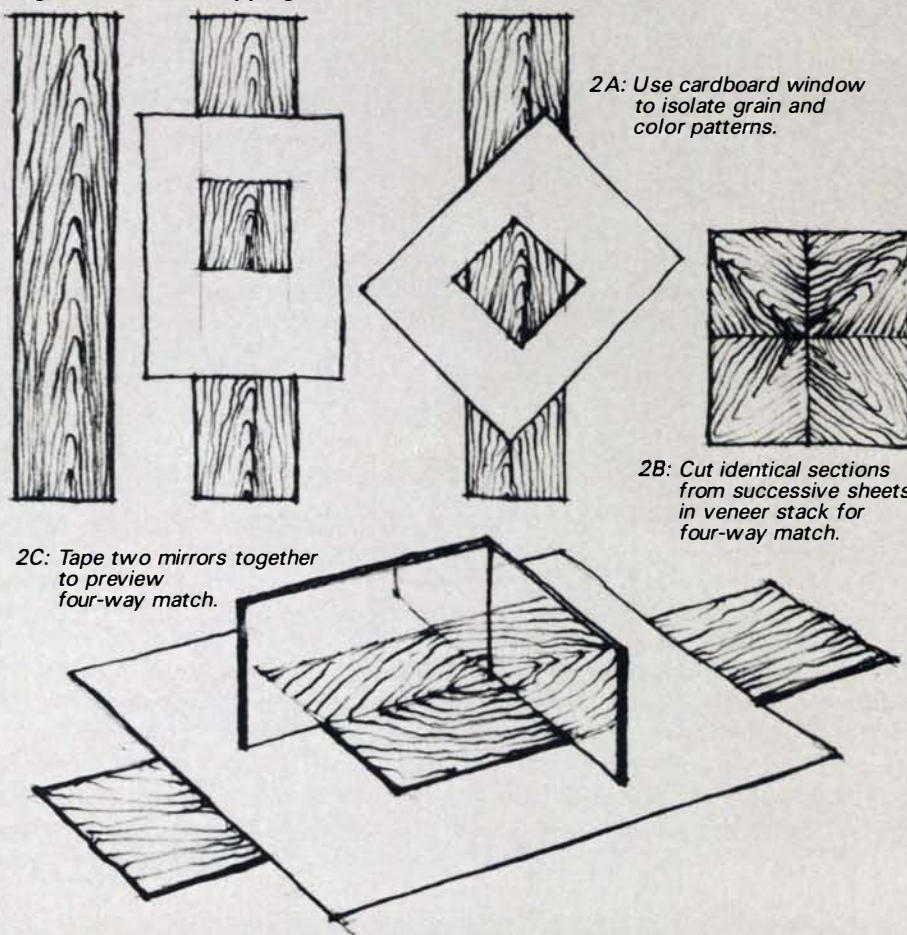


Fig. 2: Window shopping



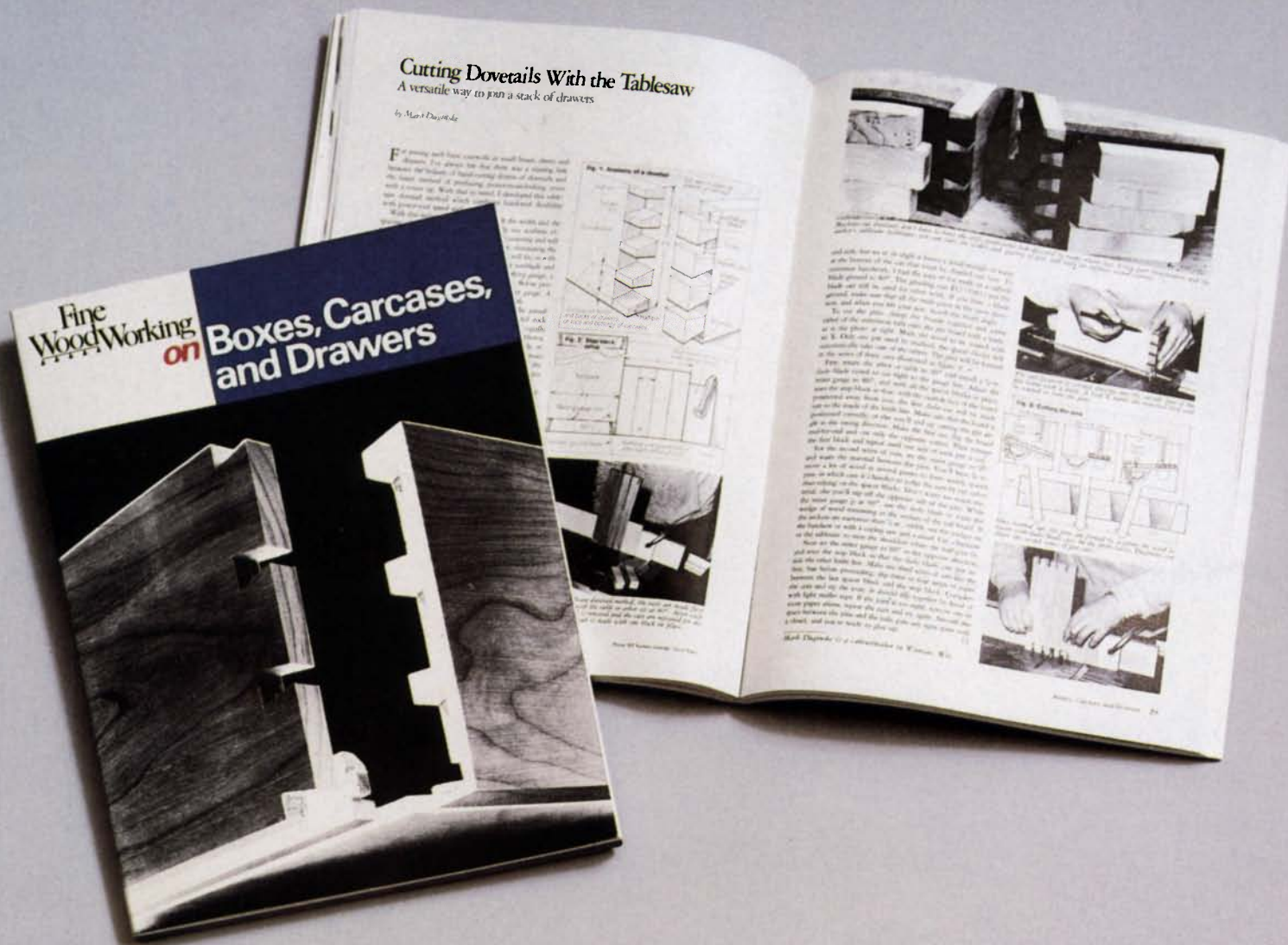
eye-catching. A checkerboard, for instance, is a good example of the power of simplicity. The usual way to make a checkerboard is with alternating squares of light and dark veneers. An equally effective checkerboard can be made with only straight-grained ash squares assembled at right angles to each other. The result is dramatic, but somewhat more subtle than the usual black-and-white.

Another simple way to mix veneers is to use inlay and edgebanding. You'll find that a mix of approximately 90% major veneer with 10% inlay will generally create a pleasing effect. In these proportions, the alternate veneer acts as a highlight or color contrast to strengthen the shape or form of the object.

Veneer is available in a variety of thicknesses and species from local shops and mail-order houses. It's usually sold in bundles that have the sheets stored in the same order in which they were cut from

the tree. Once you know the length and width of the veneer sheets you're buying, you can calculate the number of sheets required to give the pattern you want and the square footage you need. Since there are quite a number of variables here, including at least a 15% waste factor, it's usually impossible to get exactly the right amount, so it's best to buy extra. Otherwise, if you run out, you may be forced to use veneer from a different flitch, which could spoil the whole effect.

The best way to store veneer is to lay it on a larger board so there are no overhanging edges or ends that could get knocked and broken. Enclose the whole stack in an envelope of plastic sheeting to retain the moisture in the stack and to keep dirt out. Store the stack in a dark place—sunlight will rapidly fade veneer. Aging doesn't help veneer, but if the sheets are stored carefully, they can be saved for quite a few years. —J.J.K.

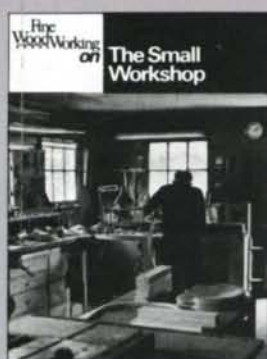


There's a new way to get your woodworking information.

Now you can get your woodworking information the way you've often wanted it, subject by subject. Our new *Fine Woodworking on...* series takes the best articles from *Fine Woodworking's* first nine years and organizes them into individual volumes on joinery, shop tips, wood-bending and a variety of other woodworking specialties. Filled with articles by some of the most talented amateur and professional woodworkers of the past decade, each of these books offers you an in-depth look at a single facet of the craft. Whether you're setting up a shop or making period furniture, you'll find books here that will give you just the ideas and information you're after.

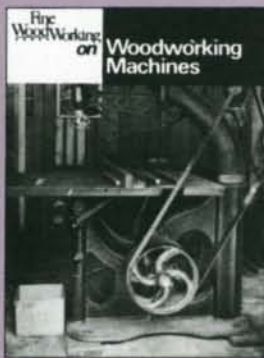
All books are softcover, \$6.95 each

To order: Use the attached insert or call toll-free, 1-800-243-7252, and use your credit card.



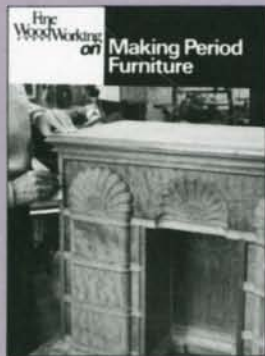
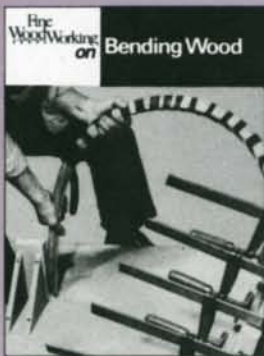
Fine Woodworking on The Small Workshop. Looking for some new ideas on shop setup? Here are discussions of floor layouts, plans for workbenches, some clamps you can make, suggestions on storing tools, methods of holding and clamping work and tips on controlling dust and keeping your shop safe. 96 pages

Fine Woodworking on Planes and Chisels. Planes and chisels are among the most important tools in your shop. Find out how expert craftsmen choose, sharpen and use these basic edge tools, how to maintain your own tools and how to make wooden-bodied planes. 96 pages



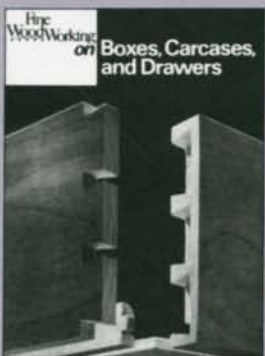
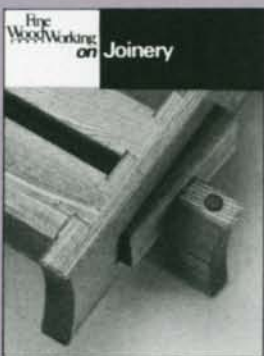
Fine Woodworking on Woodworking Machines. Which machines do you really need? How can you get the most out of a router? What's the right way to adjust a jointer or thickness planer? How about those Japanese resaws? Expert craftsmen tell you what you need to know. *112 pages*

Fine Woodworking on Proven Shop Tips. Our "Methods of Work" column has served as a kind of national switchboard for woodworkers eager to share tips, jigs and shop tricks. This book is a collection of these contributions—nine years of ingenuity and common sense that can make your life in the shop a whole lot easier. *128 pages*



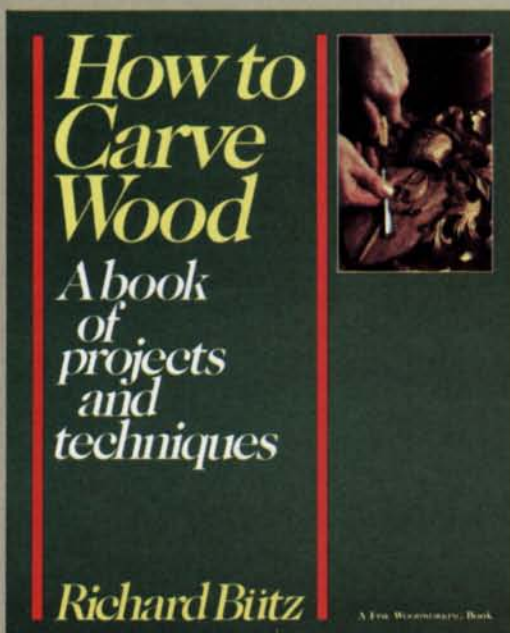
Fine Woodworking on Bending Wood. There are three ways to bend wood: steam-bending, green-wood bending and laminate bending. Discover the basic methods involved in each, and learn how to make the tools and acquire the skills you need for successful bending in your own projects. *128 pages*

Fine Woodworking on Making Period Furniture. Find out how period furnituremakers do their best work. There are plans for favorite 18th-century pieces, technical explanations of how to reproduce such fine details as claw and ball feet and tapered reeds, and practical design ideas that will help you capture in your own work the flavor of the era. *128 pages*



Fine Woodworking on Joinery. This book is largely about how to make that workhorse of the cabinetmaker's art, the mortise-and-tenon joint. You also learn to make and use other specialty and decorative joints. And there's information about glues for wood. *128 pages*

Fine Woodworking on Boxes, Carcases and Drawers. Skilled woodworkers show you how to design and construct fine storage furniture in solid wood, plywood and particleboard. You learn how to choose, make and use every kind of carcase joint, using both hand and machine methods, with particular emphasis on the classic dovetail. *112 pages*



NEW

Got a craving for carving?

Richard Bütz has written a book just for you. Using step-by-step instructions, skill-building exercises and over 200 detailed photos and drawings, Bütz teaches you six distinct methods of carving—whittling, chip carving, relief carving, wildlife carving, lettering and architectural carving. You also learn about selecting tools and keeping them sharp, choosing the right kind of wood and setting up an efficient work area. And along with all this expert instruction, Bütz provides you with scaled patterns for a marvelous range of carvings—some 37 different projects in all.

Whether you're an accomplished woodcarver looking to strengthen your skills or a beginner eager to learn, you can't do better than Bütz's book. Softcover, 224 pages, \$14

To order: Use the attached insert or call toll-free, 1-800-243-7252, and use your credit card.

A professional saw fence system priced for the home shop.

The home shop T-Square™ saw fence system from Biesemeyer gives fast, safe, accurate cuts just like the professional system, but at a fraction of the price.

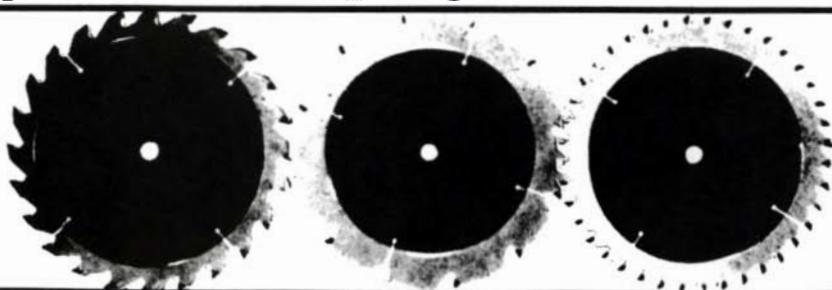
Get the same easy front-lock lever, our famous hairline pointer and guide rail scale that eliminate hand measuring, and a choice of cutting capacities from 28" 40" and 52" to the right of the blade. With prices starting as low as \$199, you can't afford not to have state-of-the-art technology in your shop.

For information or the dealer nearest you, write Biesemeyer Manufacturing, 216 S. Alma School Road, Suite 3, Mesa, Arizona 85202. Or call toll-free 800/782-1831.

BIESEMEYER
The T-Square™ saw fence company.



SET OF FREUD 7¼" BLADES WITH THE SAME FEATURES AS THE 85 SERIES SUPER BLADES!



Saw Slick Material

Freud's 85 series blade has an extraordinary reputation with woodworkers. Woodsmith magazine said, "Freud's new teflon coated cut-off blade produced the finest finish of all the blades tested." Working with Freud, we've developed an exclusive 3 blade set that guarantees top performance with your circular saw. These blades cut faster, leave a smoother finish and cause less wear and tear on your equipment! The secret: anti-grip coating, precision grinding and sharp industrial carbide tips. The set consists of 3 blades (all 7¼"): 40 tooth fine cutting, 24 tooth general purpose and 12 tooth ripping. All have 5/8" arbor and diamond knockouts. Available only in 7¼" and only as a set of 3. **SPECIAL OFFER** with each set, we'll provide a saw slick, an extraordinary coated pad that adheres to the base of your saw to protect the wood finish and make your saw easier to handle.

**SET OF 3 FREUD 7¼" BLADES
AND FREE SAW SLICK**

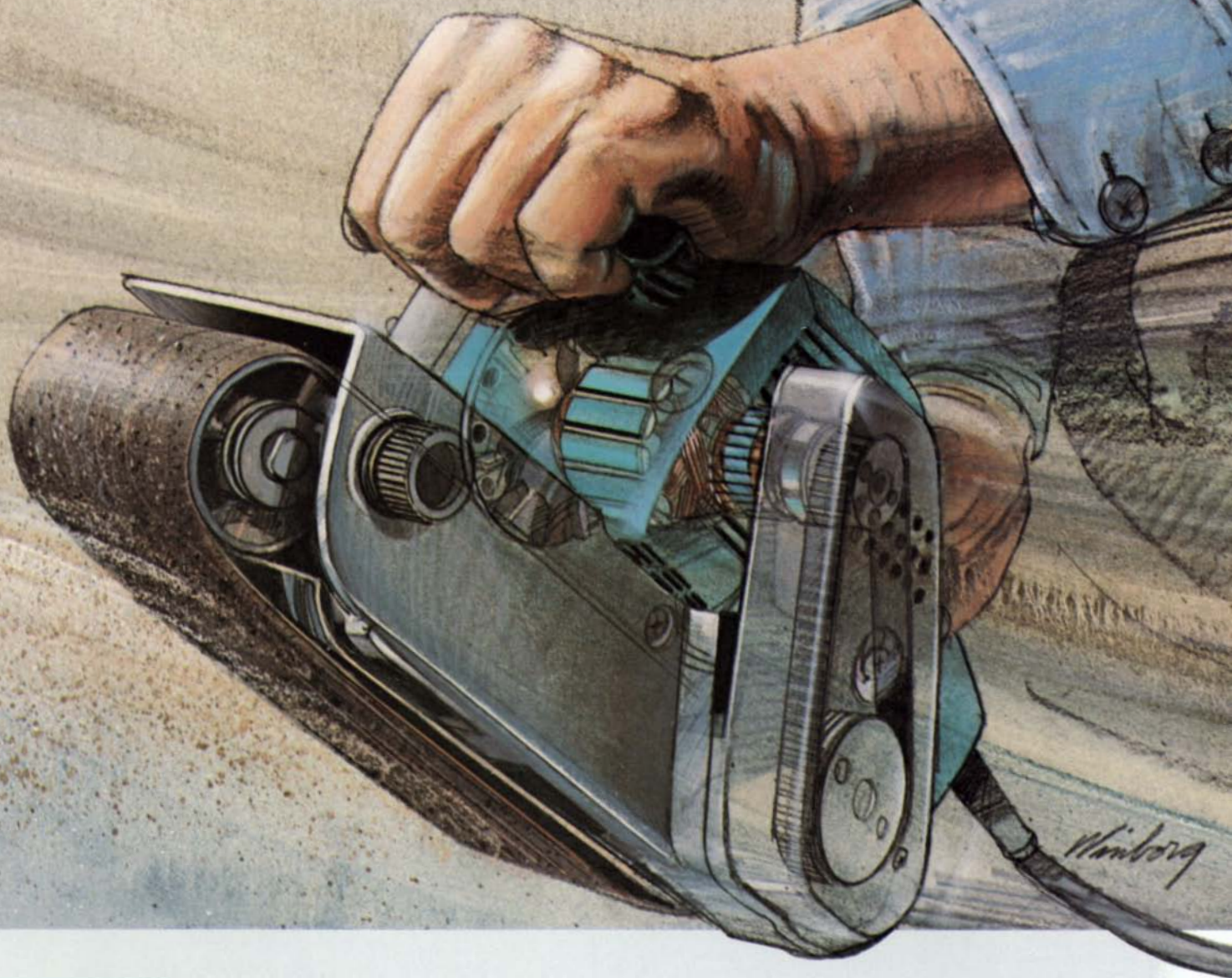
**800-343-3248 (USA)
800-322-6100 (MA)**

TREND-LINES, INC.

\$59.95

375A Beacham St.
P.O. Box 6447A
Chelsea, Ma.
02150

Finish first with Makita.



Rugged, hard-working Makita power tools give you the performance demanded by the professionals.

Because all Makita power tools are built with outstanding features -- advanced motor technology, high-impact housings, machined gears, high quality bearings and extra long cords -- you know they will outperform all the rest.

We're strongly committed to giving you the very best service in the industry. We have established over 190 service centers including 30 factory owned Service Centers, where most repairs are completed in less than 48 hours.

Whether you're working with wood, metal, plastic or concrete, Makita provides a line of power tools that is the ultimate in dependability.



Step up to **Makita**

Makita U.S.A., Inc., 12950 E. Alondra Blvd., Cerritos, CA 90701. (213) 926-8775

TOOLS ON SALE™

AMERICA'S LOWEST PRICED TOOLS

★ PLUS ★ ... FREE ... Freight On Every Item

MILWAUKEE TOOLS

List	Sale
0224-1 3/8 drill 4.5A magnum	154 109
0234-1 1/2 drill 4.5A magnum	159 115
0244-1 1/2 drill 4.5A magnum	159 115
0222-1 3/8 drill 3.3A 0-1000rpm	139 99
0228-1 3/8 drill 3.3A 0-1000 rpm	129 95
0375-1 3/8 close quarter drill	
- NEW - 3.5 amp	168 118
0210-1 3/8 cordless drill	
- NEW - 2 speed	154 114
6539-1 cordless screwdriver	
- NEW - 190 RPM	84 84
1007-1 1/2" drill 4.5AD-Hdle	194 145
1107-1 1/2" drill 4.5A D-Hdle	199 145
3300-1 magnum rt angle drive kit	239 170
3102-1 Plmbrs rt angle drill kit	253 180
1676-1 HD Hole Hawg w/cse 2 sp	323 236
5386 3/8 sgle sp hammer drill kt	203 150
5397 3/8 var sp hammer drill kt	208 155
5371-1 HD mag. hammer drill 1/2"	287 207
5373 HD mag. ham. drill 3/8"	240 175
6507 TSC Sawzall w/case	184 125
6511 2 speed Sawzall w/case	172 123
6226 port band saw 2 sp w/case	382 280
6234 TSC band saw port w/case	382 280
6365 7 1/4" circ. saw 13 amp	159 109
6405 8 1/4" circ. saw 13 amp	179 127
6460 10 1/4" " " 15 amp w/case	349 245
6377 7 1/4" HD worm saw 13 amp	235 155
6378 8 1/4" HD worm saw 13 amp	249 165
6165 12" Chop Saw 15 amp	
4200 R.P.M.	287 189
6170 14" Chop Saw 15 amp	
3600 R.P.M.	289 209
6255 v/sp Jig Saw 3.8 amp	199 140
6245 sgle sp Jig Saw 3.8 amp	175 125
6287 HD v/sp Jig Saw w/case 2.3	312 225
6012 1/2 sheet HD Orb. sander.	149 110
6014 1/2 sheet HD Orb. sander.	159 115
5935 4" by 24" belt sander	
w/bag 10 amp	299 215
5900 3" by 24" belt sander	
9.5 amp.	355 255
5660 1 1/2 HP router 10 amp	256 185
5680 2 HP router 12 amp	314 220
8950 Wet/Dry 8 gal vac 6 amp	136 110

BENCH GRINDERS

4901 1/4 HP 26 amp 24"	149 110
4921 1/2 HP 4 amp 26"	169 130
4891 1/2 HP 4 amp 41"	269 195
5041 1/4 HP 8.2 amp 58"	389 270

DRYWALL SHOOTERS

6753-1 3.5 amp 0-4000 rpm new	115 85
6747-1 4.5 amp 2500 rpm	144 100
6750-1 4.5 amp 0-4000 rpm	144 100
6751 4.5 amp 4000 rpm	144 100

FREUD SAW BLADES

Univ. Bore — Professional Series
CARBIDE TIPPED SAWBLADES

Item No.	Description	Diam.	Teeth	List	Sale
PS203	Gen'l Purp.	7 1/4"	24	27.24	17.50
PS303	fine cutting	7 1/4"	40	32.97	20.50

5/8" Bore — Industrial Grade

CARBIDE TIPPED SAWBLADES

Item No.	Description	Diam.	Teeth	List	Sale
LU72M010	Gen'l Purp.	10"	40	68.58	35
LU81M010	Gen'l Purp.	10"	40	69.30	36
LU73M010	Cut-Off	10"	80	79.65	39
LU82M010	Cut-Off	10"	80	86.40	45
LU84M010	Combination	10"	40	70.99	36
LU84M011	Combination	10"	50	74.51	40
LU85M010	Super Cut-Off	10"	80	110.88	68
LM72M010	Ripping	10"	24	84.85	37
DS 306	8" Dado			139.00	95
DS 308	8" Dado			170.00	115
TR 100	3 blades & Dado set			399.00	255

RECORD PLANES

Model	Type	Length	Width	List	Sale
03	Smooth	9 1/4"	1 1/4"	37	31
04	Smooth	9 1/4"	2"	38	32
04 1/2	Smooth	10 1/4"	2 3/8"	38	32
05	Jack	14"	2"	48	37
05 1/2	Jack	15"	2 3/8"	58	41
06	Jointer	18"	2 3/8"	70	54
07	Jointer	22"	2 3/8"	80	60

MAKITA TOOLS

List	Sale
804510 Sander	79 43
9900B 3"x 21" belt sander	198 125
9924B 3"x 24" belt sander	204 135
9924DB 3"x 24" b/sand. w/bag	214 140
9401 4"x 24" b/sand. w/bag	279 189
9035 1/2 sheet finish sander	79 55
9045B 1/2 sheet finish sander	158 100
9045N 1/2 " " w/bag	170 110
4200N 4-38 circ. saw 7.5 amp	152 95
5007NB 7 1/4 circ. saw 13 amp	158 105
5008NB 8 1/4 circ. saw 13 amp	178 110
5201NA 10 1/4 circ. saw 12 amp	348 235
5402A 16-5/16 " " 12 amp	488 375
4300BV v/sp jig saw 3.5 amp	192 120
4301BV orb v/sp jigsaw 3.5 amp	208 130
2401BW 10" mitre saw	319 185
2400BW 10" mitre saw (for vice)	359 249
JR3000WL 2 sp recip saw w/cse	168 120
JR3000V vs recip saw w/case	178 125
6010DWK 3/8 cordless drill w/case	152 89
6010DL 3/8 " " plus flashlight	162 100
6012HDW 3/8 " " 2 sp w/case	178 110
5081DV 3-3/8 cordless saw kit	165 109
1900BV 3 1/4" planer w/case	154 98
1100HD 3 1/4" planer w/case	278 165
1805B 6-1/8 planer w/case	416 265
3608BK 3/4 hp router w/case	132 85
3601B 1-3/8 hp router	198 120
3612BR 3 hp router 14 amp	286 190
3700B 1/2 hp trimmer	
28,000 rpm	124 85
6510LVR 3/8 drill v/sp w/rev 3 amp	114 68
DP3720 " " 2.7 amp	68 49
DA3000 3/8" angle drill	158 105
DP4700 1/2 v/sp w/rev " 4.8 amp	154 96
6013BR 1/2 " 6 amp HD drill	174 115
HP1030W 3/8 v.s.r. hammer drill	
w/case	145 98
6300LR 1/2" angle drill w/rev	229 152
84198B-2W 1/2" 2 sp. hammer	
drill w/case	238 150

DRYWALL SHOOTERS

6800DB 2500 rpm 3.5 amp	123 79
6800DBV 0-2500 rpm 3.5 amp	133 89
6801DB 4000 rpm 3.5 amp	123 79
6801DBV 0-4000 rpm 3.5	133 89
2030 12" planer/jointer	1980 1350
2040 5/8" planer	1780 1195

DELTA (formerly Rockwell)

List	Sale
33-890 12" Radial Saw featuring "Turret-Arm" Action	1280 975
33-990 Deluxe 10" Radial saw	589 475
33-150 Sawbuck frame/trim saw	686 519
34-621 9" contr. saw w/o motor	500 395
34-410 10" contr. saw w/o motor	871 650
34-710 super 10" motorized saw	579 450
34-010 motorized mitre box 9"	231 169
15-091 15" floor model Dipress	467 375
15-090 15" bench model	467 375
28-283 14" wood cutting Band Saw	897 695
28-243 14" " " w/o motor	594 450
37-207 Saw/Jointer Combination	1018 810
37-609 6" Motorized Jointer	413 335
37-290 4" deluxe Joiner w/o motor	346 275
22-651 RC-33 — 13" Planer	1943 1450
43-122 Wood Shaper w/stand and 1 HP Motor	669 495
46-140 11" lathe, gap bed model w/stand w/o motor	407 335
52-493 1 hp motor for #34-621	170 130
62-042 1 1/2 hp motor for #34-410	230 170
62-144 1/2 hp motor for #37-290	136 105
62-142 1/2 hp motor for #28-243 and #46-140	121 85

SKIL TOOLS

List	Sale
551 5 1/2" Circ. Saw 65A	99 75
77 7 1/4" Worm Saw	240 139
367 6 1/2" Worm Saw	239 149
825 8 1/4" Worm Saw	270 185
807 7 1/4" Skilsaw 13A-Super	153 100
808 8 1/4" Skilsaw 13A-Super	172 110
2016-023/8" Cordless Drill complete W/Charger Case & 2 batteries	199 99
310410" Band saw 4.2 amp vs	195 159
31028 1/4 Table saw 2hp 10amp	190 155

1985 TOOL CATALOG AVAILABLE

Call Toll-Free 1-800-328-0457 — In Minnesota Call (612) 224-4859

4 WAYS TO BUY: CHECK — MONEY ORDER — VISA — MASTERCARD

SEVEN CORNERS ACE HDW. Inc.

216 West 7th St. • St. Paul, MN 55102 • Est. 1933

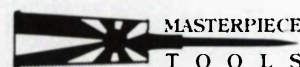


New Photo Catalogue Masterpiece Tools

The world's finest and most beautiful tools can be found clearly photographed in our spectacular new photo catalogue of MASTERPIECE TOOLS. Each tool has been photographed by a renowned New England silver and pewter photographer using large format 4" x 5" cameras for maximum detail. Striking colour and high-tech black and white photographs have been designed in an informative way that makes sense to woodworkers. All of our masterpiece chisels are photographed next to each other, in colour, for comparison. All of our masterpiece planes have their blades and subblades closely photographed for detail, separate from their wood bodies. Our select and aged tool woods are elegantly photographed in colour. We've included rare photographs of the master Japanese toolmakers we alone have personally met, interviewed, and photographed for history. Even the thick glossy paper is exceptional, and the pages are far wider than all other tool catalogues. Our catalogue had to be the best, we sell historic tools, we sell tools with souls.

Send \$5 today for our new MASTERPIECE TOOLS PHOTO CATALOGUE, and Volume 1, Editions 1 to 5 of our Masterpiece Tools Newsletter will be included at no extra charge.

3 Master Craftsmen have just visited from Japan and all agreed that our selection of MASTERPIECE TOOLS is the finest selection of tools in the world, including Japan. You're welcomed to visit us too!



MASTERPIECE
TOOLS

SUNCOOK,
N.H. 03275 USA
(603) 736-8227

NEW! ELEKTRA U.S.A.

The advanced technology woodworking system. One motor (2 1/2 h.p.) powers a complete range of woodworking machines.

Jointer/Planer/Thickneser
\$1023.50

Spindle Shaper
\$758.00

Lathe \$326.50

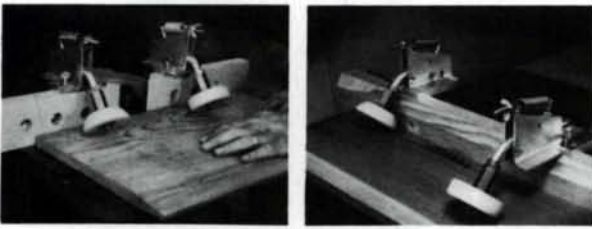
Unimex Motor
\$226.50

Also available: Bandsaws, Dust Extractors. See these machines demonstrated at the following shows: Houston, Jan. 11-13; Boston, Jan. 18-20; Wash, DC, March 1-3; Pasadena, CA, March 1-3; San Francisco, March 8-10; Dallas, March 29-31. Call 1-800-223-8600. Send \$1.00 for catalog. ELEKTRA BECKUM USA CORP. Dept. TJF, PO Box 24, Somerdale, NJ 08083

Shop helper U.S. PAT. #3-738-403

Safety Guides

Anti-Kickback Stock Feeder



SAVE TIME! SAVE MATERIAL!
LIKE HAVING AN EXTRA PAIR OF HANDS!

Keep your fingers away from cutters. Let Safety Guides hold your work. Use your hands to feed and control the operation. Push stock through Safety Guides with a follow board.

WORK WITH CONTROL!
 Safety Guides provide control, stability, and smoothness in ripping and cutting operations. It helps eliminate uneven cuts binding and chatter of material when hand feeding power machinery.

WORK WITH CONFIDENCE!
 The spring loaded SINGLE DIRECTION BALL BEARING WHEELS will not reverse, the hard composition wheels hold work down and against the fence without marring or marking.

WORK SAFELY!
 SHOP HELPER Safety Guides hold work down firmly helping to assure safe handling of stock on: table saws, band saws, shapers, motorized mitre boxes, jointers, etc. SHOP HELPER Safety Guides meet CAL-OSHA requirements as an Anti-kickback device when properly mounted and adjusted.

\$79.50
 Includes: One pair of Safety Guides with long mounting brackets and hardware, instructions for use and plans for auxiliary fences.
Extra Sets of Mounting Brackets - Long: \$12, set; Short: \$8, set.
 Satisfaction Guaranteed or return within 30 days for a full refund.

SAFETY IS A MATTER OF SELF-RESPECT!
 To Order: VISA/MC Call Toll Free: 800-344-7455; Calif: 800-828-8833
 For Free Brochure Write: P.O. Box 1202, Tulare, CA 93275

TOOLS ON SALE™

AMERICA'S LOWEST PRICED TOOLS

★ PLUS ★ ... FREE ... Freight On Every Item



#0155001
FW 500

WAGNER
ELECTRIC AIRLESS SPRAYER KITS

Series 50 Fine Finish — 6 pc. Outfit — Furniture touch-up woodwork and staining 3.5 oz./min. **List \$3 ★ SALE \$5**

Series 100 Handi-Duty — 7 pc. Outfit — sprays latex & oil paint, stains, varnishes, etc. for furniture, fences, toys & shutters 7.5 oz./min. **List \$127 ★ SALE \$75**

Series 200 Heavy-Duty — 10 pc. Outfit — for big jobs, for oils, stains, varnishes. Cover large surface areas fast — 10.75 oz./min. **List \$154 ★ SALE \$95**

Series 300 Pro Duty — 14 pc. Outfit — tungsten carbide piston and cylinder resists scoring by abrasive paints — 10.75 oz./min. **List \$208 ★ SALE \$129**

W-500 POWER PAINTER — This elec. airless unit contains all the equipment you need to get the big job done. Delivers 1/2 gal./min to 2500 psi, incl. G-05 spray gun, adj. carbide tip & 25' hose. **List \$79 ★ SALE \$419**

0155001 POWER ROLLER — Pressurized roller system with 18' hose. **List \$117 ★ SALE \$65**

★ **NEW LOW PRICES** ★

PONY CLAMP FIXTURES Lots of 12

#50	for 3/4" Black Pipe	List	Sale
#50	for 3/4" Black Pipe	11.23	7.40
#52	for 1/2" Black Pipe	8.36	6.10

JORGENSEN HAND SCREWS

Jaw Length	Open Cap.	List	Sale	Box of 8	
#5/0	4"	2"	11.50	7.25	30.15
#4/0	5"	2 1/2"	12.45	8.10	43.75
#3/0	6"	3"	13.35	8.50	46.95
#2/0	7"	3 1/2"	14.35	8.95	48.35
#0	8"	4 1/2"	15.97	9.95	53.75
#1	10"	6"	18.25	11.35	61.25
#2	12"	8 1/2"	20.94	13.50	72.95
#3	14"	10"	23.58	16.75	81.35
#4	16"	12"	34.55	23.75	120.25

JORGENSEN BAR CLAMPS
STYLE 37 — 2 1/2" Throat 1/4" x 3/4"

	List	Sale	Lots of 8
#3706	6"	7.88	5.50
#3712	12"	8.73	5.95
#3718	18"	9.84	6.95
#3724	24"	10.54	7.35
#3730	30"	11.76	8.25
#3736	36"	12.85	8.95

STYLE 39 — 3 1/2" Throat 5/16" x 1"

	List	Sale	Lots of 8
#3906	6"	18.88	12.95
#3908	8"	19.45	13.50
#3912	12"	20.69	14.50
#3918	18"	22.55	15.95
#3924	24"	24.45	17.25
#3930	30"	26.18	18.35

STYLE 45 — 5" Throat 5/16" x 1 3/8"

	List	Sale	Lots of 8
#4506	6"	22.40	15.95
#4508	8"	23.94	16.50
#4512	12"	23.85	17.50
#4518	18"	25.18	18.95
#4524	24"	26.81	20.95
#4530	30"	28.06	21.95
#4536	36"	29.54	22.95

PORTER-CABLE List Sale

314	4 1/2" Trim Saw 4.5 amp	180	115
587	7 1/4" circ. saw 14.5 amp	180	130
315-1	7 1/4" circ. saw 13 amp	159	104
368-1	8 1/4" circ. saw 13 amp	180	119
9548	HD v/s bayonet saw w/case	255	179
648	H.D. single speed bayonet saw 3 amp	255	180
9627	2 sp. tiger saw kit 8 amp	183	120
338	3" x 21" belt sander	184	115
337	3" x 21" belt sander w/bag	174	115
361	3" x 24" belt sander	248	175
360	3" x 24" belt sander w/bag	289	180
363	4" x 24" belt sander	289	180
382	4" x 24" belt sander w/bag	284	180
505	H.D. 1/2 sheet finish/sander	155	105
330	spd bloc sander 1/4 sheet sz	85	56
304	Professional 7" disc sander	150	105
305	Professional 7" polisher	150	105
7511	3/8" xtra hvy v/s drill 5.2 amp	148	100
7554	1/2" xtra heavy drill 8 amp	195	135
309	3.8 amp laminate trimmer	115	80
310	3.8 amp laminate trimmer	180	130
312	offset base laminate trim.	195	135
319	tilt base laminate trimmer	205	140
187	block plane 2.5 amp	129	80
9652	Versa-Plane Kit	419	285
9118	Porta Plane Kit	289	195
518	NEW 3 hp speedtronic 5 spd microprocessor prod/router 10-13-16-19-22,000 rpm	475	325
520	NEW 3 hp production router	435	275
100	7/8 H.P. router	124	88
690	1 1/2 H.P. router	179	130
536	1 1/2 H.P. speedmatic router	295	210
537	1 1/2 H.P. D-Hdle router	310	218

DRYWALL SHOOTERS

7544	5.2 amp — 2500 r.p.m.	148	100
7545	5.2 amp — 0-2500 r.p.m.	148	100
7546	5.2 amp — 4000 r.p.m.	148	100

BLACK & DECKER List Sale

3050	6 1/2 worm/drv saw 12 amp	247	160
3051	7 1/4 worm/drv saw 13 amp	232	149
3052	8 1/4 worm/drv saw 13 amp	247	160
3030	7 1/4 circ saw 13 amp	NEW 155	100
3047-09	7 1/4" super Sawcat circular saw	226	150
3048-09	8 1/4" super Sawcat circular saw	240	160
3157-10	v/sp orb. jlg saw 4.5 amp	174	115
3153-10	v/speed jlg saw 4.5 amp	158	105
3934	14" chop saw 13 amp 3800 rpm	279	169
1321	1/2 rev spade hdl drill 6 a.	175	115
4010	sander palm grip w/bag	80	49
4015	finish sander 1/2 sheet 10,000 orbits	180	110
2037	drywall 0-4000 rpm 4.5amp	139	89
2034	drywall 0-4000 rpm 3.5amp	121	69
1940	3/8 cordless drill kit 800rpm	157	100
1920	3/8" cordless drill kit 1850 r.p.m.	157	100

RECORD VICES
QUICK RELEASE - FRONT DOG TYPE

Model	Jaw Width	Jaw Open.	List	Sale
52D	7"	8"	69	49
52 1/2D	9"	13"	83	65

MARPLES WOOD CHISELS
 Walled Set of 5 (1/4" - 3/8" - 1/2" - 3/4" - 1") Model (all with bevel edge) List Sale

MR222/S5	Ash handle	22.70	15.95
M 444/S5	Polypropylene handle	33.50	21.95
M 373/S5	Splitproof handle	40.85	26.95
M 377/S5	Boxwood handle	51.40	33.95

"DOWL-IT" Dowel Jigs List Sale

1000	Self-centering	33.95	24.95
2000	Self-centering	42.95	32.95

★ **X-TRA SPECIAL** ★ List Sale

7715	9" Dewalt Power Mitre Box	198	125
------	---------------------------	-----	-----

1985 TOOL CATALOG AVAILABLE
 Call Toll-Free 1-800-328-0457 — In Minnesota Call (612) 224-4859
 4 WAYS TO BUY: CHECK — MONEY ORDER — VISA — MASTERCARD
SEVEN CORNERS ACE HDW. Inc.
 216 West 7th St. • St. Paul, MN 55102 • Est. 1933

Mason & Sullivan

DOUBLE YOKE MOVEMENT NEW



NEW

The finest instruments available, to fit the finest cases made.

When you're ready for the best, We're ready for you.

Send \$2 to receive a one year subscription to our 56-page color clockbuilding supply catalogue. Includes clock kits, dials, movements, weather instruments, hardware, tools, books and accessories.

REPRODUCTION ADMIRAL FITZROY MERCURY BAROMETER

Mason & Sullivan
 "Serving Fine Clockmakers Since 1947"
 Dept. 2141, W. Yarmouth, Cape Cod, MA 02673



Factory Lumber Outlet

"Woods of the World"

200 SHREWSBURY STREET
BOYLSTON, MASSACHUSETTS 01505

We stock over 100 species of domestic & exotic woods including:

- All Domestic Woods
- Apple
- Balsa
- Bengé
- Brazilian Rosewood
- Bubinga
- Ceylon and African Ebony
- Ceylon Satinwood
- Cocobolo
- Curly and Birds Eye Maple
- East Indian Rosewood
- English Brown Oak
- European Pearwood
- Goncalo Alves
- Holly
- Honduras Mahogany
- Honduras Rosewood
- Iroko
- Jelutong
- Macassar Ebony
- Mahogany
- Mexican Rosewood (Bocote)
- Padouk
- Philippine Mahogany
- Purple Heart
- Shedua
- Teak

During more than a half century as millwrights and cabinetmakers, we have become experts in acquiring and working with the finest hardwoods and softwoods. Our knowledge of the best domestic and worldwide sources of rare woods is without peer. The large volumes in which we buy fine woods affords us the best possible prices which, in turn, we pass along to you. Lac-carino and Son is also your source for the finest lines of high quality woodworking hand tools.

Call For Free Catalog

(617) 869-2791

TOLL FREE:

In Mass. 1-800-521-0039
New England 1-800-222-1420



TABLE SAW TECHNIQUES

The only guide you'll ever need!

For the ten million table saw owners in the United States here is a veritable **encyclopedia** packed with the latest information on every model of table saw, every kind of blade, every accessory, and every technique ever developed, with 700 illustrations and 352 pages of the most complete solid, readable instructions; including close-up photographs, easy-to-follow diagrams, superb draftsman quality drawings, floor plans and patterns. You'll quickly learn how to make the table saw simply and facilitate every project without adding additional expensive equipment. Here's what's covered in this amazingly complete book:

- Types of saws—advantages and disadvantages
- Controls and accessories
- How to select and maintain blades and accessories
- How to maintain the saw itself
- How to buy a new or used saw (including specially designed buyer checklist)
- Design and construction of table saw jigs
- Basic through advanced operations: cuts, mitering, joints, etc.
- How to solve problems

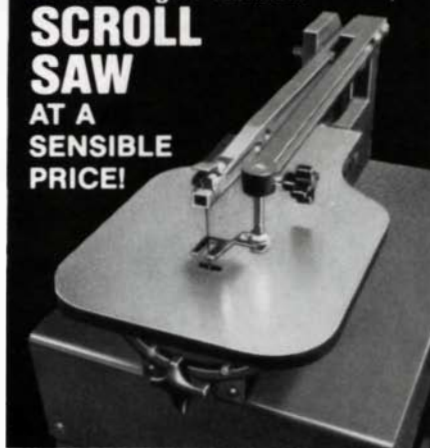
Nothing is left out. The author includes tips, pointers, special set-ups (some used only rarely in a woodworker's lifetime) and a vast number of techniques that represent the combined knowledge of numerous contributing master cabinetmakers and woodworkers.

Using jigs and accessories, you can learn to make a host of such exciting projects as picture frames, brush holders, night stands, gun cabinets, small tables, bathroom cabinets, kitchen work tables, chests of all sizes, storage trunks and wall clocks.

Nor is this book for master woodworkers only. Even small details such as safety latch position, how to choose the right table for you, how to cut different types of wood and much more are included. So if you want to get the absolute most out of the table saw you already own or intend to buy, act now. **Send \$14.95, Free Freight!**

STERLING PUBLISHING CO., INC. Dept. FW4
Two Park Ave., New York, NY 10016

**NEW! High-Precision
SCROLL
SAW
AT A
SENSIBLE
PRICE!**



30-DAY FREE TRIAL!

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 is virtually unnecessary!

The new Woodmaster Model 1600 gives you a big 16-in. throat capacity, 2-in. cutting depth, a generous, oversize worktable, ball-bearing drive... and much more! Made in U.S.A. **Easy Terms.**

Send today for free information kit!

Phone Toll Free 1-800-824-7888 Oper. 642

Woodmaster Tools, Dept. CE5
2908 Oak, Kansas City, MO 64108

Name _____
Address _____
City/State _____ Zip _____



CARVE RUSTIC SIGNS In seconds with Guide-All II

3D Carving System \$225.00 (20" x 32" model). Also 3 larger sizes. Router not included.

Guide-All II is fast, safe, rugged and accurate. Does it all, incised letters, raised letters, cut-out letters, murals, etc.

Send \$1.00 for brochure & price list.

THE RUSTIC SHOP
7431 Artesia St., Buena Park, CA 90621
(714) 521-1464

MAKE TOYS & WOOD PROJECTS

7 CAR TRAIN

\$6—Plan only
\$26.50—Plan & turned parts
(92 parts in all!)



62" long

100's of plans, kits, colored and unfinished hardwood parts for toys, crafts and furniture (Colonial, Shaker, primitive & modern). Bulk Prices available. Color catalog \$1. (614) 484-1746

Cherry Tree Toys, Box 369-19, Belmont, OH 43718



Furniture Hardware Chair Cane Lamp Parts



Catalog: \$2.50 3rd Class
or \$3.50 1st Class.

7818 Bradshaw Rd., Dept. B4
Upper Falls, Md. 21156/(301) 592-8505

Your own
Personalized
**BRANDING
IRON**



Several styles
and sizes available
Send for brochure

TURNING POINT, INC.
BOX 9303B • FARGO, ND 58109
701-645-2319

THE MOST INNOVATIVE PRODUCTS FOR WOODWORKERS

TOY PLANS
BOOKS
VIDEO
TOOLS
POWER TOOL JIGS



DECRISTOFORO DESIGNS

27082 HORSESHOE LANE NO. 7
LOS ALTOS HILLS, CA 94022-9990

1984 CATALOG \$1.00

KLAMP-KIT

14" JAW LENGTH — JAWS OPEN TO 10"



DO-IT-YOURSELF KIT INCLUDES

- 2 3/8"-12 Acme threaded rods • 2 tension pins
- 4 specially threaded pivot nuts
- Easy to follow instructions for making & assembling the jaws & handles from your wood

ONLY \$9.95

ppd. SATISFACTION GUARANTEED

To order, send \$9.95 per kit (WI residents add sales tax) VISA or MASTERCARD accepted.

ROCKLEDGE CO., INC.

Box 56, Dept. F Milwaukee, WI 53201



Develop a profitable second income in your spare time making small, unique bandsaw boxes. This unpublicized, little-known technique allows you to turn common inexpensive lumber and scraps into valuable utility boxes for the home and office. High demand in gift shops, stationery stores and craft fairs. Fully illustrated instruction booklet of 15 original and profitable designs. Satisfaction absolutely guaranteed. Send \$10.00 to **Box-Art, Dept. W, Box 8069, Woodridge, IL 60517.**

Professional Furniture Restoration

There is an appreciation, a true satisfaction from working with wood. We at Kwick Kleen have helped over 1,000 shop owners into this exciting profession. If you would like to join us, just give us a call or write for our catalog.

For your catalog, send \$1.00 to

**KWICK KLEEN
INDUSTRIAL SOLVENTS
Dept. 10
P.O. Box 905 Vincennes, IN 47591
Call Toll Free: 1-800-457-9144
Indiana Collect: 1-812-882-3987**

THE PHOENIX CLOCK



Think of the fascinating ways
the clock can be exhibited!

An adult kit—Unequaled in quality and value at any price.
Capable of 3 sec./day accuracy.

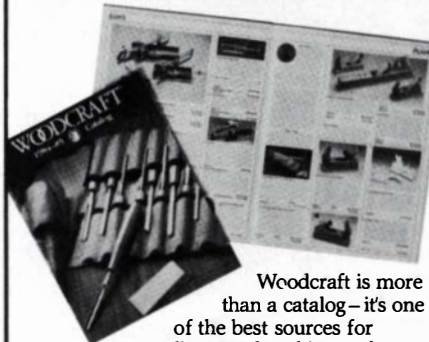
See p. 23 March, p. 93 July issues.

Send \$2.00 for color brochure
and literature.

KASSNER WOODCRAFT, INC.

Rt. 4, Box 73, Rolla, MO 65401

MORE THAN A CATALOG...



Woodcraft is more than a catalog—it's one of the best sources for quality woodworking tools you'll ever discover. We're your source for everything from bit braces to wood borers, from saws to sharpening stones. Every item is crafted to meet precise standards of excellence, and backed by our guarantee of satisfaction. Some people may call this a catalog, but if you're a woodworker we think you'll call it indispensable.

☐ Please send me your FREE tool catalog.

Name _____

Address _____

City _____

State _____ Zip _____



WOODCRAFT®
Dept. FW15, 41 Atlantic Avenue,
Box 4000, Woburn, MA 01888

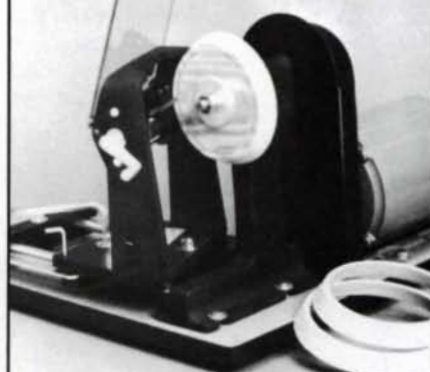
RING MASTER

"The second new idea
in power woodworking
to come along in 100 years."

Cut Perfect Rings In Any Wood...
any angle, any size up to 1" thick, 12" diameter.

1

Cut flat wood into angle or straight-edged rings, stack the rings and create ANY HOLLOW CYLINDRICAL SHAPE... Just glue, sand and finish... create matched sets of items.



Ring Master is simple to operate. Only 2 adjustments to set up, 3 operating steps to cut rings.

In just two years **Ring Master** is the center of attention in SCHOOLS, BUSINESS, and HOMES, AND is a welcome profit-maker for many—

NOW Ring Master Model 2 works on your **Shopsmith® Mark V. OR SIMILAR MACHINE**—attaches in 15 seconds.



Mr. B.W.H. of Santa Barbara, Cal. recently wrote about the Model 2: "Ring Master — is a new and fantastic machine — it fit(s) on the Shopsmith, it has simplicity and durability incorporated into it — I find it a tremendous addition to my woodworking shop."

3 To request a color brochure or to order —
PHONE TOLL FREE 1 800 854 9815,
in Florida 305 859 2664.
We honor Visa, Master Card,
personal check and COD.

Ring Master, Inc.
P.O. Box 8527A, Orlando, FL 32856, 305/859-2664

Please send me complete facts about the ALL NEW Ring Master.

Name _____

Address _____

City _____ State _____ Zip _____

Ring Master DEALERS wanted in all areas.

New Carbide Tipped "Cost

These New Cutters by Freud are a concept of precision.

Our outstanding workmanship and unsurpassed technology, combined with new production methods, have made us the leading manufacturer of carbide cutting tools in the world.

Our team of engineers have developed these new Cutters with the cabinetmakers in mind.

The tungsten carbide tips have been particularly selected to cut tough, hard, and abrasive materials.



Certification of quality.

Genuine Freud Cutters are made only from the finest materials and highest grade of carbide. Our cutters are specially designed to meet exclusive individual operational requirements of most shapers.

Why our cutters?

Our basic cutter bodies are machined to maximum precision and tipped with new induction methods.

Every cutter is built with an anti-kickback design, therefore eliminating the danger of kickbacks.

Cutters are made for the industrial user and are stocked by our distributors nationwide.

Ball bearing rub collars are available. See list for details.

We are now able to sell these cutters at a very special low price because of our know-how, mass production and unsurpassed technology.

Each "cost cutter"

is made to instrument-perfection accuracy, balanced, and quality control tested. Exact attention has been given to every detail.

Check these exclusive features:

Lowest prices

Affordable to every small shop, professional shop and home workshop. Up to 50 times the life of steel at only a few dollars more.

Innovative design

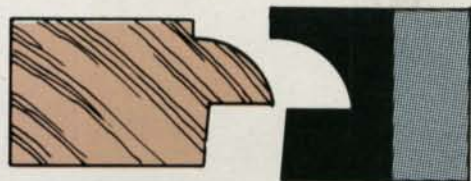
Unique design makes these cutters safer and easier to use eliminating dangerous kickbacks.

Most popular models

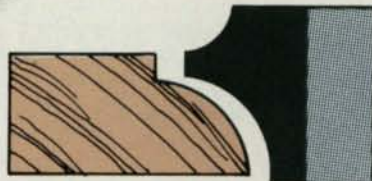
All cutters are 3 wings and with the exception of EC-034 will fit $\frac{3}{4}$ or $\frac{1}{2}$ spindle.

Carbide

All cutters are carbide tipped with new induction methods vs. brazing. We use a special C2 micrograin for smoother finish and longer life. The edge is honed with a 400 grit size diamond wheel. Carbide is .100 of an inch thick.



EC-001



EC-044



EC-005



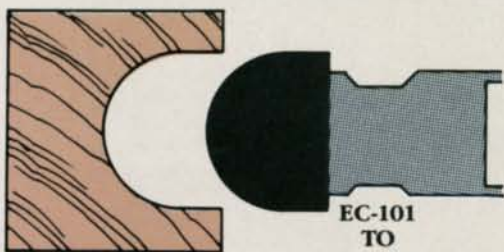
EC-031



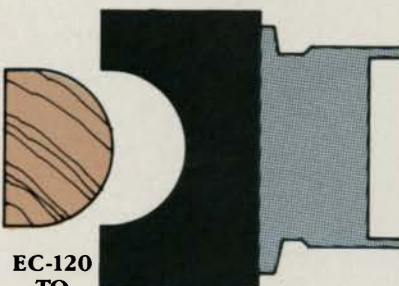
EC-032



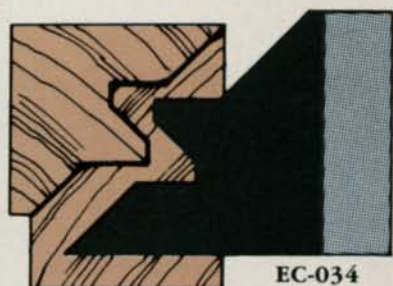
EC-033



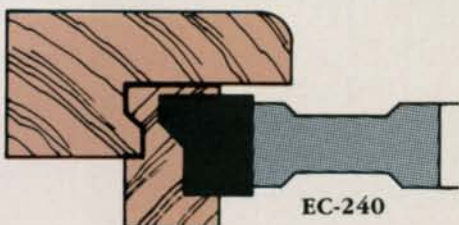
EC-101
TO
EC-105



EC-120
TO
EC-124



EC-034



EC-240



EC-140
TO
EC-146

Cutters" From *freud*[®]

Professional Carbide Cutters

Item No.	Description	List Price	SALE
EC-001	DOOR LIP CUTTER	62.00	49.00
EC-005	ROMAN OGEE CUTTER	58.00	46.00
EC-031	REV. GLUE JOINT	60.00	49.00
EC-032	WEDGE TONGUE CUTTER	68.00	54.00
EC-033	WEDGE GROOVE CUTTER	68.00	54.00
EC-034	LOCK MITER SET (FOR 1/4" SPINDLE ONLY)	120.00	99.00
EC-044	1/4 AND 1/2 QUART. ROUND	72.00	58.00
EC-101	1/8 RADIUS CONVEX	50.00	40.00
EC-102	3/16 RADIUS CONVEX	56.00	45.00
EC-103	1/4 RADIUS CONVEX	61.00	49.00
EC-104	3/16 RADIUS CONVEX	68.00	54.00
EC-105	1/8 RADIUS CONVEX	74.00	59.00
EC-120	1/8 RADIUS CONCAVE	54.00	44.00
EC-121	3/16 RADIUS CONCAVE	58.00	46.00
EC-122	1/4 RADIUS CONCAVE	62.00	49.00
EC-123	3/16 RADIUS CONCAVE	66.00	55.00
EC-124	1/8 RADIUS CONCAVE	70.00	56.00
EC-140***	1/4 STRAIGHT EDGE	44.00	35.00
EC-141***	3/8 STRAIGHT EDGE	48.00	39.00
EC-142***	1/2 STRAIGHT EDGE	52.00	41.00
EC-143***	3/4 STRAIGHT EDGE	56.00	45.00
EC-144***	1 STRAIGHT EDGE	60.00	49.00
EC-146***	1 STRAIGHT EDGE	64.00	51.00
EC-202**	1/8 STOCK RAISED PANEL	122.00	109.00
EC-209**	1/4 STOCK RAISED PANEL	122.00	109.00

Item No.	Description	List Price	SALE
EC-210**	1/4 STOCK RAISED PANEL	122.00	109.00
EC-211**	1/4 STOCK RAISED PANEL	122.00	109.00
EC-212**	1/4 STOCK RAISED PANEL	122.00	109.00
EC-213**	1/4 STOCK RAISED PANEL	122.00	109.00
EC-240	DRAWER LOCK CUTTER	64.00	51.00
EC-260*	1/4 STOCK STILE & RAIL	246.00	198.00
EC-266*	1 STOCK STILE & RAIL	280.00	249.00
EC-270*	1 1/8 STOCK STILE & RAIL	280.00	249.00
EC-274*	1 1/4 STOCK STILE & RAIL	280.00	249.00

RC-001*	BALL BEARING RUB COLLARS	42.00	39.00
RC-002**	BALL BEARING RUB COLLARS	42.00	39.00
RC-003***	BALL BEARING RUB COLLARS	42.00	39.00

Service

Our technological superiority does not end with the manufacturing of the world's best tools. An example of this is a coast to coast computer satellite connection. Our toll free lines are open to the millions of woodworkers in need of information or technical advice. Freud products are sold exclusively through a network of selected dealers.

Call Us Toll Free!

FOR THE NAME OF YOUR LOCAL DISTRIBUTOR:

In California: 1-800-824-0141
 If You Live In This Area: 1-800-824-8045
 If You Live In This Area: Call Toll Free (Outside NC) 1-800-334-4107



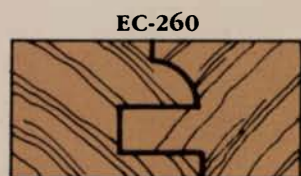
freud usa

218 Feld Ave., High Point, NC 27264
 (919) 434-3171

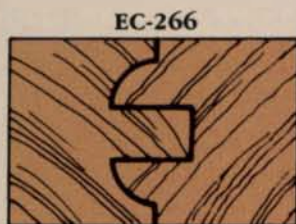
1570 Corporate Dr., Suite G
 Costa Mesa, Cal. 92626
 (714) 751-8866

ON SALE: Now through April 30, 1985 save on any of these new cutters.

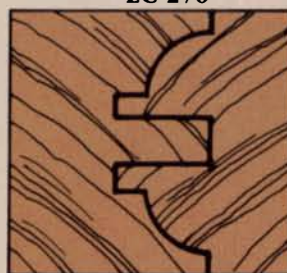
NOTE: Molding patterns shown are actual size.



4 Pcs. Set



5 Pcs. Set



5 Pcs. Set



5 Pcs. Set



EC-202



EC-211



EC-209



EC-212



EC-210



EC-213

BOOKS ON SALE

All prices post paid. Call for other prices.

Techniques 1-6 \$15 ea. (list \$17). All 6	\$86.00
NEW Butz — Carve Wood (list \$14)	\$12.50
NEW Dunbar — Windsor Chair (list \$14)	\$12.50
Tage Frid — Joinery or Shaping (list \$18)	\$16.00
Both books	\$30.00
Odate — Japanese Tools (list \$23)	\$20.00
Watts — Houseful of Furniture (list \$19)	\$17.00
Design III — (list \$14)	\$12.50
Hoadley — Understanding Wood (list \$20)	\$18.00
Cary — Kitchen cabinets (list \$12)	\$10.50
Spielman — Router Handbook (list \$10)	\$9.00
Nakashima — Soul of a Tree (list \$52)	\$46.00
Sam Maloof — Woodworker (list \$50)	\$44.00
Dale Nish — Woodturning (2 books) (list \$29)	\$26.00
Krenov — Set of 4 books in paper back (list \$54)	\$45.00

All prices including shipping

SALE on **freud**

LM 72M — 10" Rip 24t \$42
 LU 85M — 10" Crosscut 80t \$72
 LU 73M — 10" Crosscut 60t \$45
 LU 84M — 10" Combi 50t \$45
 Shopsmith Owners — Add \$8 ea. for 1/4 arbor
 AD 800 — 8" Adjustable dado \$40 (Reg. \$63)
 OS 308 — 6" Dado set \$98 (Reg. \$140)
 OS 308 — 8" Dado set \$120 (Reg. \$170)

MANNY'S WOODWORKER'S PLACE
 602 S. Broadway, Lexington, Ky. 40508
 Hours: 10 - 5:30 Mon-Sat
 VISA, MasterCard, Checks, COD (\$2)
 Ask for free sales brochure.

ORDER TOLL FREE
 1-800-243-0713
 In KY call
 606-255-5444

REAL WOODS

A division of **BROOKSIDE VENEERS, LTD.**

VENEER EXOTIC & DOMESTIC

3' x 7' Faces in: RED OAK, WALNUT, & MAPLE

Specializing in **BROOKLINE VENEERS**

Mail order, retail, all inquiries are welcome.

REAL WOODS

215 Forrest St., P.O. Box 908

Metuchen, N.J. 08840

phone: 201-494-3730



WETZLER

ASK FOR FREE CATALOG
 SOLD THROUGH LEADING DISTRIBUTORS
WETZLER CLAMP CO., Inc.

P.O. Box 6
 Scarsdale, N.Y. 10583
 TEL. 212-784-2874

BOSCH/PHILIPPS BROS.

NEW YEARS RESOLUTION:

"To save you more than ever before!"

ORBITAL ACTION VS JIG SAWS TOP HANDLE, #1581VS



• 4 position orbit
 • 500-3100 S P M

LIST \$225 *

SPECIAL
\$135.00

1-3/4 H.P. ROUTER, #1604



- Captive templet
- Raised index pointer
- Large sub-base
- Standard equipment
 1/4" Collet, 1/2" Collet
- Two wrenches

LIST \$199 **

SPECIAL
\$115.00

BARREL GRIP, #1582VS



LIST \$209 **

SPECIAL
\$125.00

3/8" DRILL, #1158 115V AC



- RPM 0-2
- 100 variable speed
- Fully insulated
- UL Listed
- OSHA

LIST \$85 **

SPECIAL
\$49.00

Check or Money Order



All Orders P.P.D.

PHILIPPS BROS. SUPPLY, INC.

Construction and Industrial Supplies

3159 BAILEY AVE. • BUFFALO, NY 14215 • 716/834-8353



Est. 1927

WOODWORKER'S DREAM STORE



THE CUTTING EDGE®

Fine Hand & Power Tools
Books ★ Classes ★ Hardwoods

*Inca • Hegner • Vega • Onsrud
 Biesemeyer • Freud • Bosch • Makita
 Lamello • Cutting Edge Workbench Kit*

LOS ANGELES 90066
 3871 Grand View Blvd.
 (213) 390-9723

SAN DIEGO 92126
 7626 Miramar Rd., #3500
 (619) 695-3990

PIN ROUTER

**Speed and Precision at a
 Small Shop Price.**

With the Award Winning Onsrud
 Inverted Router, templates are so
 simple it is economical to reproduce
 one part or hundreds.
 Call or write for our free
 literature today.

MODEL 2003



(704) 528-6170

P.O. Box 416 Troutman, N.C. 28166



We Dare You — to find a better 8" Jointer than ours at even twice our price!



- 8" x 65" Heavy Duty Cast Iron Bed.
- Beds are stress relieved and precision ground for the ultimate in accuracy.
- Exclusive quick setting levers for raising and lowering the tables.
- Powerful 1 1/2 H.P. Single Phase Motor.
- One piece stand has chip-chute for quick disposal.
- Large 3 blade cutter-head has lubricated-for-life ball bearings.
- Weighs close to 500 lbs. — certainly not a toy!

Model G1018 Only \$575.00

(F.O.B. BELLINGHAM)

This is an old price and will be going up soon. Call for low freight rates!



Call for
Low Freight
Rates on
these 2
machines.



Dust Collection Systems

These powerful yet lightweight dust collectors are the answer to your messy shop. Chips get sucked in, whirl around the top bag and fall through a funnel into the bottom bag which can be removed for easy dumping. Bags are 19" in diameter and 35" high each.

3 super models and all are single phase power. All units come with casters making these very portable.

Model G1028 — 2 Bags/1 H.P. — \$295.00

Model G1029 — 2 Bags/2 H.P. — \$355.00

Model G1030 — 4 Bags/3 H.P. — \$455.00

(ALL ABOVE PRICES ARE F.O.B. BELLINGHAM)

Our merchandise is fully guaranteed with local parts and service back-up right in our warehouse. We also sell 15" planers, carbide-tipped saw blades, table-saws, lathe chisels, sanders and much more — All at super low prices. Send \$3.00 for our fully loaded 1985 color catalog! We import and sell direct to the users.



GRIZZLY IMPORTS INC.

P.O. BOX 2069, BELLINGHAM, WA 98227 • PHONE (206) 647-0801

PHONE YOUR ORDER IN USING YOUR VISA OR MASTERCARD OR SEND A MONEY-ORDER, CERTIFIED CHECK OR BANK DRAFT FOR INSTANT DELIVERY. PAYMENT BY REGULAR CHECK WILL DELAY SHIPMENT APPROXIMATELY 3 WEEKS.



Build What You Need! Restore, Refinish What You Own! Do It Yourself and SAVE!

New Catalog Has Everything

See page after page of hard-to-find products plus plans and instructions.

Cabinet and furniture woods. Mahogany, walnut, cherry, maple, oak, teak, rosewood, padauk, etc. Kiln-dried, 1/4" to several inches some kinds.

Veneers. Colorful, richly grained. 79 kinds, 3-ft. lengths. 19 flexible veneers to 36" wide, 8 ft. long (cover beatup surfaces and unpainted furniture) 11 fancy burls & crotches. 16 exotic veneers. 7-ft. long.

hardwoods veneers hardware shop equipment inlays wood finishes moldings how-to-books specialty hand tools cane and so much more.

Carving blocks, 54 sizes & kinds. 118 carving tools & chisels. 32 upholstery tools & essentials. 39 clamps. 13 turning squares 1" to 4" sq.

76 assembled inlay designs. Birds, floral, scrolls, animals, chess & card pips, butterfly, Madonna, sunburst, Zodiac, eagle, professional, fraternal.

Wood finishes. Period & modern hardware. Latches, locks, hinges, pulls, escutcheons. Music instrument woods. Small box hardware. 72 lamp parts.

96 how-to books: cabinetmaking, furniture, crafts, carpentry, shop techniques.

Wood picture kits. 73 appealing subjects. Some pre-cut, ready to assemble. Others are marquetry kits for you to cut and assemble.

Picture molding. Prefinished. 33 beautiful styles. 500 plans: furniture, cabinets, shelves, toys, desks,

IF YOU are at all handy with tools—or willing to learn in easy steps—here's the modern-day way to SAVE considerable sums of money. Build what you need. Restore and refinish what you own. Save on every project.

Everything you need—fine woods, veneers, specialty tools, wood finishes and how-to guidance—can be ordered by mail from Constantine. Read this partial list.

workbenches, period reproductions, cradle, clocks, home bars, Boston rocker, beds, etc.

Old-time icebox restorator pop up kitchen shelf hardware

18" hole cutter attachment maple plywood, 8 sizes. 1/4" Balsa wood, 19 sizes.

Cane, fiber rush, round re-

116 Pages



Woodworker CATALOG

CONSTANTINE Est. 1812

2065 Eastchester Road, Bronx, N.Y. 10461

Send Woodworker Catalog. \$1 enclosed

Double Your Money Back!
\$2 Refunded on 1st Catalog Order

Get \$2 BACK

Name

Address

City.....State.....Zip.....

Order \$1 Catalog NOW

\$2 Refunded

Double Your Money Back!

\$2 Refunded on 1st Catalog order

CONSTANTINE

\$2 Refunded. Double Your Money Back. \$2 Refunded. Double Your

*Who wants to spend
\$1,000 on a
Japanese plane?*

Even experienced Japanese temple builders would spend only about \$200 on one.

Wake up American Woodworkers!

Don't be misled by boastful advertisements or fancy boxes.

Please have eyes to see the real craftsman's tools.

**SHINDO SAW CO.
FUJIHIRO CHISELS
LOBSTER STONES
KOBAYASHI PLANES
NIWATORI STEEL INC.
MORI NATURAL STONE CO.**



HIDA JAPANESE TOOL CO.
1333 San Pablo Avenue
Berkeley, CA 94702
(415) 524-3700
Catalog \$2

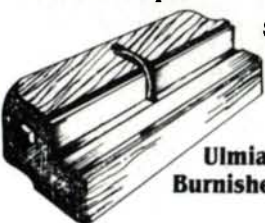
Gooseneck Scraper



Sandvic Scraper

**Set Price
\$40⁰⁰ppd.**

Offer expires
Feb. 28, 1985



**Ulmia Wheel
Burnisher**

**FINE TOOL &
WOOD STORE**

7923 N. May Ave.
Oklahoma City, OK 73120

To Order
Call Toll Free

800-255-9800

in Oklahoma Call 405-842-6828 Collect

Send \$2.00 for our Catalog.

Create A Classic



Full size patterns for Packard Le Baron and 1929 Chevy Truck, plus a catalog of over 100 wooden toy patterns, wooden wheels, axle pegs, people, and other hardwood turnings. Send check or money order for \$10.00 for both patterns and catalog, or \$1.50 for catalog.

TOY DESIGNS - Dept. F85, Box 441
Newton, Iowa 50208



BUTTERNUT, WALNUT, ROSEWOOD, PINE, CHERRY, BUCKEYE and about a dozen other woods in boards, slabs and freeform cut ovals. Pieces up to 6" thick, 3' wide and 16' long in some species. We specialize in coffee tables, benches, bars, carving stock, clock ovals and movements, accurately cut for you to finish. We sell by mail and from our fantastic wood "museum," 9-5 Mon.-Sat., 11-4 Sun. Send 50¢ in coin or stamps for brochure. No checks, please.

WEIRD WOOD, Box 190FW
Chester, Vt. 05143, 802-875-3535

**CABINETMAKER'S HARDWARE
AND SPECIALTY ITEMS**

Hinges, Drawer Slides, Cabinet Pulls.

- Grass • Amerock • K&V
- Hafele • Ajax • Grant

SUN GOLD ABRASIVES

ELU PLATE JOINTER . . . \$350.00

LEIGH DOVETAIL JIGS

Colonial Bronze Solid Brass Cabinet Pulls

Clamps by Destaco and Wetzler

Corner Cabinet Lazy Susans by: Hafele, Amerock, Ajax

Duofast Pneumatic Tools • 3M Products

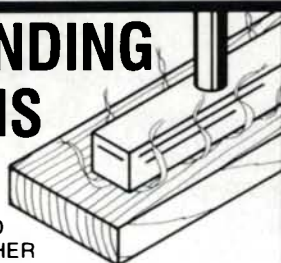
802/888-4252

ODA HARDWARE SUPPLY

PO Box 153, Lake Elmore, VT 05657

Please send one dollar to cover postage & handling on catalog.

**BRANDING
IRONS**



FOR WOOD
AND LEATHER

- Brands Your Full Name With
1/8" or 1/4" High Letters



GUARANTEED



SEND FOR FREE BROCHURE

NOVA TOOL CO.

4533 Colfax Circle, Dept. FW
P.O. Box 29341, Lincoln, NE 68529

**CRAFTSMAN'S 54th YEAR of SERVICE to
WOODWORKERS**

**World's Largest Selection of
fine dimensioned HARDWOODS
and quality VENEERS**

42 VARIETIES Amaranth to Zebra
1/64" to 4" thick

Save on Wood, Tools, Supplies

Fast service on all your needs in choice kiln dried Wood and Veneers, Complete choice of Moldings, Trim, Hand and Power Tools, Lamp Parts, Upholstery Supplies, Clock Movements and Kits, Hard-to-Find Hardware, Finishing Materials, Books . . . over 4000 items in stock! Craftsman has been the Woodworker's best friend for 54 years . . . and we always save you money!



Send for **NEW
CRAFTSMAN**
148 page **CATALOG**

**OVER
4000
ITEMS**

for your Wood
Projects

Please enclose
\$1.00 to help
pay mailing
and handling



CRAFTSMAN Wood Service Co.

Dept. A-16

1735 W. Cortland Ct., Addison, IL. 60101



CONOVER

Woodcraft Specialties, Inc.
18124 Madison Road, Parkman, OH 44080
216/548-3481

THE CONOVER SPOKE SHAVE



The Conover Spoke Shave is made from solid rosewood with a warranted tool steel iron.

Until our unique design, spoke shaves were cantankerous. Our foolproof mechanism allows precise screw adjustment of the iron, and instant replacement after sharpening, with no new adjustment necessary.

Dear Conover,

Send me _____ Spoke Shaves @ 24.50 each postage prepaid (Ohio residents add 5% tax)

_____ Enclosed is \$1 for your catalogue of unique tools

_____ Check/Money Order _____ MasterCard/Visa

Card # _____ Exp. Date _____

Name _____

Address _____

City _____

State _____ Zip _____

Daytime Phone () _____

TREND-LINES BEATS ANY AD THIS ISSUE!

Free with any order:

- 1 Year (3-4 issues) catalog subscription
- Subscription to Woodworking Trends
- Membership in TLC with special offers
- Mention this ad and receive a free 6" flexible rule

All Freud router bits on sale

4 Pc. Chisel Sets	\$ 26.75
6 Pc. Chisel Sets	33.95
10 Pc. Chisel Sets	55.75
8 Pc. Lathe Set	56.50
6 Pc. Carving Set	65.95
12 Pc. Carving Set	117.50

Free Wooden Case

MAKITA TOOLS

1100	3 1/4" Planer Kit	\$164.50
1805B	6 1/2" Planer Kit	264.50
1900BW	3 1/4" Planer w/cs	97.95
2030	12" Planer/Jointer	1280.00
2040	15 1/2" Planer	1170.00
2400BW	10" Miter Saw w/bld	259.50
2401BW	10" Miter Saw w/ blade	

2708	Table Saw	249.95
3601B	Router	119.95
3608BK	Router w/case	84.95
3612BR	3 H.P. Router	189.00
3700B	Laminate Trimmer	84.25
4200N	4 1/2" Circular Saw	94.50
4301BV	Vr Sp Orbital Jig Saw	128.50
5007NB	7 1/4" Circular Saw	103.95
5008NB	8 1/2" Circular Saw	109.75
5012B	12" Chain Saw	119.95
5081DW	3 1/2" Cord. Saw	108.75
5201NA	10 1/2" Circular Saw	226.50
5402A	16" Circular Saw	375.00
6000R	Uni-Drill	106.00
6010D	3/4" Cordless Drill	79.95
6010DL	Cordless Drill w/charger	

6010DWK	Cordless Drill w/charger & case	99.50
6012HDW	Cord. Drill Kit 2-Sp.	88.75
6013BR	1/2" Reversible Drill	105.95
6300LR	1/2" Angle Drill	151.95
6501VR	3/4" Drill-Rev.	68.00

6710DW	Cord. Screwdriver	107.10
6800DBV	Drywall Screwdriver	89.00
9030	1 1/2"x21" Belt Sndr	123.50
9035	Finishing Sander	49.95
9045B	Finishing Sander	99.50
9045N	Dustless Sander	110.00
9207SPB	7" Sander Polisher	136.95
9401	4"x24" Belt Sander	169.00
9501BKIT	4"Sander Grinder Kit	85.75
9900B	3"x21" Belt Sander	124.95
9924DB	3"x24" Belt Sander	139.95
BO4510	Finishing Sander	46.95
BO4530	6" Rnd Finish Sander	52.95
DA3000	3/4" Angle drill	105.00
DK1001	Drill (6010D), Charger & Vacuum Cleaner	129.95
DP3720	3/4" Reversible Drill	56.90
DP4700	Drill Reversible	95.95
GV5000	Disc Sander	49.95
HP1030	Hammer Drill	97.50
JG1600	Jig Saw Single Sp.	91.25
JR3000V	Recipro Saw	124.75
JR3000W	2 Sp. Reciprosaw Kit	119.95

PONY CLAMP FIXTURES

	Each	Pkg 6
No. 50 1/4" Pipe Clamp	\$7.35	6.95 ea
No. 52 1/2" Pipe Clamp	6.05	6.40 ea
No. 1215 (WEB) 15"	6.40	5.80 ea
No. 7456 Clamp Pads	2.50	2.25 ea

JORGENSEN BAR CLAMPS (Heavy Duty)

	Each	Pkg. 6
No. 7224 24"	17.30	15.70 ea
No. 7230 30"	18.10	16.45 ea
No. 7236 36"	18.70	16.95 ea
No. 7248 48"	20.75	18.70 ea
No. 7260 60"	22.65	20.55 ea
No. 7272 72"	24.55	22.25 ea
No. 7284 84"	26.55	24.10 ea

JORGENSEN CLAMPS (Med Duty)

No. 3712 12"	5.90	5.60 ea
No. 3724 24"	7.30	6.80 ea
No. 3736 36"	8.90	8.35 ea

JORGENSEN HAND SCREWS

No. 3/0 3"	\$9.30	\$8.40 ea
No. 0 4 1/2"	9.90	9.85 ea
No. 1 6"	11.30	11.15 ea
No. 2 8 1/2"	13.45	13.35 ea

JORGENSEN BAR CLAMPS (\$ reach)

No. 4512 12" Open	17.05	15.35 ea
No. 4524 24" Open	19.05	17.15 ea
No. 4536 36" Open	21.20	19.20 ea

JORGENSEN & PONY CLAMPS

No. 3325 3 Way Edging	\$5.40	4.90 ea
No. 1623 3" Hold down	7.20	6.40 ea
No. 3202HT 2" Spring	2.15	1.90 ea

9X11 Non-Loading Silicon Carbide

Grit	A WEIGHT	Pack of 100
400, 360, 320, 280, 240		
220, 180, 150, 120		\$19.60

RYOBI TOOLS

B7075	3x21 Belt Sander	\$118.95
B7100	3x24 Belt Sander	148.50
B7200A	4x24 Belt Sander	167.90
D1010	3/4" Var. Sp. Drill	89.50
D1015A	3/4" Screwdriver/ Drill	111.95
D1310	1/2" Drill	89.95
D1320R	2 Sp. 1/2" Rev. Drill	99.95
E3700A	Drywall Screwdriver	77.95
JS-60	Jig Saw	99.95
JSE-60	Electronic Jigsaw	125.90
L-120U	3 1/4" Planer	81.25
L1323AL	3 1/4" Planer	129.95
LS-35	Finishing Sander	46.95
L-580	6 1/4" Planer	189.00
R-150	1 HP Plunge Router	88.00
R-330	2 H.P. Router	139.70
R-500	3 HP Plunge Router	165.00
RA-250010	Radial Saw	449.95
S500A	3x5 1/2" Finishing Sander	43.95
SR-6200	Finishing Sander	
TR-30	1/2 Sheet Laminate Trimmer	89.50
TS-251U	10" Miter Saw	78.95
TS-251U	w/ Accessories	189.95
W630	7 1/4" Circular Saw	199.95
W730	8 1/4" Circular Saw	99.50

MILWAUKEE TOOLS

0228-1	3/4" VSR Drill	\$ 94.50
0234-1	1/2" VSR Drill	108.50
0375-1	3/4" Rev. Angle Drill	117.75
1107-1	1/2" VSR D Handle	144.50
1660-1	1/2" SSR Compact	174.65
5397	Hammer Drill Kit	154.00
5660	1 1/2 HP Router	162.00
5680	2 HP Router	208.50
5935	4"x24" Sander	219.95
6014	1/2 Sheet sander	114.50
6145	4 1/2" Angle Grinder	107.50
6255	VR-Sp. Jigsaw	139.75
6287	H.D. Jigsaw Kit	225.00
6367	7 1/4" Circular Saw	119.95
6460	10 1/4" Circular Saw	244.25
6507	Sawzall w/case	119.50
6543-1	1/4" Screwdriver	137.50
6749-1	Magnum Screwdriver	123.50
6750-1	H.D. Drywall Screwdriver	119.50
6753-1	Drywall Screwdriver	79.95

ROCKWELL POWER TOOLS

11-072	32" Radial Drill	\$379.95
22-651	13" Planer	1250.00
28-140	10" band Saw	349.75
28-243	14" Band Saw	449.95
31-205	8" Table Saw	149.50
33-150	Sawbuck	525.00
33-990	10" Radial Arm Saw	474.50
34-010	Miter Saw	158.95
34-410	10" Contractors Saw	725.00
34-695	10" Homecraft Saw	295.00
34-710	10" Tilting Arbor Saw	449.95
37-609	6" Jointer	334.50
43-122	Wood Shaper	539.95
46-140	11" Lathe	399.95

FREUD SAW BLADES 10" = 3/4" Bore

No.	Size	Teeth/Use	Price
LU72M10	10"	40 General	\$35.00
LU73M10	10"	60 Cut-Off	36.00
LU73M12	12"	72 Cut-Off	76.90
LU78M10	10"	80 Plastic	83.50
LU82M10	10"	60 Cut-Off	38.00
LU82M12	12"	72 Cut-Off	85.95
LU84M10	10"	40 Comb.	36.00
LU84M11	10"	50 Comb.	38.00
LU85M10	10"	80 Cut-Off	64.00
LM72M10	10"	24 Ripping	38.00
TR100	3 blades & dado set		264.95
DS306	6" Dado		95.00
DS308	8" Dado		115.00

SUN GOLD SANDING SHEETS

9x11 Aluminum Oxide C Weight	Grit	Pk of 100
150, 120, 100		\$21.95
80		23.70
60		28.90
50		32.05
40		38.30

BLACK AND DECKER INDUSTRIAL TOOLS

1165	3/4" Angle Drill	\$119.50
1179	3/4" VAR. Sp. Drill	69.95
1180	3/4" VSR Holgun	99.95
1311	1/2" VSR Drill	119.75
1575	3/4" VSR Scrudrill	119.50
1940	3/4" Cordless Drill w/98060 Charger	99.95
1975	3/4" Cordless Screwdriver w/98060 charger	129.50
2034	Drywall Screwdriver	91.50
2054	VSR Screwdriver	155.00
2931	Cordless Screwdriver w/98060 Charger	159.95
3027-09	7" Circular Saw	79.95
3030	7 1/4" Circular Saw	99.95
3034	7 1/4" Circular Saw	118.65
3035	8 1/4" Circular Saw	129.50
3051	7 1/4" Wormdrive Saw	149.00
3091	10" Miter Saw	189.95
3103	2 Sp. Cut Sawkit	99.95
3105	Var. Sp. Cut Sawkit	109.50
3107	Var. Sp. Orbital Cut Sawkit	119.50
3141	Cordless Jigsaw w/98060 Charger	149.95
3157-10	Var. Sp. Jigsaw	114.75
3265	Laminate Trimmer	145.65
3310	1 1/2" H.P. Router	139.50
3330	1 H.P. Router	99.95
3370-10	3 1/4" Planer	129.95
4010	Palm Sander	48.95
4018	1/2 Sheet Sander	99.50
4247	4 1/2" Disc Sander/Grinder	69.95
4260	Power File	189.50
6750	Heat Gun	69.75

Watco Danish Oil

Natural, Medium, Dark, Black or Colors	
\$5.70 Qt.	\$16.10 Gal

TITEBOND WOOD GLUE

\$5.75 Qt.	\$12.95 Gal
------------	-------------

HITACHI TOOLS

B600-A	14 1/2" Band Saw	\$1525.00
CJ65VA	Electronic Jigsaw	132.75
CR10V	Reciprocating Saw	99.50
C7SA	7 1/2" Circular Saw	69.95
C10FA	10" Miter Saw	279.00
C10FB	10" Miter Saw w/vice extension	199.95
C12Y	12" Table Saw	1250.00
DRC-10	Cordless Screwdriver	89.00
DR-10	3/4" Drill/Screwdriver	108.00
D6V	1/4" Var Sp Rev Drill	71.00
D10V	3/4" Var Sp Rev Drill	74.95
D13V	1/2" Var. Sp. Rev. Drill	99.75
F-20A	3 1/4" Planer	99.75
F1000A	Planer/Jointer	1325.00
JH-60A	Jig Saw	103.50
P50	6 1/2" Planer	295.00
P100F	12" Planer	1045.00
PSM-7	7 1/4" Circular Saw	114.95
PSM8	8" Circular Saw	141.90
SB-110	4x24 Belt Sander w/dust bag	183.00
SO-110A	1/2 Sheet Sander w/dust bag	119.95
SB-75	3x21 Belt sander-2 Sp. w/dust bag	134.75
SB8T	3x24 Belt sander 2-Sp w/dust bag	149.95
TR-6	Laminate Trimmer	92.25
TR-8	1 H.P. Plunge Router	126.95
TR-12	3 H.P. Plunge Router	175.00
W6V	Screwdriver	94.50

SUNGOLD X-WEIGHT SANDING BELTS

Sold in packs Outlasts regular of 10 only belts 2 to 1

Size	Grit	10 Belts
------	------	----------

3 x 21"	120	100 \$9.8 ea \$8.8 ea
		80 1.00 ea .86 ea
		60 1.05 ea .92 ea
		50 1.07 ea .94 ea
		40 1.10 ea .96 ea
		30 1.20 ea .93 ea
		20 1.22 ea .97 ea
		10 1.26 ea 1.12 ea
		50 1.31 ea 1.15 ea
		40 1.34 ea 1.18 ea
		100 1.68 ea 1.46 ea
		80 1.73 ea 1.51 ea
		60 1.78 ea 1.64 ea
		50 1.85 ea 1.70 ea
		40 1.89 ea 1.76 ea

If another prepaid price is lower, we match the price and give you a gift certificate worth \$5.00 when purchasing from our catalog. Few restrictions apply. **Minimum Order \$15.00**

Freight prepaid in all U.S.A. on orders of \$35.00 or more.

Note: Under 35.00 add \$2.00 per order. Extra charge to Alaska & Hawaii on stationary machines. Misprints are subject to correction. This ad expires February 28, 1985. Watch for our next ad.

FREE CATALOG WITH ORDER OR BY WRITING TO POST OFFICE BOX.

SPECIAL SALE TO READERS OF THIS AD

You Must Mention This Ad When Ordering

800-343-3248 USA 800-322-6100 Mass.

617-884-8882 Non-Order Calls

TREND-LINES, INC.

375A Beacham St.

P.O. Box 6447A

Chelsea, Ma. 02150

Open Monday to Saturday 8:30 AM-5:00 PM plus

Thursday until 9:00 PM

30 DAY MONEY BACK GUARANTEE

Examine any item in your home or shop. If it's not what you expected, return it in original condition for a full refund.



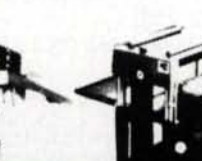
Makita Table Saw 2708
\$249.95



Makita 4x24 Belt Sander
\$171.95



Makita 12" Planer-Jointer 2030
\$1280.00



Hitachi 14 1/2" Bandsaw B-600A
\$1525.00



Hitachi Planer-Jointer F1000A
\$1325.00

What do the SMITHSONIAN INSTITUTION, LOS ALAMOS NATIONAL LABORATORY, BOEING AIRCRAFT, WESTINGHOUSE ELECTRIC, UNIVERSITY OF WISCONSIN, HEWLETT-PACKARD, CALIFORNIA STATE UNIVERSITY, VANDENBERG AIR FORCE BASE, and hundreds of other companies, schools and government bodies have in common with thousands of amateur and professional woodworkers?

THEY USE A RIPSTRATE® IN THEIR WOODWORKING SHOPS!

The RIPSTRATE has become a standard fixture in every well equipped shop. It speeds the job, gives straighter cuts, and makes ripping on table and radial arm saws infinitely safer by keeping **BOTH HANDS AWAY FROM THE BLADE** and by **PREVENTING KICKBACKS**. There is no way of knowing how many jobs it has speeded and improved, or how many fingers it has already saved, but judging by the comments of satisfied customers, it must be a lot!

The RIPSTRATE is sold on a 30 day money back trial basis. \$59.50 plus \$3.50 shipping. Check, M.O., Visa or M/C. Free brochure.

Write, or call our toll free number.
Fisher Hill Products
 1 Fisher Hill
 Fitzwilliam, NH 03447
 800 421 0256



At last, a pro-size, band saw priced for the home shop! Big 24½-in. throat easily handles large scrollwork, complex curves, 4 x 8 sheets. 9-in. vertical cut makes it easy to resaw valuable hardwoods. Ball bearing construction, all-steel welded frame to eliminate deflection. Can be ordered complete with motor, stand, dust collector, rip fence, scroll saw table. Full instructions.

30-DAY FREE TRIAL!

Send for complete facts on how you can try this versatile saw without risk! Easy Terms.

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

Woodmaster Power Tools, Dept. SE15
 2908 Oak, Kansas City, MO 64108

☐ **YES!** Please rush me, free and without obligation, your Complete Information Kit on the new 24½" MODEL 500 BAND SAW plus facts on Woodmaster's 30-Day FREE TRIAL Money-Back Guarantee.

Name

Address

City

State Zip

SHAKER CHAIR KITS

An exciting collection of Shaker chair and furniture kits which exemplify the simplicity and versatile beauty of Shaker design. Also featured: Shaker needlework kits, baskets, rag rugs, pegs, pegboard, oval boxes and spirit drawings. Large selection of replacement chair tape.



Come to the source! New color catalog and 12 tape samples \$1.00

SHAKER WORKSHOPS
 Box 1028-FW15, Concord, MA 01742

RECAINE for fun and profit



Recane or re-rush heirloom chairs — for yourself or for others as a profitable hobby — with our full line of materials & instruction books.

Since 1934 America's largest selection of caning & basketry materials & supplies —

- Superior quality weaving cane & machine woven cane
- Flat, oval & round reeds
- Fibre & genuine rush
- Danish seat cord
- Raffia, rattan, seagrass

Illustrated catalog with complete how-to-do-it information, prices, order form. \$1 (refundable with 1st order)

CANE & BASKET SUPPLY CO.
 1283 S. Cochran, Dept. FW, Los Angeles, CA 90019

STATEMENT OF OWNERSHIP, MANAGEMENT AND CIRCULATION

(Required by 39 U.S.C. 3685)

1a. Title: Fine Woodworking. 1b. Publication no. 105190. 2. Date of filing: October 1, 1984. 3. Frequency of issue: Bimonthly. 3a. No. of issues published annually: 6. 3b. Annual subscription price: \$16.00. 4. Location of office of publication: 52 Church Hill Road, PO Box 355, Newtown, CT 06470. 5. Location of the headquarters of the publishers: 52 Church Hill Road, PO Box 355, Newtown, CT 06470. 6. Publisher: Paul Roman, 52 Church Hill Road, PO Box 355, Newtown, CT 06470; Editor: Paul Bertorelli, 52 Church Hill Road, PO Box 355, Newtown, CT 06470. 7. Owner: The Taunton Press, Inc., 52 Church Hill Road, PO Box 355, Newtown, CT 06470. Stockholders owning or holding 1 percent or more of the total amount of stock: Paul Roman, 52 Church Hill Road, PO Box 355, Newtown, CT 06470; Janice A. Roman, 52 Church Hill Road, PO Box 355, Newtown, CT 06470. 8. Known bondholders, mortgagees and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages or other securities: None. 9. Not applicable. 10. Extent and nature of circulation:

	Average no. copies each issue during preceding 12 months	Actual no. copies of single issue published nearest to filing date Oct. 1, 1984
A. Total no. copies (net press run).....	265,329	273,812
B. Paid circulation		
1. Sales through dealers and carriers, street vendors and counter sales.....	48,025	48,809
2. Mail subscription.....	205,103	207,930
C. Total paid circulation.....	253,128	256,739
D. Free distribution by mail, carrier or other means, samples, complimentary, and other free copies.....	1,230	1,007
E. Total distribution.....	254,358	257,746
F. Copies not distributed		
1. Office use, left over, unaccounted, spoiled after printing.....	3,947	8,830
2. Return from news agents.....	7,024	7,236
G. Total (sum of E, F1 and 2) ..	265,329	273,812

II. I certify that the statements made by me above are correct and complete. Signature: Paul Roman, Publisher.

DOMESTIC & IMPORTED VENEERS

Artistry In Veneers provides the finest domestic and exotic Wood Veneers for woodworkers, craftsmen, and hobbyists. We have an inventory of over 5 million sq. ft. of veneer, housing 80 different species. Whether you need 10, 100, or 1,000 sq. ft., **Artistry** can provide top quality veneer to satisfy any need.

SUPER WINTER SALE

Order any one of these Super Sale packages and get our new 1985 catalog free. All lengths 30"-36", widths 6"-14" (except Burl).

Carpathian Elm Burl —

25 sq. ft. for only \$16.25

Walnut Shorts —50 sq. ft. for only \$10.00

Red Oak Shorts —50 sq. ft. for \$9.00

Bubinga Shorts (African Rosewood) —

25 sq. ft. only \$7.50

ADD \$3.50 FOR POSTAGE & HANDLING (ENCLOSE AD WITH ORDER)

Artistry In Veneers presents its 72 page 1985 edition of our catalog. Beautiful veneers at exceptional prices, a complete line of quality tools and accessories, inlays, burls, instructions, and much more.

SEND \$1.00 TO:

ARTISTRY IN VENEERS

450 OAK TREE RD.

SOUTH PLAINFIELD, NJ 07080

(a subsidiary of Eagle Plywood Door Mfrs. Co.)

Wood

Flitches to 50" wide...walnuts, cherries, oaks, maples, beeches, pines, ash, paulownia, fruits...over 25 species of soft and hardwoods.

Over 3000 outstanding pieces. All shapes and sizes in our showroom. Many unusual stump and root cuts...also, dimensional lumber.

We feature fine burls, feathers, curls, and clear grains, gathered, cut and dried at our own mill. Exotics: See our showroom display of woods from around the world.



Please send 50¢ for our pricelist

Willard Brothers Woodcutters

300 Basin Road
Trenton, NJ, 08619
Call (609) 890-1990



One Source For

QUALITY Furniture & House HARDWARE

Stock or Made To Order

Call or write for your **Free** Mini-Catalog of Quality House and Furniture Hardware Or send \$5.00 for our complete 108 page Catalog, now including many new Victorian Products.

BALL and BALL

436 W. Lincoln Hwy.
Exton, PA 19341
(215) 363-7330

Number 1 INCA Dealer
in the United States
603-736-8227



Suncook, NH 03275

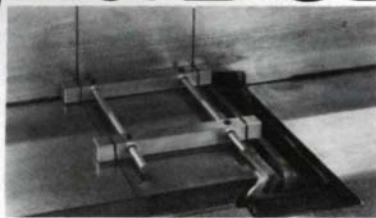
Knowledgeable woodworking staff with 77 combined machine years of experience
Special Offers • Free Delivery • Best Prices
Superior efficient service and assistance after-sale
Machine and accessories in-stock and on display
Financing

FAST, EASY TO USE

Magna-Set

**ACCURATELY
RESET JOINTER
KNIVES IN
10 MINUTES!**

- Magnetically holds knives in perfect position
- Steel, Brass & permanent magnet construction
- Life-time guarantee



Adjustable, fits any size jointer **\$39.95** plus \$2.50 post. & hand.

QUEST INDUSTRIES, P.O. BOX 7768, MURRAY, UT 84107 801-973-0896

Now you
can make
raised panel
doors with
your router!



Made in U.S.A.



(shown 2/3 actual size)

That's right — with your 1/2" router you can easily produce professional raised panel doors without a shaper.

The set of 4 router bits is manufactured by Reliable Grinding, the same supplier of carbide shaper cutters to wood manufacturers nationwide. Call our toll free 800 number for complete information.

RELIABLE GRINDING

145 W. Hillcrest Ave., San Bernardino, CA 92408
(800) 424-9154, within CA call (800) 521-8521



MAKITA • PORTER CABLE • ROCKWELL • BOSCH • LION
HILLER HARDWARE CO.

ASSURES YOUR SATISFACTION ON ANY ITEM PURCHASED FROM US! WE CAN SHIP YOUR BANK CARD ORDER TODAY

freud INDUSTRIAL SAW BLADES

10" CARBIDE TIPPED BLADES

Blade	Description	Teeth	List Price	Hiller's Price
LU72	General Purpose	40	68.58	39.50
LU73	Cut-Off	60	79.65	40.95
LU81	General Purpose	40	69.30	40.95
LU82	General Purpose	60	86.50	42.75
LU84	Combination	40	70.99	39.50
LU84	Combination	50	74.51	42.75
LU85	Combination	80	110.88	73.90
LM72	RIP	24	64.85	43.95

5/8" BORE STANDARD, ADD \$8.00 FOR ANY OTHER BORE

- WE HONOR ALL FREUD NATIONALLY ADVERTISED SPECIALS
- CALL OR WRITE TODAY FOR CURRENT PRICES ON OTHER TOOLS/ACCESSORIES
- PRICES QUOTED, DELIVERED PREPAID
- VISA, MASTERCARD ACCEPTED

HILLER HARDWARE CO.

1411 ASSEMBLY STREET, P.O. BOX 1762
COLUMBIA, S.C. 29202-1762
803-779-3131 EXT. 12

YOUR WOODWORKING SPECIALIST IN THE SOUTHEAST

HEGNER • STANLEY • GREENLEE • HENCKELS • MERIT

MAKITA • PORTER CABLE • ROCKWELL • BOSCH • LION • HILLER HARDWARE CO. • ASSURES YOUR SATISFACTION ON ANY ITEM PURCHASED FROM US! WE CAN SHIP YOUR BANK CARD ORDER TODAY • freud INDUSTRIAL SAW BLADES • 10" CARBIDE TIPPED BLADES • BLADE • DESCRIPTION • TEETH • LIST PRICE • HILLER'S PRICE • LU72 • General Purpose • 40 • 68.58 • 39.50 • LU73 • Cut-Off • 60 • 79.65 • 40.95 • LU81 • General Purpose • 40 • 69.30 • 40.95 • LU82 • General Purpose • 60 • 86.50 • 42.75 • LU84 • Combination • 40 • 70.99 • 39.50 • LU84 • Combination • 50 • 74.51 • 42.75 • LU85 • Combination • 80 • 110.88 • 73.90 • LM72 • RIP • 24 • 64.85 • 43.95 • 5/8" BORE STANDARD, ADD \$8.00 FOR ANY OTHER BORE • WE HONOR ALL FREUD NATIONALLY ADVERTISED SPECIALS • CALL OR WRITE TODAY FOR CURRENT PRICES ON OTHER TOOLS/ACCESSORIES • PRICES QUOTED, DELIVERED PREPAID • VISA, MASTERCARD ACCEPTED • HILLER HARDWARE CO. • 1411 ASSEMBLY STREET, P.O. BOX 1762 • COLUMBIA, S.C. 29202-1762 • 803-779-3131 EXT. 12 • YOUR WOODWORKING SPECIALIST IN THE SOUTHEAST • HEGNER • STANLEY • GREENLEE • HENCKELS • MERIT

BLACK & DECKER • MILWAULKEE • FORSTNER • JORGENSEN • 3M • W.L. FULLER

BUY DIRECT AND SAVE!

• BOSCH • HITACHI • MAKITA

BOSCH

Air and Electric Power Tools

YOUR CHOICE!

Variable Speed

JIG SAWS

ONLY \$139⁰⁰

Models 1581VS
1582VS



NO.	TOOL	SALE
1288-034	Finishing Sander, 1/2 sheet	\$89.00
1288-934	Dustless Finishing Sander	98.45
1920RK	3/8" Cordless Reversing Drill	75.00
1920VSRK3/8"	Cordless Var. Spd. Rev. Drill	99.00
1921VSRK3/8"	Cordless Var. Spd. Screwdriver	129.00
90900	Heat Gun, 650-900	62.00
1158VSR	3/8" Var. Spd. Rev. Drill	55.00
1160VSR	3/8" Var. Spd. Rev. Drill	86.00
1604	1 1/4" HP Router	119.00
90085	3/4" HP Router	87.00
93910	Cabinet Door System	600.00
1272	3"x24" Belt Sander	181.30
1272D	3"x24" Belt Sander w/Dust Collector	191.80
1273	4"x24" Belt Sander	191.80
1273D	4"x24" Belt Sander w/Dust Collector	202.30

SPECIAL! SPECIAL!

ALL ROUTERS/DRILLS

30% DISCOUNT
FROM LIST



HITACHI Power Tools

C12Y	10" Table Saw	1400.00
P100F	12" Planer	1100.00
TR12	Plunge Router, 3 hp	190.00
S875	Belt Sander, 3"x24"	133.00
C10FB	10" Miter Box	210.00
DTC-10	Cordless Drill	80.00
DRC-10	Cordless Drill/Screwdriver	90.00
CR-10V	Reciprocating Saw	120.00
D-10V	3/4" Variable Speed Reversing Drill	73.00
C7SA	7" Circular Saw	55.00
B-600A	Band Saw, 1" Blade, Rubber Tires	1554.00

PLANER JOINTER



Model F-1000A
Lightweight, Portable

ONLY \$1290.00

CLEARANCE
LOWEST PRICES - MAKITA
6012HDW CORDLESS DRILL
\$99.95

CALL TOLL FREE 1-800-525-0750

In Colorado Call 1-355-2391

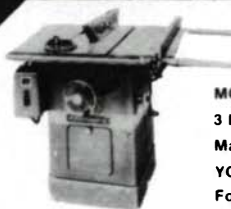
AVIATION INDUSTRIAL SUPPLY

P.O. Box 38159 • Denver, CO 80238

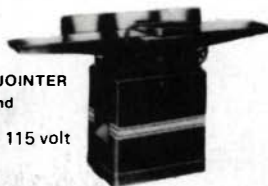
Clearance on all MAKITA TOOLS

MOST TOOLS PREPAID

Better By Design[®] POWERMATIC III



MODEL 66. 10" TA SAW
3 HP. 1 PH. 230 Volt
Mag. Control
YOU PAY \$1695
For Biesemeyer Fence
Add \$99



MODEL 60. 8" JOINTER
with stand
1 1/2 HP. 1 PH. 115 volt
Switch

YOU PAY \$1319



MODEL 26 - SHAPER
1/2" & 3/4" Spindles,
3 HP, 1 PH, 230 Volt
Mag. Control

YOU PAY \$1773

supplies limited

FOB. McMinnville, TN

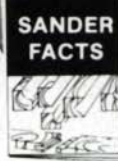


BRADY CORP.
649 MADISON AVENUE
P.O. BOX 326
ELMIRA N.Y. 14902-0326
607-733-6591

NEW! Power Feed DRUM SANDER!



At last!
A complete,
power-feed drum
sander priced for the
home shop!



FREE
DETAILS!

This heavy-duty, 12-inch sander comes ready to use including motor & stand... nothing extra to build or buy!

A Finish Sander... A Thickness Sander

You can use this high-tolerance machine for light dimensioning as well as the finest finish work. Because stock is power-fed at a uniform rate, you'll achieve results impossible to duplicate with hand methods or hand-held sanders. Dimensions remain exact... no more low spots, waves or cross grain marks!

Improves Results!

Use the Woodmaster to dimension and finish-sand cabinet pieces, resawn stock, paneling, grandfather clocks, toys, tabletops, knees, burls, crotches, and much, much more! You'll soon find it's one of the most valuable tools in your shop!

30-Day FREE Trial!

Send for Complete Facts! See how you can use the Woodmaster Drum Sander in your own shop for 30 days completely without risk! Easy terms.

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

Woodmaster Tools, 2908 Oak, Dept. DS7
Kansas City, Missouri 64108

☐ YES!

Please rush my FREE Information Kit and details on your 30-Day Free Trial Guarantee.

Name _____

Address _____

City _____

State _____

Zip _____

MYFORD ML8 LATHE

FROM
ENGLAND



SEND 60¢ IN
STAMPS FOR MYFORD
PRICE LIST AND BROCHURE

COME BY AND SEE OUR SELECTIONS
OF POWER TOOLS AND FINE HAND TOOLS.

SORBY • BIESEMEYER • INCA
ROCKWELL • HEGNER • BOSCH

Please call or write for information.

DALLAS WOOD AND TOOL STORE

1936 RECORD CROSSING 214 631-5478 DALLAS, TEXAS 75235

BALLEW

Saw & Tool, Inc.

SALES & SHARPENING SINCE 1968

freud[®]

Industrial Carbide Blades

LU72M - 10" x 40T ATB	General Purpose	\$38.65 P.pd
LM72M - 10" x 24T FLAT	Smooth Rip	\$41.90 P.pd
LU73M - 10" x 60T ATB	Smooth Cut Off	\$43.50 P.pd
LU84M - 10" x 50TCOMB.	General Purpose	\$44.90 P.pd
LU85M - 10" x 80T ATB	Finish Cut Off	\$69.90 P.pd

BLADE PRICE INCLUDES 1 FREE SHARPENING

All Freud Router Bits and Shaper Cutters 25% Off

For More Information Write or Call

BALLEW SAW & TOOL, INC.

420 BOONVILLE AVE.

SPRINGFIELD, MO. 65806

(417) 865-7511

MO. Residents 1-800-492-3322, Ext. 2

All Other States 1-800-641-3322, Ext. 2

New! DELMHORST MODEL J-88

\$89.00 Pocket-size Wood Moisture Tester

LED display type meter indicates ten ranges of wood moisture content between 6 and 25 percent. Ideal for a woodworking shop or hobbyist.
Limited 3 Year Warranty
Shipped complete with carrying case, batteries and pins.
Order one today!



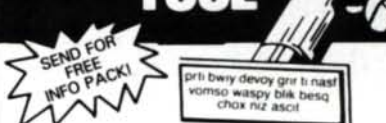
Call toll free 800-222-0638
201-334-2557 (in NJ)



DELMHORST
Instrument Company
908 Cedar Street, P.O. Box 130
Boonton, NJ 07005

"MAKER'S MARK"

BRANDING
TOOL



SEND FOR
FREE
INFO PACK!

prti bwy devoj gnr ti nast
vomo waspy blk besq
chok niz asci

NOW! Brand your own name permanently on wood and leather handcrafts! Simple to use. Long lasting U.L. approved electric handle. Brands full name. Guaranteed.
CRAFTMARK PRODUCTS, INC.
P.O. Box 6308 - F-1 Marietta, GA 30065

CLASSIFIED

The CLASSIFIED rate is \$4.50 per word, minimum ad 15 words. All payments must accompany orders; all are non-commissionable. The WOOD & TOOL EXCHANGE and SITUATIONS WANTED are for private use by individuals only; the rate is \$6 per line, minimum 3 lines, maximum 6 lines, limit 2 insertions per year. Allow 30 letters or spaces per line, including name and address. DISPLAY CLASSIFIED rates on request. Send to: *Fine Woodworking*, Advertising Dept., Box 355, Newtown, CT 06470. Deadline for the March/April issue is December 20th; for the May/June issue, February 25th.

Busn. Opportunities

Do you have a woodworking shop/business? Originators looking for REGIONAL LICENSEES for simple manufacture and easy distribution of unique, successful and established wooden gift item. Earn \$50,000 p.a. profit, plus. Write/call: Mazooma Ltd., 2 Phipps St., Toronto, Ont., M4Y 1J5. (416) 960-1152.

BENCH SPACE and machine use available in custom wood shop, Yonkers, NY. Call (212) 549-9394 evenings.

Established RETAIL/WHOLESALE hardwood lumber business. 1984 gross, \$200,000. Includes full millshop, inventory. \$78,000. Write PO Box 7867, Ann Arbor, MI 48104.

HANDMADE LIVING ROOM TABLES of different sizes wanted by failed craftsman for his new home. Exotic woods appreciated. Please send photos and I will pay, or call collect to Peter Richards, 5 Frost St., Norwalk, CT 06850. (203) 852-9999. Allergic to gallery prices. Also interested in other wood shapes and forms.

RETAIL DEALERS wanted for "Swiss Made" carving tools. World's finest carving tools now available to qualified retail stores. Write for details: Woodcraft Distribution Services, Dept. FW01, 41 Atlantic Ave., Woburn, MA 01888.

STUDIO SPACE in Residency Program available at Leeds Design Workshops, 1 Cottage St., Easthampton, MA 01027.

DEALER INQUIRIES INVITED

We are a direct importer stocking all quality hand tools needed for a woodworking tool store or specialty department. Resale only—no enduser sales.

Robert Larson Company, Inc.
82 Dorman Avenue
San Francisco, CA 94124 (415) 821-1021

Help Wanted

HELP WANTED. Cabinetmaker, extensive experience with hand and power tools. One-of-a-kind project-oriented furniture shop. Apply Kramer and Eiland Woodworking, PO Box 221, Washington, VA 22747. (703) 675-3882.

APPRENTICE VIOLIN MAKERS and restorers: Positions available with finest rare violin shop in the country. Good salary and benefits, excellent training program. Professional woodworking experience required. Must be willing and able to learn. Bein & Fushi Inc., 410 S. Michigan Ave., Chicago, IL 60605.

SKILLED CABINETMAKER needed in small NYC shop where excellence and independence are encouraged. (212) 431-9175.

CABINET SHOP FOREMAN. We are in need of a shop foreman and skilled cabinetmakers for a custom cabinet and small production run shop. Top salary and medical benefits. Send resume and salary requirements to AWD Corp., 2800 N. Claiborne Ave., New Orleans, LA 70118.

CABINETMAKERS. High quality, Richmond, Virginia, 18th-century furniture reproduction company with 94-year history seeks experienced cabinetmakers for immediate employment—competi-

tive wages and good benefits. Contact Biggs, 900 W. Marshall St., Richmond, VA 23220. (804) 648-8321.

CABINETMAKER. Shop producing fine 18th-century furniture to order and antique restoration. Box 663, Paoli, PA 19301.

EXPERIENCED PERSON wanted for small, high quality, custom furniture and architectural woodwork shop. Write PO Box 135, Huntington, NY 11743.

WOODWORKER/CRAFTSMAN. Experienced in fine furniture/commercial furnishings. Background in drafting—designing/pricing desirable. Minneapolis shop. Immediate openings. Resume to: PO Box 1002, Anoka, MN 55303.

TECHNICAL JOURNALIST to join *Fine Homebuilding* magazine as assistant editor. Successful candidate will have a background in writing and editing, or show a strong aptitude for working with the written language; applicant should also have several years' experience building houses. Photographic skills and drawing ability are important. Must be willing to move to southwestern Connecticut and to travel on the job. We offer liberal benefits and an excellent working environment. Send resume to Personnel Director, The Taunton Press Inc., 52 Church Hill Rd., Box 355, Newtown, CT 06470.

Situations Wanted

Recent Tech school grad wants apprenticeship in custom woodworking, prefer reproduction or furniture work. Paul Wahlstrom, 711 Gaines, Iuka, MS 38852. (601) 423-6065. Will relocate.

Young man of integrity, 23, seeks traditional live-in apprenticeship with European master artisan cab./furn. maker in 1985. Anywhere in N. Amer. Seek only the best willing to train. Matt Woods, Box 1582, Apple Valley, CA 92307.

Instruction

WOODWORKING CANOE BUILDING

write: Horizons, Box 499
N. Amherst, MA 01059
(413) 549-4841

HORIZONS
THE NEW ENGLAND CRAFT PROGRAM

EASTERN NEW MEXICO UNIVERSITY offers programs with an emphasis in "Fine and Creative Woodworking." A master craftsman teaches a course every semester. Contact Dave Goin, ENMU, Station #11, Portales, NM 88130.

BFA, BS, CERTIFICATE in Furniture Design/Construction. Large well-equipped facility. Contact Wendy Maruyama, Appalachian Center for Crafts, Box 347A-1, Rt. 3, Smithville, TN 37166.

WOODWORKING CLASSES, beginning and intermediate, for the do-it-yourself and aspiring professional. Also individual consultations and custom millwork and cutting. Michael Weiss, Handcrafted Furniture, Cambridge, MA. (617) 661-7709.

COLLEGE WOODWORKING. One-year certificate and two-year degree programs. Write Elizabeth Bradbury, Jamestown Artisan Center for Woodworking, Jamestown Community College, Jamestown, NY 14701. (716) 484-9920.

Accessories

FREE WOODWORKER'S SUPPLIES CATALOG. Hundreds veneers, toymaking, hardwoods, patterns, books, cane, dowels, pegs, spindles, more! Bargain offers included. Hurry! Morgan, F04M06, 1123 Bardstown, Louisville, KY 40204.

THE GOLD LEAF PEOPLE™, genuine, imitation sheets, rolls, supplies and texts. In USA: Three Cross St., Suffern, NY 10901-4601. Canada: 454 Lawrence West, Toronto, Ont. M5M 1C4.

CHAIR CANING SUPPLIES—Cane webbing, rush, splint, ash, rawhide, cord. Catalog \$1 (refundable). The Caning Shop (FW), 926 Gilman, Berkeley, CA 94710.

Jig and scroll saw owners! PLASTIC LAYOUT TEMPLATES—letters and numbers—several styles, sizes. Brochure, \$3 (refundable). Seyco, 1238 Bardfield, Garland, TX 75041.

WOOD MOLDING KNIVES made for Bel-saw-type molders. Waniger Custom Knives, 536 East B Ave., Kingman, KS 67068. (316) 532-5391.

BRANDING IRONS MADE TO ORDER. Names, signatures, logos—any size, any design, faithfully duplicated. Write or call for information, sample brandings. Norcraft Custom Brands, Box 277F, So. Easton, MA 02375. Tel. (617) 238-2163 anytime.

POLYETHYLENE GLYCOL

The new wood stabilizer and chemical seasoning agent.

Make crack-free table tops from log cross sections and flawless bowls and carvings from green scrap wood. \$1.00 for catalog.

The Crane Creek Company
Box 5553 F
Madison, Wisconsin 53705

The original Emmert Roto-Vise is now back in production.

For Details Write:
EMMERT VISE CO.
P.O. Box 3553
Hagerstown, MD 21742



Introducing the Beall Wood-threader, a new and better way to cut threads in ANY kind of wood. This patented device attached to your router allows you to make perfect 1/8", 3/16" and 1" threads. For more information write:
541 Swans Road, N.E., Newark, Ohio 43055
614-345-5045



CONCEALED HINGES FOR WOOD & GLASS DOORS
STEREO AND KITCHEN CABINET HARDWARE
SLIDES ★ CATCHES ★ SPECIALTY ITEMS
MAIL ORDER ONLY — CATALOG \$1.00
ALLEN SPECIALTY HARDWARE
P.O. BOX 10833 PITTSBURGH, PA 15236

Clock Kits & Parts

Established in 1916
Quality Clock Kits & Plans
Write for Free Literature or Call
1-800-328-6445
Kuempel Chime
Dept. 121, 21195 M'tka Blvd.
Excelsior, MN 55331

Demos & Shows

"THE WOODWORKER" third year in Philadelphia—Sept. 20-22, 1985. Sell your work to 10,000 visitors—architects, connoisseurs and galleries. 70 exhibitors sold over \$220,000 in 3 days. Booths from \$135-\$275. Contact Craftmarket America, Box 30, Sugarloaf, NY 10981, (914) 469-2158 for application. Deadline for entry is April 10th.

Finishes

BEAUTIFUL AND EASY wipe-on wood finishing explained in FREE wood finishing guide and products catalog. General Finishes, Box 14363F, Milwaukee, WI 53214.

SWEDISH WOOD DYES. Beautiful brilliant colors. Inexpensive, non-toxic. \$5 for 3 samples. Professionally used. T.H.&A., PO Box 6004, Rockford, IL 61125.

FREE 1985 CATALOG. Many difficult-to-find finishing materials. Write for yours today. WoodFinishing Enterprises, Box 10117, Milwaukee, WI 53210-0117.

PEG - 1000 WHOLESALE

POLYETHYLENE GLYCOL

Green wood stabilizer

10 pounds \$12.50 plus 2.40 shipping

FREE wood finishing products catalog from GENERAL FINISHES. Box 14363, West Allis, WI 53214. Phone 414-774-1050.

Miscellaneous

BRANDING IRONS for craftsmen. Logo design. Send your ideas for quote. Heat Mark Co., Rt. 6, Box 828, Mooresville, NC 28115.

33,000 WHOLESALE BUYERS

Publicize FREE, handmade & limited edition items you sell at wholesale. Authoritative trade magazine read by 33,000 store buyers. Send illustration, description, prices to Gifts Editor, Creative Products News, P.O. Box 584, Lake Forest, IL 60045. Or call 1-800-323-4968.

Replace old fashioned rags in your finishing operations. Our product is used throughout Europe in the automotive industry and industrial applications. Absorbs up to four times faster than cotton rags, lint free and predictable performance. It is also convenient, easy to store and dispense. Send 2.00 for samples and price.



2781 Central Ave.
Columbus, IN 47201
(812) 376-3354

WEST SYSTEM® Epoxy Products, well-known for their quality and durability, have been developed to meet the requirements of today's high strength structures. Our experienced technical staff is available to assist you with your questions.



Gougeon Brothers, Inc.
780F Martin Street
Bay City, MI 48708
517/684-7288

* Trademark of Gougeon Brothers, Inc., U.S.A.

HERACON
BRANDING IRONS
DRILL PRESS or HANDHELD
250 to 800 watts
For Custom Logos or Artwork
SEND \$1.00 FOR BROCHURE
ENGRAVING ARTS (707) 984-8293
P.O. Box 787
Laytonville, CA 95454

Musical Supplies

MUSIC BOX WORKS. Free list of 700 tunes. Music Box World, Dept. MA, Avon, NJ 07717.

EARLY INSTRUMENT KITS! Build dulcimers, mandolins, psalteries; even harps, lutes, harpsichords. Free catalog, FW Hughes, 4419 West Colfax, Denver, CO 80204.

LUTHIERS' SUPPLIES: Imported tonewood, tools, varnishes, books, plans, parts, accessories, strings, cases, for violins, violas, cellos, basses and guitars. Assemble-yourself violin and guitar kits. Catalog, 50¢, includes 10% discount certificate. International Violin Company, Ltd., Dept. WX, 4026 W. Belvedere Ave., Baltimore, MD 21215.

VIOLIN, GUITAR, BANJO, MANDOLIN-MAKING materials, accessories, books. Catalog, \$1. International Luthiers Supply, Box 580397, Tulsa, OK 74158.

Plans & Kits

SHIPS' WHEELS. Full-size plans, 24-in. dia, \$8.50; 36-in., \$9.50; 66-in., \$13.50 ppd. Dawson Designs, Box 5624, St. John's, Newfoundland, Canada A1C 5W8.

CATALOG, Full-size Furniture Plans—\$2. Refunded with first order. Traditional, early American, over 180! Furniture Designs, 1425 Sherman, Dept. CK-15, Evanston, IL 60201.

BUILD IT YOURSELF
TOYS • PUZZLES
ROCKING & RIDING HORSES
PLANTERS • BIRD HOUSES
FURNITURE • LAWN ITEMS
PLAY SETS • PLAQUES
SAME SIZE PATTERNS—WHEELS—HOW TO BOOKS
40 PAGE ILLUSTRATED CATALOG \$1.00
Design Group, Box 514-E, Miller Pl., NY 11764

WHITTLERS—CARVERS
Whittling kits with our famous
3-D foam models, pre-cut wood
blocks and carving knives. Also
strong bend type models.
Send stamp for FREE
brochure
WOOD IS GOOD CO. F
Box 286, Ben Lomond, CA 95005

Machinist Tool Chest Plans
9 Drawer, 26" x 17" x 9 1/2"
Professionally designed & detailed
for the master craftsman.
\$14.95 ppd.
Custom Specialties Ltd.
Box 173, Abingdon, MD 21009
(301) 679-0496

**Hundreds, Wood-
working Patterns,
Wood Parts,
Books, Tools.**
THE WOOD COUNTRY
FREE Woodworking
Catalogue #F9
Carmelita Bay, CA 95711-0850

Tools

MARYLAND'S AUTHORIZED INCA/HEGNER DEALER. All tools in stock and displayed. Demonstrations available at all times. We inventory 8,000 sq. ft. of fine hardwoods and woodworking tools and supplies. Call today: Craftwoods, 10921 York Rd., Cockeysville, MD 21030. (301) 667-9663.

RESTORED MACHINERY—Finest wood-working machines ever made. Oliver, Yates, Northfield. Bandsaws, tablesaws, wood lathes, etc. Puget Sound Machinery. (206) 627-0802.

MAKITA/JET TOOLS. We'll not be under-sold. Price quotes, call (800) 331-TOOL (8665). Calif. (800) 336-TOOL (8665). (707) 964-6661. Write AES, Box 1790, Ft. Bragg, CA 95437. Prices include delivery.

ALBANY, NY TO BURLINGTON, VT your local INCA dealer is Precision Woodworking Machines, Rt. 7A, Manchester Village, VT 05254. (802) 362-1985.

SILVO Hardware, 188-page Hand & Power Tool Catalog, \$1. Dept. FW-5-2, 5301 Tacony St., Philadelphia, PA 19137-2399.

THANKS for many new Steton & Griggio machinery orders. Our service and prices best. Henry Wiegand Corporation, Claremont, NH 03743.

NEEDA GOOD PLANE? Stanley Bed Rock No. 605 Jack, \$79.50 ppd. Other quality antique and used tools for sale, many scarce Stanleys. Send \$1 for current illustrated tool list. Subscription, \$4/yr., 5 lists. Bob Kaune, 511 W. 11th, Port Angeles, WA 98362. (206) 452-2292.

WOODWORKERS! Tremendous savings on finest quality tools, accessories, and supplies. Every item we sell is unconditionally guaranteed. For details write: Dusty Splinters Enterprises, PO Box 32041, Flushing, NY 11386.

LATHES/INDUSTRIAL. Automatic, semi-automatic, variety, faceplate, asymmetric, large pattern lathes. The Miller Company. (415) 488-4333.

JAPANESE WOODWORKING TOOLS SINCE 1888. Free catalog. Tashiro's (near 3rd & Yesler), 119 Prefontaine Pl. So., Seattle, WA 98104. (206) 622-8452.

REBUILT JAPANESE MACHINERY. Saws, jointers, shapers, planers, jointer-planer combinations. Quality small-shop-sized industrial woodworking machinery. Mosman Machinery Co., 18435 Cruzon Grade, Nevada City, CA 95959. (916) 265-3713.

GENERAL, EXCALIBUR woodworking machinery. Catalog, \$1. John Gorrell Woodworking, 7188 Whitfield Dr., Riverdale, GA 30296.

SHAPER CUTTERS—40 profiles, direct from manufacturer. FREE offer. Corob, 53 Westwood Rd., Shrewsbury, MA 01545.

FREE CATALOG—(50 pgs.) "How to make crown doors", solid high-speed steel and carbide shaper cutters, quality carbide saw blades, Weaver shaper 3HP, 1PH, 3/4-in. spindle, \$1,135 delivered. Call toll free (800) 255-6214 or write L.A. Weaver Co., Inc., 1108 So. 37th St., Kansas City, KS 66106.

USED & ANTIQUE TOOLS, British tools. Current list, dollar bill. Bristol Design, 14 Perry Rd., Bristol, England BS1 5BG.

HUDSON VALLEY WOODWORKERS—Sterling Woodcraft offers Inca and Hegner machines, hardwoods, and fine tools. Box 335A, RD 3, Highland, NY 12528. (914) 883-6780.

DISTRIBUTOR BANKRUPTCY SALE: New power tools. Rockwell Unisaws, 2HP, \$1,150; 8-in. long-bed jointers, \$975; Makita 10-in. miter saws, \$165; 2030 planers, \$950; 2040 planer-jointers, \$975. All factory warranted. While supplies last. Prepaid freight eastern U.S. No phone or COD orders (checks acceptable). Murphy Co., 1801-107 E. 5th, Charlotte, NC 28201.

DUST COLLECTION SYSTEMS for small wood shops. Includes 1HP motor/blower unit, filter bag and system design plans, \$350. Also available: filter bag fabric (80-in. width, \$10/yd ppd.); standard and custom filter bags. Barter Enterprises, Box 102B, Prospect Harbor, ME 04669.

VIRUTEX 0-81 PLATE JOINER, list \$335; SALE \$289, delivered. Precision Woodworking Machines, Rt. 7A, Box 603, Manchester, VT 05254. (802) 362-1985.

BANDSAW OWNERS! Fabricate your own bandsaw blades from inexpensive roll stock! Repair broken blades that would otherwise go to waste. Tools and stock

available in sizes 1/4 in. to 1 1/2 in. with tools starting at \$39 ppd. Send LSASE for free information to: New Milford Specialties Co., 24A So. Main St., Dept. FH, New Milford, CT 06776.

CARPENTERS MACHINERY CO., INC. has one of the largest inventories of new and used industrial woodworking machinery in the country. Over 100,000 sq. ft. inventory. Offices in Philadelphia and York, Pa. SPECIAL: Delta RC-33 13-in. planer with 2HP, 1PH motor, with stand and free castors and table extensions. \$1,519 F.O.B. Philadelphia/York. Limited quantities. 212 N. 11th St., Philadelphia, PA 19107. (215) 922-7034. 365 W. Cottage Pl., York, PA 17403. (717) 843-2101.

TABLE STROKE SANDER
6 Models \$595.00 — \$695.00 **BALL**
Deluxe \$750.00 — \$1200.00 **BEARING**
Sand 38" x 6' & 8'
Sidelstroke & String Sanders
Available, Kits \$45 to \$570.
(Less Motor)
F.O.B.
© McCall House, Box 1950-F
Lenoir, N.C. 28645 704-758-1991

Over 300 Router Bits
Over 300 Different Carbide Router Bits and 150 Carbide Tipped Saw Blades. From 7" to 16", designed and manufactured for the professional woodworking trade. Our quality and prices are unbeatable. Send \$2.00 for illustrated catalog.

Nimrod
P.O. Box 54
Cedarhurst, N.Y. 11516 **Tools**

CANADIANS
Rockwell, Emco, Duplicarver, R.B.I.,
Record Marples, Hitechi, Greelee, Shopsmith,
Dremel, and high quality machinery from the Orient.
Visit our showroom for demonstrations
GERRY'S TOOL SHED
1111 Flint Rd. Unit 6
Downsview (Toronto), Ontario M3J 3C7
(416) 665-6677

**KRENOV - QUALITY
PLANE IRONS**
3-1/8" THICK 3-1/2" LONG 5 WIDTHS AVAILABLE
HIGH CARBON TOOL STEEL RC 60 62
FREE DETAILS
1650 MITCHELL CREEK DR. FORT BRAGG, CA 95437

**Whittling and Carving
Tools and Supplies**
New catalog—60¢. American
and foreign made quality tools.
WARREN TOOL CO., INC.
Rt. 1, Box 14-AE, Rhinebeck,
NY 12572 (914) 876-7817

TRY FREE ROUTER BIT
Whatever your cutting needs, there's a full line of Carbide-Tipped Router Bits & Cutters to meet your demand. Our precision cutting tools are manufactured for all-purpose work, to provide long life and offered at super low prices! Send \$3.50 (postage/handling) for free sample, straight dubl. 1/4" cut. & catalog.
TCM Industries, Inc.
P.O. Box 6867, Alhambra, CA 91802

**WOODWORKING
TOOLS & SUPPLIES**
Over 1500 Items • Name Brands
Marples • Sorby • Kunz • Clay • Ulmia
Plans • Books and Much More.
Catalog \$2.00 Refundable
CUSTOM WOODWORKING
P.O. Box 102, Mercer, PA 16137

GERMAN PRIMUS PLANES. Everyday low prices. #711, \$66; #703P and 704P, \$55; #649P, \$24; #605, \$36. The Swiss Cabinetmaker, 10355 S.E. Highway 212, Clackamas, OR 97015. (503) 655-9911.

QUALITY 350-450 lb. WOOD LATHES, 60 in. to 96 in. between centers, 18 1/2 in. turn (gap), 12 in. thereafter. \$650-\$825. Harold Barker, 3108 Klingler Rd., Ada, OH 45810. (419) 634-7328.

INCA IN CANADA
All machines and accessories
available from
**Canadian Swiss
Machinery Co. Ltd.**
2 Cataract Street
Kingston, Ont. K7K 1Z7
Tel: (613) 544-8603

Woodworkers Super Catalog
Three pounds, 704 pages of
tools, materials &
machines, 60,000 items,
valuable reference, Name
Brands Discounted, call for
our price before buying any
machine Ph.607-729-6511
Send \$5 or credit card to get your catalog
McKILLIGAN SUPPLY
FWC 185, Johnson N.Y. 13790

SEATTLE
You'll find a large selection of the
best woodworking tools at:
The Wooden Boat Shop
1007 NE Boat St., Seattle, WA 98105
(206) 634-3600
9 AM-5:30 PM weekdays
9 AM-5:00 PM Saturday

TOOL PLANS
Your Complete Workshop of Plans
SAW, LATHE, DRILL PRESS, SANDER
ROUTER TABLE, JIGS, + PROJECTS
Stamped Envelope for a Brochure
SAVE POSTAGE - Send \$20 for SET
Send to: PLANS-F, PO Box 39081
Charleston, SC 29407

Toolhaus
CORPORATION™
14 Charles St., Needham, MA 02194
SALE **NOBEX 202 72.88**
EXTRA BLADES
24, 18, 12 TPI \$7.45
RYOBI SCREWGUN
E3700A 0-4000RPM
#2 BITS \$3/1.00
\$64.88
1" Travel Dial Indicator \$39.88
& Magnetic Stand
Hand Screw Kits—Jaws not included
8" 4.95 10" 5.25 14" 8.45 16" 10.95
MC VISA 617-449-4756 **SHIPPING EXTRA**

NEW SHIPMENT JUST ARRIVED
Hardened Steel. For filing, drilling, milling,
carving, routing any metal or wood. Cutting
edges from 1/4" to 1", all shanks 1/4". Brand new
in air-tight G.I. packs.
32-Tool Set. G.I. cost \$295.00 now \$26.00
14-Tool Set. G.I. cost \$126.00 now \$18.00
Save even more. Both Sets now \$38.00
Two \$38 Sets (Limited Time) \$58.00
Money Back Guarantee. Add \$3.00 for shipping.
Texas orders add 5%
tax. Export orders add
\$4.00.
U.S. SURPLUS CENTER
Dept. 517, 715 Camden
San Antonio, TX 78215

Toy Plans/Kits

Catalog of unique WOODEN TOY PATTERNS. \$1, refundable. Playrite, Rt. 8, Box 343F, Moultrie, GA 31768.

GIANT CATALOG: PATTERNS, PARTS, books for making wooden toys, \$1. Toy-maker Supply, Catalog #FW22, Tahoe, CA 95730-5459.

MAKE WOODEN TOYS—PROJECTS. 100's plans, kits, hardwood parts (toy, craft, furniture). Catalog, \$1. Cherry Tree Toys, Belmont, OH 43718.

TURNINGS

TOYMAKERS SUPPLIES
WALNUT AND OAK DOWELS
Furniture Plugs, Pins, Buttons
Cabinet Spindles and Knobs
Shaker Pegs and Candle Cups

WOODWORKS
4013-A Clay Ave. Ft. Worth, TX 76117
817-281-4447

Catalog \$1 First Class FREE 3rd Class

CATALOG ONLY \$1

MAKE TOYS

PLANS & PARTS

JULIA WOODEN TOYS DEPT. 1901
1283 AVERY CT. ST. LOUIS MO. 63122

FULL SIZE QUALITY PLANS

Wood Parts

WOOD PARTS

TOY, FURNITURE, CRAFT & GAME

Wheels • Spindles
• Balls • Knobs
• Shaker pegs • And more!

Since 1927! Send \$1.00 for Catalog.

BROWN WOOD PRODUCTS CO.
P.O. Box 8246FW, Northfield, IL 60093•(312)446-5200

Wood

HARDWOOD PLYWOODS. Ash, Baltic birch, red, white or natural birch, cherry, mahogany, maple, knotty pine, red oak, white oak, walnut, teak. All items 1/4-in. and 3/4-in. thickness. Sheet sizes 4x8, 2x8, 4x4, 2x4 or precision cut (1/8-in. tolerance) to any size, paying for what you order. Edging for all species in hardwood veneer strips or hardwood molding 3/8 in. by 3/4 in. Sheets of hardwood veneer with polyester backing. Wholesale quantity discounts. Call (617) 666-1340 for quotations. Shipping in USA via UPS or a common carrier. Boulder Plywood, 24 Broadway, Somerville, MA 02145.

Mail order, **FREE CATALOG.** Hardwood lumber products. Timberline Forest Products, Box 858B, Lake Elmo, MN 55042.

EXOTICS. Lumber and logs. Blackwood, bocote, ligum, kingwood, tulipwood, Brazilian rosewood, pink ivory, C. ebony, M. ebony, cocobolo, ironwood, quilted maple, lilac burls, other odd species. SASE for list. SJW, 650 St. John, Pasadena, CA 91105. (213) 441-1067.

RENALDO'S SUPPLY, hardwood capital of Saskatchewan. Domestic and imported wood for craftsmen. Free stock list. Box 64, Arelee, Sask. S0K 0H0. (306) 237-9585.

JOSHUA'S TREES. The source for the elusive hardwoods. Butternut, curly maple, padauk, bubinga, purpleheart, cocobolo, ligum vitae, ebony, more. Turning stock, logs, lumber. 113 N. Seventh, Brooklyn, NY 11211. (212) 387-9016.

COCOBOLO, BOCOTE from \$6.50 rbm. Ligum vitae from \$2.50 lb. A&C Hutt Enterprises Ltd., 15861 32 Ave., Surrey, B.C., Canada V4B 4Z5.

CALIFORNIA HARDWOODS: Kiln-dried California black oak, white oak, tan oak, Pacific madrone, Fremont cottonwood, black walnut. Burls and more. Cal Oak Lumber Co., California's largest hardwood lumber producer. PO Box 689, Oroville, CA 95965. (916) 534-1426.

BRAZILIAN EXOTIC HARDWOODS. Purpleheart, satinwood, sucupira, macauba, angelim, jatoba, ipe, gonalco, freijo, pernambuco, cumaru. Excellent quality. Paradise Farm Wood Products, Wesley, ME 04686. (207) 255-3711.

The finest in **BOWLS, TURNING SQUARES,** carving wood. Brochure, 40¢

stamps. Johnson Wood Products, Strawberry Point, IA 52076. (319) 933-4930.

DEFECT-FREE cocobolo, bocote, ligum. Lumber, squares, blocks, bowl blanks. Wholesale/retail. Send requirements. Quality guaranteed. Produced and imported by Tropical Timber Corp., 3125 VanWater, Portland, OR 97222. (503) 654-5349.

CHESTNUT SPECIALISTS. Custom milled. Woods of Heavenly Valley, Plymouth, CT 06782. (203) 283-4209 after 8 p.m.

EXOTIC/DOMESTIC hardwoods, 40 species! Custom cutting, multi-dimensions, free catalog. Woodworker's Dream, Box 329, Nazareth, PA 18064. (800) 345-3103 or (215) 759-2064.

ZIRICOTE lumber and squares. Honduras rosewood, bocote, granadillo, purpleheart, Peruvian walnut, machich, bubinga, padauk. Send \$1 for list. Black Mountain Wood Co., Inc., PO Box 3525, Portland, ME 04104. (207) 772-3332.

CONSTANTINE'S

Wood Center of Florida

Exotic woods in veneers, lumber. Hard-to-find woodworking tools, hdwe. specialties, wood finishes. Catalog at store. Come on in.

1040 E. Oakland Pk. Blvd. 305-
Ft. Lauderdale, FL 33334 561-1716

VENEER

long, premium, lowest prices
brochure: 12613 Centerline Rd.
S. Wales, NY 14139 (716) 655-0206

certainly wood

ATTENTION:

FLORIDA WOODWORKERS

We have Florida's largest selection of exotic and native hard and soft woods, table slabs, veneers, etc. for the professional and novice. Send SASE for list.

HENEGAN'S WOOD SHED
7760 Southern Blvd. (W. West Palm Beach, FL 33411)
Call (305) 793-1557

WESTERN PENNSYLVANIA WOODWORKERS

50 Domestic & Imported Woods
Veneers • Finishes • Mouldings • Hardware
Carving Stock • Inlays & Bandings
Plans • Books • Magazines • Quality Tools
Call or Visit Our Store

WOODCRAFTERS' SUPPLY
7703 Perry Hwy. (Rt. 19)
Pittsburgh, Pa. 15237 (412) 367-4330

DENIER BROS.

HARDWOOD SELECTION ROOM

710 E. SHEPHERD LANE
CINCINNATI, OHIO 45215
PHONE (513) 554-0449
ONE BLOCK EAST OF I-75 AT EXIT 13

GILMER WOOD CO.
503 • 292-4182

Rare & Exotic Woods

- in logs, planks & squares
- over 50 species in stock
- also cutlery, turning & musical instrument woods

10426 NW Laidlaw Rd., Portland, OR 97229

HARDWOODS

Over 80 varieties of hardwood • Plywood
• Everything for the professional and hobbyist • Commercial Discounts.

AUSTIN HARDWOODS
3821 E. Broadway • Phoenix AZ 85040
(602) 437-2945

2045 N. Forbes • Tucson AZ 85745
(602) 622-7383

FINEST DRESSED HARDWOODS

Full line of Softwoods and Cabinet Plywoods, Laminates and Veneers

Millwork Available

Guthrie Lumber Co.
617-893-1300

187 Lexington Street, Waltham, MA 02154

Specializing in all sizes of eastern & western pines. Also hardwood and softwood mouldings.

Unicorn Universal Woods Ltd.

SPECIALTY FOREIGN & DOMESTIC HARDWOODS-SOFTWOODS-VEENEERS

Mail Orders
Write for 'New' Price List-Still Free
4190 Steeles Ave. W. Unit 4
Woodbridge, Ont., Canada, L4L 3S8
416-861-2308

WOOD & TOOL EXCHANGE

Limited to use by individuals only

For Sale

2,000 sheets veneer. \$500 for all. Will divide. G. Maynard, PO Box 22, Brownsboro, AL 35741.

Tannewitz 30-in. bandsaw. Excellent condition, ball bearing machine just reconditioned. \$2,700. (518) 747-7658.

Walk-in spray booth, hot lacquer spraying equipment, case clamp, sash clamp,

molder cutters, small Cyclone. Bair (513) 335-2904.

Planer, 24-in., excellent condition, good knives, 3PH, 7 1/2 HP, flat or V belt, PTO or line shaft (incl.), \$2,200. C. Wardwell, upstate NY. (315) 646-2445.

Dust collector type D roto-clone by American Air Filter. Size 12, 5HP, 3PH, with pre-cleaner and hopper. Contact Ron Nikkel, Rt. 2 Box 180N, Bartlesville, OK 74006. (918) 333-7033.

Crescent 24-in. planer, \$5,500; Delta 20-in. bandsaw, \$2,600; Delta 14-in. table saw, \$1,900; Powermatic #90 lathe, \$1,600; Powermatic 8-in. jointer, \$1,150; DeWalt 16-in. radial, \$1,500; Whitney shaper. (404) 266-2453.

Antique great wheel lathe. Dia. 63 in., bed 64 in., square nails, crank for apprentice to turn. \$660. Bob Siegel, 11458 N. Laguna Dr., Mequon, WI 53092. (414) 242-1571.

KD walnut/butternut, \$2.75; cherry, \$2.25; ash/oak, \$2; chestnut, \$5; maple, \$1.75. M. Morrison, Rt. 1, N. Bloomfield, OH 44450. (216) 889-3770.

Barn drills, slicks, chisels, etc. Many Stanley 45s, 55, 97, 105, 90, and hundreds of other quality old tools. Old chests. Write for list. Morris Grenzow, Juda, WI. (608) 934-5437 evenings.

Emmert patternmaker's vises and workbenches. Both styles. Excellent working condition. \$300 each or 3/\$750. Frank Flynn, 5800 Alderson St., Pittsburgh, PA 15217. (412) 362-6996.

Wanted To Buy

Sassafras and unstained pearwood. MacMurray, 1419 Washington St., Bath, ME 04530.

Dowel maker Woodcraft Supply #06101W, with drive cones—1/2 in. by 1 in. by 1 in. J. Brooks, Pine Rd., New Boston, NH 03070.

• TEAK • EBONY • MILLWORK • ORY KILN FACILITY • BASSWOOD •

• POPLAR • OAK • MAPLE • ASH • MAHOGANY



YUKON LUMBER CO.

520 W. 22nd St. • Norfolk, Virginia 23517 • (804) 625-7131

Furniture and Cabinet Woods
Boatbuilding Lumber

Custom Millwork
Exotic Hardwoods

• COCOBOLO • BUBINGA • PURPLEHEART • ROSEWOOD • WENGÉ •

PADOUK • BIRCH • CHERRY • WALNUT

PARKS OUTSTANDING NEW MODEL 98

12" THICKNESS PLANER

MADE IN AMERICA

• Compact • Ready-To-Run

Classic design and construction features: cast iron structure, steel feed and bed rollers, ball bearing cutterhead, micro blade adjustment.

SPECIAL PARKS FEATURE: "Full Power" 2 H.P. motor permits deep 1/8" cut on widest boards.

WRITE FOR LATEST CATALOG AND PRICES
THE PARKS WOODWORKING MACHINE CO.
Dept FW 1501 Knowlton St., Cincinnati, OH 45223



Listings are free, but restricted to happenings of direct interest to woodworkers. Our Mar./Apr. issue will list events between Feb. 15 and May 15; deadline Jan. 15. Our May/June issue will list events between Apr. 15 and July 15; deadline Mar. 15.

CALIFORNIA: Lecture/workshop—Introduction to woodturning, Del Stubbs, Jan. 11, Fresno; woodturning workshop, Del Stubbs, Jan. 12–13, Porterville. Contact Mark R. Webster, 670 N. G St., Porterville, 93257. (209) 781-4074.

Seminar—"How to Market Your Arts and Crafts," Howard L. Cossman, Feb. 16, Ambassador Hotel, Los Angeles. Contact Art Marketing Institute, PO Box 4564, North Hollywood, 91607. (818) 782-2377.

Show—Woodline-East Bay Woodcrafters 4th Annual Woodcarving Show, Mar. 2–3, 1731 Clement Ave., Alameda. Contact Dick Compton, 4351 Whittle Ave., Oakland, 94602. (415) 531-6455.

Show—Contemporary American Wood Sculpture, through Jan. 6, Crocker Art Museum, 216 "O" St., Sacramento, 95814. (916) 449-5423.

COLORADO: Juried exhibition—Colorado Artist-Craftsmen, Nov. 30–Dec. 23 (Colo. residents only). Arvada Center for the Arts and Humanities, Arvada. Contact Box 4382, Denver, 80204.

Juried exhibition—2nd Art of Crafts Festival, July 26–28, Denver Art Museum. Application deadline Feb. 22. Contact The Art of Crafts, PO Box 38223, Denver, 80238. (303) 592-7238.

Workshops/seminars—Woodturning, Dale Nish, Feb. 1–2; numerous other events through Mar. 16: finishing, joinery, caning, veneering, carving, European hardware and Japanese tools. The Woodworkers' Store, 3040 South Broadway, Denver. (303) 778-8650.

CONNECTICUT: Exhibition—16th Annual Celebration of American Crafts, Nov. 8–Dec. 23. Creative Arts Workshop, 80 Audubon St., New Haven, 06511. (203) 562-4927.

Workshops—Winter '85, numerous classes Jan. 19–Mar. 3, Brookfield Craft Center, PO Box 122, Brookfield, 06804. (203) 775-4526.

DELAWARE: Juried exhibition—25th Contemporary Crafts Exhibition, Jan. 18–Mar. 3, Delaware Art Mu-

seum, 2301 Kentmere Pky., Wilmington, 19806.

FLORIDA: Exhibition—Boynton's G.A.L.A. (Great American Love Affair), Mar. 1–3. Contact Eleanor Wol-lenweber, PO Box 232, Boynton Beach, 33425. (305) 734-8120, ext. 432.

Show—Inlaid Exotic Woods, Giles Gilson, Mar. 15–Apr. 6. Netsky Gallery, 3107 Grand Ave., Coconut Grove. Contact Netsky Gallery, 5759 Sunset Dr., South Miami, 33143. (305) 662-2453.

ILLINOIS: Workshops/demonstration—Workshops, Feb. through Apr., call for details; Inca power tools demonstration, Feb. 9 and Mar. 30. The Hardwood Connection, 420 Oak St., DeKalb, 60115. (815) 758-6009.

INDIANA: Juried fair—30th Annual Talbot Street Art Fair, June 8–9, Talbot St. from 16th to 18th Sts. between Pennsylvania and Delaware Sts., Indianapolis. Entry deadline Feb. 15. Contact Fair Committee, Box 479, Danville, 46122.

Exhibition—Indiana Woodworking, Jan. 18–Mar. 1. Artifacts Gallery, 6327 Guilford Ave., Indianapolis, 46220. (317) 255-1178.

Juried show—Indiana Craft Market 85, Mar. 28–31. Indianapolis Hilton, downtown on the Circle. Application deadline Jan. 15. Contact David Robb, 202 N. Alabama St., Indianapolis, 46204. (317) 631-1247.

KENTUCKY: Exhibition—"Wood or Wood Not," Jan. 12–Feb. 6, Owensboro Museum of Fine Arts, 901 Frederica St., Owensboro. Contact museum at (502) 685-3181.

LOUISIANA: Juried show—Craftworks Gift Show (wholesale only), Mar. 16–17, Riverside Complex, 175 S. River Rd., Baton Rouge. Contact Jennifer Martin, Craftworks, Rt. 4, Box 688, Gonzales, 70737. (504) 673-4002.

Workshop—Sam Maloof, Feb. 9–10, Louisiana Crafts Council, 720 Terrace Ave., Reddy Cultural Center, Baton Rouge, 70802. (504) 381-9562.

MARYLAND: Exhibitions—"Boxes and Baubles," and Woodworkers' Guild of Washington, Oct. 20–Dec. 24, Appalachiana, 10400 Old Georgetown Rd., Bethesda. **Juried fair**—ACC Craftfair, trade: Feb. 12–14, public: Feb. 15–17, Baltimore Convention Center, Baltimore. Contact American Craft Enterprises, Inc., PO Box 10,

New Paltz, N.Y. 12561. (914) 255-0039.

Juried fair—Spring Craft Fair, May 1–3, University of Maryland, College Park. Application deadline Apr. 15. Contact Mary Shaffer, Craft Center, Univ. of Maryland, Stamp Union Room 0232, College Park, 20742. (301) 454-4754.

Juried fair—10th Annual Spring Arts & Crafts Fair, Apr. 19–21, Montgomery County Fairgrounds, Gaithersburg. Jurying begins Jan. 21. Contact Deann Verdier, Director, Sugarloaf Mountain Works, Inc., Ijamsville, 21754. (301) 831-9191.

MASSACHUSETTS: Demonstrations—Tool demonstrations, Jan. 12; chip carving, Wayne Barton, Feb. 16; joinery, furniture and finishing, Tage Frid, Mar. 16. Woodcraft Supply Corp., 41 Atlantic Ave., Box 4000, Woburn, 01888. (617) 935-5860.

Workshops—Extensive winter schedule. For calendar, write Old Sturbridge Village, Sturbridge, 01566.

Exhibition—Scent Bottle Invitational, July 5–Aug. 31. Signature galleries in Boston and Hyannis. Deadline for slides/photos, resume and SASE Mar. 1. Contact Signature, Dock Square, North St., Boston, 02109. (617) 227-4885.

Workshops/seminars—Numerous events: joinery, veneering, caning, turning, cabinetmaking, marquetry, finishing. The Woodworkers' Store, 2154 Massachusetts Ave., Cambridge. (617) 497-1136.

Fair—15th Annual Craft Fair, May 17–19. Application deadline Feb. 1. Call or write Fair Registrar, Worcester Craft Center, 25 Sagamore Rd., Worcester, 01605. (617) 753-8183.

MINNESOTA: Workshops/seminars—Numerous events: joinery, marquetry, veneering, and caning. The Woodworkers' Store, 3025 Lyndale Ave. S., Minneapolis. (612) 822-3338.

MISSISSIPPI: Conference/exhibition—American Crafts Council Southeast Region Winter Conference, Feb. 22–23, Itawamba Junior College, Fulton; National Invitational Furniture Exhibition, Feb. 23–Mar. 30, Tupelo Art Center, 211 W. Main, Tupelo. For both contact Robert Reedy, Program Coordinator, Art Dept., Itawamba Junior College, Fulton, 38855. (601) 862-3101, ext. 264.

MISSOURI: Juried exhibition—3rd Annual Laclede's Landing Artists' Showcase, June 1–2. Application dead-

JAPANESE WATERSTONES

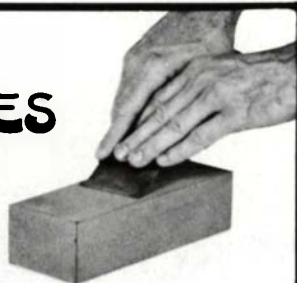
America's best selling new sharpening stones. Rapid cutting action produces razor sharp edges in minutes by hand.

SET OF THREE WATERSTONES \$39.50 POSTPAID

Set includes a 1200 grit medium stone for establishing a sharp bevel, a 6000 grit finish stone for honing and polishing the edge, and an 8000 grit Gold finishing stone for producing a final edge of unsurpassed quality. Medium stone is 2½" x 8" x 1-3/8". Finish stones are 2½" x 7¼" x ½".

GREEN COARSE STONE \$19.50 POSTPAID

This 200 grit silicone carbide waterstone pictured above features an extremely fast cutting action suitable for grinding out nicks in blades and reshaping bevels, yet is hard enough to resist rapid hollowing common to most manmade coarse stones. Complements the set of waterstones above. 3" x 8½" x 2".



MAKITA BLADE SHARPENER

\$195.00 POSTPAID Model 9820-2

Sharpens jointer & planer knives up to 16" long with great speed and accuracy. Medium grit Japanese waterstone rotates in gravity-fed water bath for safe work on your edge tools.

OPTIONAL ACCESSORY JIG (shown in use at left) for chisels & plane irons... \$12.50 Postpaid.

NEW GREEN WHEEL

for 9820-2 \$35.00 POSTPAID

120 grit silicone carbide wheel rapidly re-shapes bevels and grinds out nicks in HSS or carbon steel blades. Also sharpens carbide planer knives.



MC/Visa users outside Georgia

ORDER TOLL FREE (800) 241-6748

(Orders Only)

Or send check, money order, or MC/Visa info to Highland Hardware. Prices are Postpaid in U.S. Send \$1.00 for our tool catalog (free with order).

highland hardware

1045 N. Highland Ave., NE Dept. F
Atlanta, GA 30306 (404) 872-4466

Pink Ivory
Ebony
Snakewood

CURLY
WOODS

Bubinga
Koa
Satinwood

WOOD
QUALITY

Exotic/Cabinetwoods

AVAILABLE
THICK 3" to 6" PLANKS
for
BOWLS and TURNING

Write

Berea Hardwoods Co.

125 Jacqueline Dr.
Berea Ohio 44017
216-243-4452

"It's a matter of pride for both of us"

Cocobolo
Padauk
Rosewood

PLUS A
LARGE
VARIETY OF
COMMON
AND OTHER
RARE WOODS

Bloodwood
Ziricote
Purpleheart

FELDER

Woodworking System

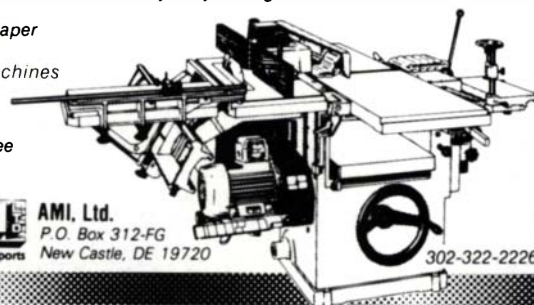
- 16" jointer/surfer
- heavy-duty mortiser
- 16" planer/thicknesser
- heavy-duty sliding table
- 12" table saw
- heavy-duty shaper

Over 25,000 machines are already in use in Europe.

Write for your free brochure today!



AMI Ltd.
P.O. Box 312-FG
New Castle, DE 19720



302-322-2226

• LOWEST PRICES • FINEST QUALITY •

CARBIDE ROUTER BITS BANDSAW BLADES

For your Catalogue Send \$1.00
(Refundable with order) To:

STOCKS TOOL CO.

P.O. BOX 642
DANA POINT, CA 92629

• LOWEST PRICES • FINEST QUALITY •

• LOWEST PRICES • FINEST QUALITY •

BUILD YOUR OWN POWER TOOLS

METAL PARTS KITS AT LOW FACTORY DISCOUNT PRICES FOR:

- 12-IN. BAND SAW
- 18-IN. BAND SAW
- 10-IN. TILT/ARBOR SAW
- COMB. DRILL PRESS-LATHE
- 9-IN. TILT TABLE SAW
- 6-IN. BELT SANDER
- SPINDLE SHAPER

SAVE \$50 To \$500

Sold for 38 Years.

PLANS \$5.00 Full Size Patterns per plan Deductible

98,000 in Use.

KITS FROM \$39.99 TO \$194.99

Featured in Workbench, Popular Science, Mechanix Illustrated. Step-by-step plans, photos, full-scale patterns show how. No machining, no welding. 5-Year Full-Service Guarantee. Send \$5 each for Plans plus \$1 for postage stating tools wanted. Catalog included. Or, send \$1 for Catalog!

GILLIOM MFG., INC., Dept. FW-1
1700 Scherer Pkwy.
St. Charles, Mo. 63303

FREE!

VENEER CRAFT CATALOG PLUS SIMPLIFIED INSTRUCTIONS

101 veneers 3 ft. to 8 ft. long. Flexible veneers that bend around corners. Extra wide and extra thick veneers. 1 ply and 2 ply fancy matched veneer faces. Glues, tools, exotics, inlays, burls. Re-veneer old surfaces instantly! Create beautifully veneered furniture quickly and easily! Illustrated catalog has simplified veneering instructions that you learn fast. Send for FREE catalog and get special bargain starter offers. Write today!

Morgan Veneers, Dept. FOAK56
1123 Bardstown Road, Louisville, Ky. 40204

WHY PAY A LOT MORE?

GO PRO WITHOUT GOING BROKE



Dealer inquiries welcome

24", 20", & 15"

Call or write for prices and information. We carry a complete line of imports. 30 days to return on all machines.

PRO SHOP Dept. 3, P.O. Box 721
Elmhurst, IL 60126
312/832-3803

138

THE Xylophile's COMPANY

MAKITA

BO4510	4" finishing sander	\$ 47
DP3720	3/8" var/rev. drill	\$ 49
1100	3 1/4" planer kit	\$169
1900BW	3 1/4" planer kit	\$ 98
1805	6 1/8" planer kit	\$279
2401BW	10" miter saw	\$189
3612BR	New plunge router	\$189
GUIDES	for 3612BR	\$ 20
3601B	1/2" router	\$129
3608BK	1/4" router	\$ 86
3700B	1/4" trimmer	\$ 85
4301BV	jig saw	\$129
5007NB	7 1/4" circular saw	\$ 99
5201NA	10 1/4" circular saw	\$219
6000R	3/8" clutch-drill	\$106
6000LR	low speed uni-drill	\$119
6010DWK	3/8" cordless drill	\$ 89
6012HDW	3/8" cordless clutch drill	\$106
6510LVR	3/8" low speed drill	\$ 69
9900B	3 x 21 belt sander	\$126
9924DB	3 x 24 belt sander	\$133
9401	4 x 24 belt sander	\$172
9045N	1/2 sheet finish sander	\$108
9820-2	blade sharpener	\$173
LS1400	14" miter saw	\$419
DP4700	1/2" var/rev. drill	\$ 99

FREUD

LM72M	10", 24t, rip	\$ 42.00
LU73M	10", 60t, cutoff	\$ 42.00
LU84M	10", 50t, smooth comb.	\$ 42.00
SET	ALL THREE ABOVE	\$125.00
LU82M	10", 60t, triple chip	\$ 49.00
LU85M	10", 80t, super blade	\$ 72.00
DS306	6" dado 1/4" - 13/16"	\$ 99.00
DS308	8" dado 1/4" - 13/16"	\$120.00

OUR PERFECTIONIST'S SET

Includes the LU85M super blade, the LM72M rip blade and the DS308 dado set.
ALL THREE \$229.00

ALL SHAPER CUTTERS 20% off
ALL ROUTER BITS 25% off

RECORD

BENCH PLANES

04	Smoothing - 9 3/4" long	\$ 34.00
05	Jack - 14" long	\$ 40.00
07	Jointer - 22" long	\$ 66.00
SET	ALL THREE ABOVE	\$135.00

LEIGH

TD514	12" dovetail jig with 1/4" bits for 1/2" dovetails	\$145
TD514	12" dovetail jig with 1/2" bits for 3/4" dovetails	\$173
TD514L	24" dovetail jig with 1/2" bits for 3/4" dovetails	\$248

HITACHI

TR12	1/2" plunge router	\$195
TR8	1/4" plunge router	\$127
TR6	1/4" trimmer	\$ 94
SB110	4 x 24 belt sander	\$183
SB75	3 x 21 belt sander	\$136
DR10	3/8" super drill	\$109
DTC10	3/8" cordless drill	\$ 89
DRC10	3/8" cordless w/clutch	\$ 94

MACHINERY

2030	MAKITA jointer/planer	CALL
2040	MAKITA 15-5/8" planer	CALL
F1000-A	HITACHI jointer/planer	CALL
P100-F	HITACHI 12" planer	CALL
B600-A	HITACHI bandsaw	CALL
550	INCA jointer/planer	CALL
710	INCA 20" bandsaw	CALL
259	INCA 10" table saw	CALL
310	INCA 10-1/2" bandsaw	CALL
HC260	ELEKTRA BECKUM jtr/plnr	CALL
TF100	ELEKTRA BECKUM shaper	CALL
SP1000	ELEKTRA BECKUM dust clr.	CALL
M/MX-2	HEGNER precision saw	CALL
HDB175	HEGNER wood lathe	CALL

CALL TOLL FREE
1-800-354-9083
IN KENTUCKY CALL
(606) 254-9823

The Xylophile's Co.
138 EAST LOUDON AVENUE
LEXINGTON, KENTUCKY 40505

"The Woodlover's Company"



MAIL ORDERS: Simply enclose your check or money order with a note describing the item(s) desired. Ky. residents please add 5% sales tax. We will ship right away.



on orders of \$35 or more **PRICES INCLUDE SHIPPING** otherwise please add \$1.95 shipping
TO THE CONTINENTAL U.S.

line Jan. 18. Contact Artists' Showcase, c/o First Street Forum Art Center, 717 N. First St., St. Louis, 63102. (314) 421-3791.

MONTANA: Show—Contemporary furniture by Forrest and Meredith Tate, Nov.–Dec. Danforth Gallery, Livingston. Contact Meredith Tate, Box 203, Gallatin Gateway, 59730.

NEW HAMPSHIRE: Exhibition—Handcrafted furniture, Oct. 29–Jan. 18. League of New Hampshire Craftsmen, 205 N. Main St., Concord. (603) 224-3375.

NEW YORK: Juried exhibition—2nd Annual Autumn Crafts Festival at Lincoln Center, Aug. 31, Sept. 1–2, Sept. 6–8. Application deadline Mar. 1. Contact Brenda Brigham, American Concern for Artistry and Craftsmanship, PO Box 6221, Hoboken, N.J. 07030. (201) 798-0220.

Courses—Various classes, Maurice Fraser, Jan. 23–May 15. The Craft Students League, YWCA, 610 Lexington Ave. at 53rd St., N.Y.C., 10022. (212) 755-2700. **Show**—Marquetry by Georges Vrize, Erté, Yves Encontre, through Jan. Atelier Yves Encontre Inc., 149 Wooster St., N.Y.C., 10012. (212) 505-5450.

NORTH CAROLINA: Juried exhibition—"After Her Own Image: Woman's Work 1985," Feb. 22. Salem Academy and College's Fine Arts Center, Winston-Salem. Entry deadline Dec. 31. Contact JoAnne Vernon, PO Box 10819, Salem Station, Winston-Salem, 27108. (919) 724-9523.

OHIO: Workshops/seminars—Veneering, caning, and finishing, Feb. 2–23. The Woodworkers' Store, 2500 E. Main St., Columbus. (614) 231-0061.

PENNSYLVANIA: Juried show—3rd Annual Pennsylvania National Arts & Crafts, May 3–5. State Farm Show Complex. Deadline Dec. 15 (open to all U.S. residents). Send SASE to Kay Kishbaugh, Pennsylvania National Arts & Crafts Show, PO Box 11469, Harrisburg, 17108. (717) 697-3834.

Juried exhibition—19th Annual Sidewalk Sale and Exhibition of the Central Pennsylvania Festival of Arts, July 11–14. Penn State Campus, State College. Application deadline Mar. 8, SASE. Contact Lurene Frantz, Box 1023, State College, 16804. (814) 237-3682.

Workshop—Hardwood lumber grading and inspection,

Feb. 25–Mar. 1. Penn State Univ., University Park. Contact Agricultural Conference Coordinator, 410 J.O. Keller Conference Center, University Park, 16802. (814) 865-9547.

TENNESSEE: Juried show—Dogwood Arts Festival's Master Furnituremaker Show, Apr. 19–21. West Towne Mall, Knoxville. Application deadline Feb. 15. Contact Festival Office, 203 Fort Hill Building, Knoxville, 37915. (615) 637-4561.

Workshops—Wood laminate construction, Ron Dekok, Mar. 11–15; creative woodturning, Rude Osolnik, Mar. 25–29. Arrowmont School of Arts and Crafts, Gatlinburg. Contact Clare Versteegen, Box 567, Gatlinburg, 37738. (615) 436-5860.

Seminar—Hardwood manufacturing and marketing, Feb. 18–22. National Hardwood Lumber Association, Memphis. Contact NHLA, PO Box 34518, Memphis, 38184. (901) 377-1818.

TEXAS: Exhibition—"Local Treasures," Dec. 4–Jan. 13. Institute of Texas Cultures, 801 South Bowie St., San Antonio. Contact Austin Woodworkers, Rt. 1, Box 112, Manchaca, 78652. (512) 282-0493.

Juried fair—Houston Festival's Annual Crafts and Arts Exposition, Mar. 23–31. Contact Barbara Metyko, Houston Festival, 1964 W. Gray, Suite 227, Houston, 77019. (713) 521-0993.

Juried fair—ACC Craftfair; trade, Mar. 27–28, public, Mar. 29–31. Market Hall, Dallas Market Center, Dallas. Contact American Craft Enterprises, Inc., PO Box 10, New Paltz, N.Y. 12561. (914) 255-0039.

Juried show—Austin Woodworkers Guild, Mar. 4–31. Deadline Feb. 7. Contact Guild, Rt. 1, Box 112, Manchaca, 78652. (512) 282-0493.

VERMONT: Exhibition—Rare tools and machines, ongoing exhibit. The American Precision Museum, Windsor. (802) 674-5781.

Exhibits/workshops—Series at Vermont State Craft Center at Frog Hollow, Middlebury, 05753. (802) 388-3177.

VIRGINIA: Festival—10th Annual Mid-Atlantic Wildfowl, Mar. 1–3. The Pavilion, Virginia Beach. \$5,000 cash prizes. Contact Back Bay Wildfowl Guild, Inc., PO Box 805, Virginia Beach, 23451. (804) 428-8549.

Juried exhibition—Spotlight '85, June 25–July 26. Slide deadline Mar. 1. Sponsored by the American Crafts Council Southeast Region, Longwood College, Farm-

ville. Contact Spotlight '85, Art Dept., Longwood College, Farmville, 23901. (804) 392-9359.

WASHINGTON: Workshop—Japanese joinery with Yosh Shimoi, Jan. 18–20. Sponsored by the Northwest Guild of Woodworkers. Contact Charlie Mastro, 4268 10th Ave. S., Seattle, 98102. (206) 767-9185.

Workshops/seminars—Numerous events: marquetry, furniture repair and refinishing, finishing, cabinetmaking, turning, joinery, and veneering, Jan. 5–Mar. 16. The Woodworkers' Store, 3823 Stone Way N., Seattle. (206) 634-3222.

WISCONSIN: Juried fair—13th Annual Festival of Arts, Mar. 24. Univ. of Wisconsin at Stevens Point, Fine Arts Building. Application deadline Jan. 7. Write PO Box 872, Stevens Point, 54481.

Show—Woodworking World—The Toronto Show, Feb. 1–3. Constellation Hotel and Convention Center, Rexdale, Toronto. Sponsored by Woodworking Association of North America. Contact W.A.N.A., 35 Main St., Suite 6, Plymouth, N.H. 03264. (603) 536-3876.

Connections

In Connections we'll publish membership calls for guilds, authors' queries, and appeals from readers who want to share special interests.

Assistantships available at the Arrowmont School of Arts and Crafts for summer workshops June 1–July 13, July 13–Aug. 18. Applicants should have at least four years of completed course work or the equivalent in practical or professional experience. Application, slide and reference deadline Apr. 1. Contact Arrowmont School of Arts and Crafts, PO Box 567, Gatlinburg, Tenn. 37738. (615) 436-5860.

Grants available, up to \$1,000, for research or publication projects about early American industries that relate to homes, shops, farms or seafaring. Application deadline Mar. 15. Write Charles F. Hummel, EALA, c/o Winterthur Museum, Winterthur, Del. 19735.

French woodworkers: I'd like to hear from other independent woodworkers who share my interest in con-

U.S.A. CUTTING TOOLS • NORTON ABRASIVES • MAKITA • DEWALT • BIESEMAYER • AIR TOOLS

NEW PRODUCT

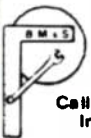
ELEKTRA BECKUM



1 1/2 h.p., 220/240V, 4 speed, tilting table, rip fence, 1/4" to 1" blade, 12" cutting height, 280 lbs.

Sale \$1370. Freight Prepaid (Free Porter Cable 330 Sander with Purchase)

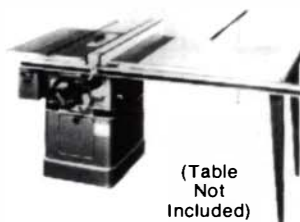
BRATTON MACHINERY & SUPPLY, INC.



ATTN: Dept. FWW
1015 Commercial Street
P.O. Box 20408
Tallahassee, FL 32316
Call toll free: 1-800-874-8180
In Florida: 1-800-342-2641
Local: (904) 222-4842
Write for catalogs.

Enclose \$3 for postage & handling.

Powermatic/Biesemeyer



(Table Not Included)

Powermatic Model 66 with Biesemeyer Fence. 10" model 66 Table Saw complete with Biesemeyer Model 50, 50 inches rt. of blade, 1 ph., 3 h.p., 230 volt, magnetic controls.

List \$2265.
SALE \$1849.

Powermatic

	List	SALE
Model 66 10" Table Saw	2160.	1749.
Model 50 6" Jointer	1138.	999.
Model 60 8" Jointer	1572.	1425.
Model 100 12" Planer	2725.	2399.
Model 180 18" Planer 1 ph.	5000.	4699.
Model 180 18" Planer 3 ph.	5000.	4540.
Model 26 Shaper	2050.	1775.
Model 45 Lathe 12"	2253.	1975.
Model 141 14" Bandsaw	1325.	1124.
Model 81 20" Bandsaw	2940.	2580.

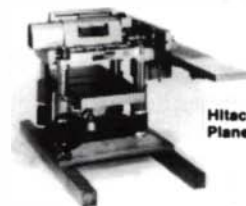
(F.O.B. BMS Warehouse, McMinnville, TN)

LEASE PURCHASE plan now available—low down payment, tax credits

Hitachi

	List	SALE
F1000A Planer/Jointer	2100.	1460.
P100F 12" Planer	1605.	1137.
B600A Bandsaw	2420.	1680.
TR-12 Plunge Router	299.	189.
C 12Y 12" Table Saw	2160.	1499.

(Freight Prepaid)



Hitachi F1000A Planer-Jointer

Delta/Rockwell

	List	SALE
10" Tilting Arbor Unisaw 3 hp.	2141.	1760.
10" Contractor Table Saw 1 1/2 hp.	1051.	799.
14" Bandsaw, encl. Stand, 3/4 hp.	932.	699.

(Freight Prepaid)

Biesemeyer

	SALE
Model 50"	299.
Home Shop Fence Systems	
Model 40"	209.
Model 52"	226.

(Freight Prepaid)

• JORGENSEN CLAMPS • AIR TOOLS • U.S.A. CUTTING TOOLS • NORTON ABRASIVES • GREENLEE

Quarter Sawn White Oak

Best quality, precision band sawn from veneer logs $\frac{1}{4}$ " and up. Extra wide stock with rift and flake figure. Bookmatched flitches also available.

Curly Soft and Hard Maple

5/4 to 8/4 kiln dried and resawn bookmatched sets $\frac{1}{4}$ " to $\frac{1}{2}$ " S2S. Excellent for all fine cabinetry. Musical instrument sets also available.

Call or write, and I'll be happy to tell you more.

(215) 775-0400

Box 303, RD 3

Mohnton, PA 19540

**TALARICO
HARDWOODS**

**FLUSH LIFTING HANDLE
Or Drawer Pull**

Polished Brass



3"x2 1/4"
\$23.95 per pair

Price Plus Delivery
Sales Tax (R.I., Ct. only)
MasterCard/VISA

McDonald-Harrington, Inc.

P.O. Box 75, Dept. FW

Pomfret Center, CT 06259

(203) 928-6579

**18th Century
Furniture Kits**

The original, and the largest manufacturer of authentic museum quality reproduction furniture kits in solid cherry, ash and mahogany.

CHAIRS • TABLES • CHESTS
LOWBOYS • and MORE!



Free
Sale
Catalog

Call 1-800-BARTLEY or
In Illinois 634-9510

The Bartley Collection Ltd.

747 Oakwood Ave., Dept. FW644

Lake Forest, IL 60045

**Are You
Being Deceived?**

Six years ago there were no ads for scroll saws in woodworking publications. Five years ago there was one ad. The last time we looked there were five. What happened?

The ad which appeared five years ago was for HEGNER Universal Precision Saws. For the first time a scroll saw was referred to as a "precision" saw. Although the parallel arm system which HEGNER saws employed was not new and had been used in the late 1800s, the revolutionary and patented aspect which made HEGNER saws extremely precise was their blade suspension.

When AMI, Ltd. introduced the HEGNER saw, a revolution began. Not only was this new saw precise, it was also quiet, it cut an edge which was smooth, it always gave square cuts, and it did all this with almost no blade breakage. It could cut 2" thick oak, maple, birch, etc. with a square, smooth edge every time.

As the HEGNER saw became more and more popular, new handicraft industries emerged. Individuals left their jobs and started making nameplates, puzzles, toys, and they were earning more than they had ever earned before.

Then, two years ago, certain manufacturers began to think that the HEGNER saw would not be that difficult to copy. The result: five ads at last count.

If you look at these ads and the literature you can send for, you'll always find a sentence which, without actually naming HEGNER saws, implies that the saw being sold is as good as a HEGNER.

As some consumers who believed this advertising have found out, it is much easier to write advertising copy than it is to manufacture a scroll saw which is precise and which functions well for years rather than for weeks or months.

Despite the claims, there is no saw which is "as good as" a HEGNER saw, and the reason for this is simply that no other saw is built like the patented HEGNER.

Next time you see a scroll saw demonstrated, ask the operator to cut not just 3/4" softwood but some thick hardwood and some metal. Ask him to break a blade, so you can see what happens. Then ask him to change a blade. Ask him to run the machine at top speed, and feel for vibration. Look at the blade and see if it runs in a straight line or in a blur. Ask him how long it takes to assemble the machine. Ask him about the warranty.

We've pointed out some facts, because we want you to know the facts. Our brochure tells even more, and it's free. You can get it by writing to us or calling us at 302-322-2226. We're AMI, Ltd., P.O. Box 312, Dept. 22, New Castle, Delaware, 19720.

POWERMATIC**MODEL 26 SHAPER**

3 H.P. Single Phase
1/2" & 3/4" Spindles

List Price \$2,479

Our Price 1,688

You Save \$791

Carbide O-G Stile & Rail set.
3/4" bore with 1/2" collars.

List price \$295

Purch. w/shaper \$213

Cutter set only \$245



WORKBENCH TOOL CO.

939 Stewart

Madison, Wisconsin 53713

1-800-792-3505 Ext. 233

**CONN • MASS • RI
MOST COMPLETE SELECTION**

**HARDWOODS
VENEERS**

HARDWOOD PLYWOOD

MARINE LUMBER

MARINE PLYWOOD (16 FT)

AIRCRAFT PLYWOOD

CABINET HARDWARE

WOODWORKING TOOLS

WOODWORKING BOOKS

GENERAL WOODCRAFT

100C BLINMAN STREET NEW LONDON, CONN 06320 203-442-5301

Planer Molder Saw

3 Power Feed TOOLS in 1



Now you can use this ONE power-feed shop to turn rough lumber into moldings, trim, flooring, furniture —ALL popular patterns. RIP-PLANE-MOLD . . . separately or all at once with a single motor. Low Cost . . . You can own this power tool for only \$50 down.

30-Day FREE Trial! SEND FOR
NO OBLIGATION—NO SALESMAN WILL CALL

RUSH COUPON TODAY! EXCITING FACTS
FOLEY-BELSAW CO.
90591 FIELD BLDG.
KANSAS CITY, MO. 64111



Foley-Belsaw Co.
90591 Field Bldg.
Kansas City, Mo. 64111

☐ **YES** Please send me complete facts about
PLANER—MOLDER—SAW and
details about 30-day trial offer.

Name _____
Address _____
City _____
State _____ Zip _____

temporary furniture. Elisabeth Beaupere, 4 rue de la Passardiere, Donville 50350, France.

Computers in woodworking: I'm using my new Mac-Intosh to make detailed drawings of my projects and would like to hear from others similarly inclined. Stan Scheiding, 823 West "O" Ave., Nevada, Iowa 50201.

English Chinese furniture: I'm collecting photos, drawings and essential dimensions with a view to possible publication. I'd be grateful to hear about any examples. Ralph Hampton, Grenestede Farm, Kingston, Hazelbury Bryan, Sturminster Newton, Dorset, England.

Book: Constance Stapleton, 2439A Old National Pike, Middletown, Md. 21769, is looking for craftspeople for a book about crafts that are rooted in particularly American traditions, regional or national.

The Daniel's Planer, a machine from the dawn of the industrial age, was manufactured in Worcester, Mass., in about 1836. The Hagley Museum has one, and they'd

like to hear from anyone with another or with any further information about the line. Preston Thayer, Hagley Museum, Greenville, Wilmington, Del. 19807.

Australia and New Zealand woodworkers interested in being in a regional register can write to W. Cyril Brown, 223 Kirk Rd., Point Lonsdale, Victoria, 3225, Australia.

Craftspeople: National Craft Showroom is seeking to represent craftspeople at the wholesale level. Application deadline Jan. 11. Contact National Craft Showroom, Department W, 11 East 36th St., New York, N.Y. 10010. (412) 279-3732.

Bay Area Woodworkers Association meets the third Thursday of every month and invites anyone interested. Write BAWA, Box 421195, San Francisco, Calif. 94142.

Shasta Woodworkers Association invites new members. Write Box 205, Shasta, Calif. 96087.

Maine and New Hampshire woodworkers, amateurs

and professionals: Want to join our guild? John Leeke, RR 1, Box 847, Sanford, Maine 04073.

Foothill Woodworkers Association is open to professional and amateur woodworkers. Write Dennis Hayes, 10310 Banyon St., Alta Loma, Calif. 91701.

Minnesota Woodworkers Guild is looking for new members. Write the guild at Box 8372, Minneapolis, Minn. 55408.

Hawkeye Woodcrafters is interested in new members. Write Dwight Mulch, 2636 South Main St., Burlington, Iowa 52601.

Topeka woodworkers: Want to join our group? Write Cleo McDonald, c/o Topeka Public Library, 1515 W. 10th St., Topeka, Kan. 66604.

East Tennessee Woodworkers Guild holds bimonthly meetings. Contact Grover Floyd, (615) 690-2973, or James Hooper, (615) 573-9752.



X-coarse excellent for dressing Japanese water stones

DIAMOND WHETSTONE™
Sharpens Knives, Tools
Faster, Easier, Better

	POCKET MODEL in Leather Case		BENCH MODELS in Wooden Box		
	\$17	\$38	\$64	\$95	
	4.3"	6"	8"	12"	
Fine					
Coarse					
X-Coarse					

Add \$2 shipping & handling on any order

Diamond Whetstones™ for Shop, Kitchen, Sports. FREE BROCHURE.

PARKER'S
BOX 241-FW15
Wellesley Hills, MA 02181



FULL SIZE FURNITURE PLAN



**ROLL
TOP
DESK**

Just like the one Grandfather had. Authentic double pedestal desk, 30" deep, 52" wide, 30" high. Roll-Top Unit adds 14" to height. Both single curve and double curve full-size profiles included. You'll love making it. You'll love using it. Adds luxurious decor to any room. A woodworker's delight!

Plan #139
(Double Pedestal Desk) \$10.75
Plan #140 (Roll-Top Unit) \$10.75
Complete Desk Plans .. \$20.00

CATALOG OF OVER 180 PLANS \$2⁰⁰

Over 180 different full-size professional furniture plans. Early American, English, Mediterranean, Spanish, Danish Modern. Chairs, Hutches, Cradles, Beds, Tables, scores more! Your remittance refunded with first order. Send today. No woodworking shop is complete without it.

FURNITURE DESIGNS, Dept. KD-15
1425 Sherman Ave., Evanston, Ill. 60201

Sleeveless DRUM SANDER
NO PRE-MADE SLEEVES TO BUY

USE ON:
Drill Press
Small Motor
Lathe
Combo-Tools
Radial Saw
1/4" Drill

ECONOMICAL - Simply cut sandpaper from standard size sheets
UNIQUE way of holding sandpaper to drum. Twist of key tightens
SPONGE RUBBER backing insures long wear of sandpaper

Send Check or Money Order
MONEY BACK GUARANTEE
SINGLEY SPECIALTY CO. INC.
P.O. BOX 5087F
GREENSBORO, N.C. 27403



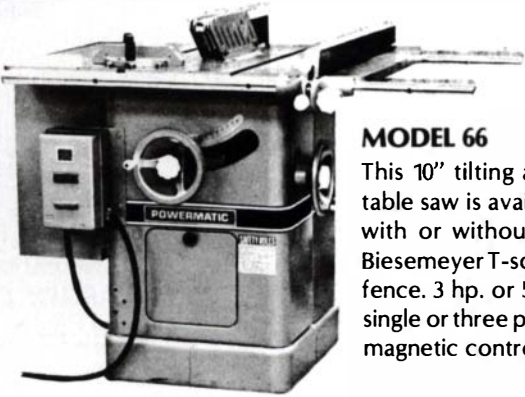
1" x 3" long	\$13.50
2" x 3" long	\$14.50
2 1/2" x 3" long	\$15.25
3" x 3" long	\$16.50
1" and 2 1/2" ABOVE \$26.75	
ABOVE 4 DRUMS \$53.50	
1/4" x 3" long	\$14.50
2 1/4" x 4 1/2" long	\$21.00
3" x 4 1/2" long	\$22.50
2 1/4" x 6" long	\$25.50
3" x 6" long	\$27.50

ADD \$2.50 PER ORDER FOR SHIPPING
FITTINGS AVAILABLE:
1/2" Bore with 1/4" or 1/2" adapter
1/2-20 RH Thread except 1/4" x 3"
1/2" Bore except 1/4" x 3" and 2" x 3"

DON'T BUY POWERMATIC
UNTIL YOU'VE TALKED WITH US!

Better By Design™

Xylophile's Co. now proudly offers for sale the outstanding Powermatic line of American woodworking machinery. Used by professionals everywhere, this complete line of equipment is superbly designed and manufactured for precision, safety, and productivity.



MODEL 66

This 10" tilting arbor table saw is available with or without the Biesemeyer T-square fence. 3 hp. or 5 hp., single or three phase, magnetic controls.

**CALL OR WRITE
FOR INFO & PRICES**

TOLL FREE
1-800-354-9083

IN KY
1-606-254-9823

138

THE
Xylophile's
COMPANY

138 E. Loudon Avenue • Lexington, KY 40505



A CONSISTENT WINNER!

We have established ourselves as a supplier of quality, industrial grade equipment for probably the lowest prices in the U.S.A.! YOU CHECK!

COMBINATION 1/8 SANDERS



- 1" x 42" Belt, 8" Disc.
- 1/2 H.P. 110v All Ball-bearing motor

MODEL G1013
Only \$110.00 Prepaid
to you via U.P.S.

HEAVY DUTY 10 INCH TABLE SAWS WITH CAST-IRON WINGS



- 5/8" Arbor is 1 1/4" long and can easily handle dado sets.
- Machine comes standard with one dado insert and blade insert.
- Arbor is supported by sealed-for-life ball bearings.
- Machine weighs 220 lbs.

FEATURES:

- 1 1/2 H.P. factory-fitted all ball-bearing, induction motor which is also totally enclosed.
- Precision ground cast-iron table top with matching ground cast-iron wings.
- Table size with wings 41 x 27".
- Cuts 25" to right of blade.
- Table has T-slots for miter gauge.
- Rip fence has fine adjustment and quick lock lever.

MODEL G1022 — ONLY \$325.00 (BELLINGHAM)
CALL FOR LOW FREIGHT RATES TO YOU!



WINTER BREAK:

We will be closed from Dec. 24 through Jan. 1 — Happy Holidays!



QUALITY, GUARANTEED MERCHANDISE WITH LOCAL PARTS & SERVICE BACK-UP RIGHT HERE IN OUR WAREHOUSE.

GRIZZLY IMPORTS INC.

P.O. BOX 2069, BELLINGHAM, WA 98227 • PHONE (206) 647-0801

WE SHIP REAL FAST IF YOU PAY BY VISA, MASTERCARD, MONEY ORDER, BANK DRAFT OR CERTIFIED CHECK. PAYMENT BY REGULAR CHECK WILL DELAY SHIPMENT 3 WEEKS.



Mortimer V. Schwartz,
President
The Fine Tool Shops

At \$21.95 my Emmerich block plane was a real value. On sale at \$9.95, it's a steal.

I'm reducing my inventory at less than half price — along with 6 other woodworking essentials. Order now — because when these are gone, there won't be any more at these prices.



\$9.95

WEDGED BLOCK PLANE

It's small enough to fit in one hand — big enough for general trimming, even end grain planing. Excellent quality, with beech body, lignum vitae sole. #109-1588



\$64.95

10 PIECE ASH HANDLED JAPANESE CHISEL SET

Our most
popular set,
and no wonder!

10" DRAWKNIFE

Comfortable
hardwood
handles and
10" forged steel blade make
it excellent for heavy, continuous
use. Compare with others at up to
\$27.50. No wonder it's one of my
most popular tools! #109-0120

\$14.95



**NOW JUST
\$19.95**

WOODWORKERS VISE with Front Dog

Was \$24.95. Cast jaws, precision milled faces, hardened steel spindles, screw and handle. Use the sliding dog on the front jaw with your bench dog to secure extra wide pieces on the bench top. 7" jaw width, maximum opening 7 3/4". #300-0400

Laminated steel blades stay sharp, resist chipping... socket-tang handles resist splitting... hollow-ground backs make it easier to hone a perfect edge. Originally \$99.95. #104-0020



**Low as
\$9.95
pair**

LIGHTWEIGHT WOOD CLAMPS IN 3 SIZES

Hornbeam and spring steel, with cork lined faces and a quick action cam that can produce 350 pounds of pressure. Were up to \$15.90 a pair. 4 3/8" throat depth.
#300-1250 8" jaw \$ 9.95 pr.
#300-1253 15 3/4" jaw \$10.95 pr.
#300-1254 23 3/8" jaw \$11.95 pr.

ORDER TOLL FREE 1-800-243-1037

The Fine Tool Shops, Dept. FWJ5
20 Backus Avenue, Box 1262, Danbury, CT 06810

Ship to _____

Address _____

City _____ State _____ Zip _____

Qty.	Prod. #	Item	Price ea.	Total Price

☐ Check enclosed ☐ VISA ☐ MasterCard ☐ AmEx
Account # _____
Exp. Date _____
☐ Send me your full color tool catalog FREE!

Subtotal _____
Sales Tax _____
Shpg/Hndlg **\$2.00**
TOTAL _____

Going before the jury

At two minutes past nine on Saturday morning, the door was locked. The sign on the door read: "Jurying now in progress. Work may be picked up at 5:30 PM." Inside, two other people and I were surrounded by more than 75 pieces of work, the results of thousands of hours of work by 25 or 30 craftspeople. By 5:30 PM we were to decide which artisans would be allowed to display in the Mactaquac Craft Festival, the largest provincial show of the year.

We had wanted a published set of standards defining acceptance for this annual show, so for most of a year we'd met once or twice a month to draw up our standards and procedures for the jurying itself. This way, we figured we could encourage all the entrants and assure steadily improved quality of work. It turned out

to be an immense task. We strived for criteria that could be easily understood and self-applied by craftspeople. Unfortunately, writing clear standards seemed to make them quite specific, often excluding work that we really didn't want excluded. In the end we compromised, emphasizing integrity of design, understanding of the nature of the raw materials, use of form and color, and, of course, overall craftsmanship.

Looking at the roomful of work that judgment day, I couldn't help but feel somewhat intimidated. I knew many of the makers and realized that they were counting on the show sales for income. It seemed unfair that anyone should have yes-no power over their fate. Still, rigorous jurying had given the show its good reputation, and all the hours invested in organization and promotion would mean little if we didn't adhere to our high stan-

dards. With more than a little nervousness, we began the day-long judging.

About two-thirds of the work was easy to evaluate. In a couple of cases, submission procedures had been ignored, so exclusion was automatic. Other pieces worked for their own rejection. One person, for example, had submitted a woodburning that was really remarkable for its delicacy and detail, yet the wood on which it was done was ragged and the finish poor.

The easy picks took about an hour. We spent the rest of the day poring over the borderline cases. Each of us reached a tentative decision independently, then we compared notes. When we disagreed, we argued our case in turn, attempting to bring into play whatever expertise we had gained through our own work, and to define everything in terms of our jurying standards. Often, it was just plain pain-

(continued on p. 110)

Show stoppers

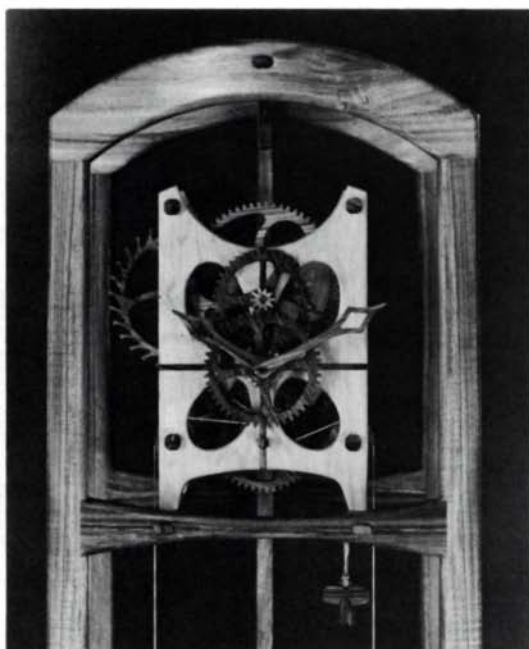
For the second year in a row, the Philadelphia Armory hosted an all-wood show called, appropriately enough, "The Woodworker." The September event featured the work of 75 artisans from across the United States, and was attended by more than 8,000 people during its three-day run.

Notable among the exhibitors was Wayne Westphale of Steamboat Springs, Colo. His contemporary clocks (top left photo) are more functional sculpture than furniture. Their open framework imparts a light and airy feel. The exposed gears and plates are made from wood—three-ply laminate—and turn on ivory bearings.

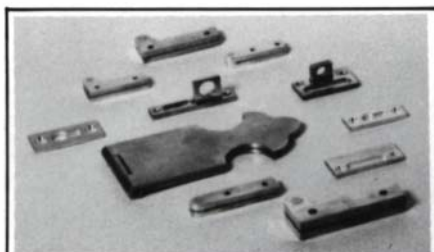
Woodworkers interested in a booth at "The Woodworker 1985" should submit slides of their work to the promoter: Richard Rothbard, Craft Market America, PO Box 30, Sugarloaf, N.Y. 10981.

"The Wood Show," a Canadian all-wood event, took place last August in Durham, Ont. Sponsored by that town, the show featured demonstrations and tools as well as finished work. In conjunction with the event, the Durham Art Gallery sponsored a competition and awarded \$4800 in cash prizes for the best work. Robert Diemart's stool (top right photo) received an honorable mention in the furniture category.

John Weisenberger's Philadelphia low-back settee (bottom photo) was a highlight of "Ten Years Later," a recent show at the Staunton Fine Arts Association in Staunton, Va. The show included fantasy carvings by wood sculptor John Heatwole and 18th-century reproductions by cabinetmaker David Ray Pine. The three men began their careers in the same job shop in nearby Harrisonburg ten years ago. □



Photos (clockwise from upper left): Jim Canfield, Marion Diemart, John Westervelt



Fine Cabinet Jewelry

Precision quality hardware for traditional and contemporary furniture.

Machined from solid stock, precision ground and polished

Larry & Faye Brusso

3812 Cass-Elizabeth • Pontiac, Mich. 48054 • (313) 682-4320

10" Tilting Arbor Saw



- Designed for Top Quality w/max accuracy
- Main Table 36"x27"
- Motor: 3HP, 1PH, 230V
- Magnetic controls (Optional Sliding Table 30"x18" Only \$450.)

For 1 year full warranty.

You pay **\$990**

FOB Warehouse

FREE ROUTER BIT

There's a full line of Top Quality Carbide-Tipped Router Bits & Cutters. Send \$3.50 (post./handling) for free sample, straight dubl. 3/8" cut & catalog.

TCM INDUSTRIES, INC.

P.O. Box 6867, Alhambra, Ca. 91802

Over 70 Different

HARDWOODS

From Afrormosia to Zebra Wood

Featuring

Pacific Northwest Woods

SITKA SPRUCE, OREGON MYRTLE

ALASKA YELLOW CEDAR

and other Northwest species.

No minimum order.

Ship anywhere.

Send for **FREE** price list.

Kaymar Wood Products, Inc.

4603 35th S.W., Seattle, WA 98126

(206) 932-3584

Established 1947

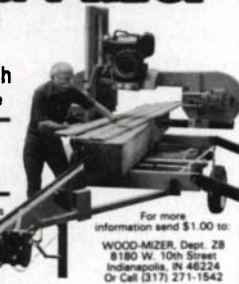
Wood-Mizer®

Bandsaw Mill

Turn Logs Into Lumber — And Cash
Portable • Precise

Accurately cuts a log
30" dia. X 16' long

"We manufacture quality sawmills so you can cut quality lumber. That's why we sell more portable bandsaw mills than anyone else in the world."



For more information send \$1.00 to:
WOOD-MIZER, Dept. ZB
9180 W. 10th Street
Indianapolis, IN 46224
Or Call (317) 271-1542

Name _____
Address _____
City _____ State _____ Zip _____

Our catalog doesn't just sell you things. It teaches you things.

The Garrett Wade Catalog is a new, 212-page collection of wood-working hand tools, machinery, finishing supplies and accessories that are simply the finest available. Anywhere.

And besides offering quality tools from around the world, we also give you a lot of quality advice. On woodworking techniques. On picking the proper tool for a particular job. On finishing, sharpening, clamping and more.

The catalog is filled with superb photography, honest specifications and reliable descriptions. It's neatly divided into seventeen sections, including a section on our Swiss INJECTA INCA power tools. And throughout the year, our catalog owners will receive several handy supplements—*free of charge*.

Just send in the coupon below with \$3.00, and we'll send out your copy of the 1985 Garrett Wade Catalog. It just may prove to be the most useful tool you own.

Garrett Wade Co., Dept. 231
161 Avenue of the Americas
New York, N.Y. 10013

Gentlemen:

Send your complete 212-page catalog of woodworking tools, machinery, and accessories. Enclosed is \$3.

☐ I would like *only* the following sections of the catalog, for 50¢ each:

☐ INJECTA INCA ☐ Carving ☐ Finishing

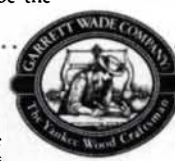
Enclosed is \$_____

Name _____

Address _____

City _____

State _____ Zip _____



Professional Model Builders... Architects...

Serious Hobbyists...

Introducing the

Zéga model center

The new multi-purpose precision workcenter for the serious model craftsman. Lets you cut, carve, grind, shape, drill, sand or polish even the smallest pieces perfectly!

The new multi-purpose precision work-center for the serious model craftsman.

Lets you cut, carve, grind, shape, drill, sand or polish even the smallest pieces perfectly!

If you've ever tried to use a full-sized saw or power tool for a model-sized, detailed job... you know what a nearly-impossible task it can be.

Now, Zéga changes all that!

Thanks to the remarkable design and engineering skills of German craftsmen, you can get a new degree of precision and versatility never before available in a model or hobby craft saw — from one unique, multi-purpose tool. The Zéga Model Center. Zéga provides more professional features, more precision applications, and a more complete workshop capability than any potentially comparable saw or similar tool on the market.

And, Zéga attachments add a remarkable degree of versatility. With its power take-off and flexible power shaft, you can virtually custom-create as comprehensive a model

work center as you wish, simply by adding accessories.

Try the Zéga for 30 days — at absolutely no risk!

Order the Zéga Model Center and *put it to the test for a full month*. If after 30 days, you don't agree that Zéga is truly the rugged, versatile precision tool we say it is, just pack it up and ship it back to us. We'll promptly refund your full purchase price! So send for **FREE** information today.

FREE BONUS ATTACHMENT (If you hurry!)

Zéga model center

A Division of Mantis Manufacturing Co.
1458 County Line Road, Dept. 104 Z
Huntingdon Valley, PA 19006

☐ **RUSH me FREE information on the Zéga Model Center**

Name _____
Address _____
City _____
State _____ Zip _____

ful. We had, for example, said that all of the three pieces required must be accepted. Why, then, did one person submit two excellent examples of his work, accompanied by a third not nearly as good? With the evidence of just how nice this maker's work could be right in front of us, it was difficult to say no, yet he seemed to leave us no choice.

As the day wore on, the decisions became more difficult. At what width should floating construction be required in hardwood? Four inches? Six inches? What about in softwood? The hardware on a piece didn't feel right, but why? What about the set of salad bowls, executed about as well as most but showing no originality in design at all?

By 4:30 PM we had staggered through all the submissions. As time ran out, each of us sat down and began frantically writing brief critiques for each person's work, trying to be encouraging to those who were rejected and informative to all. It was frustrating work. We simply lacked the time—and in some cases the words—to say what we meant. Finally, with two minutes to spare, we finished, and quietly left the room by a side door.

I returned through the main door (the jurors remained anonymous to avoid uncomfortable harassment) and circulated among the entrants who had come to pick up their work. Most ignored the critiques completely, and looked immediately for the "yes" or "no" at the bottom of the form. Some disappointed entrants didn't even bother to take the form with them, which was discouraging for us.

But there were moments. I overheard two people comparing critiques and making plans to act on some of the suggestions. Another person studied the paper for a while, then murmured, "Oh, I see..." and walked away deep in thought. And perhaps the nicest moment of all: One entrant who had been rejected asked me if there was any way he could speak with one of the jurors; he wanted to learn more about what was being suggested. That's the kind of response that, for me at least, makes the whole jurying effort worthwhile.

I came away from this experience convinced that jurying of woodwork by woodworkers is one of the most effective tools we can use to raise the quality of our work. Workshops, seminars and lectures are difficult and expensive to set up, but any group can organize a jury. Even if no show or award is involved, a periodic critique session, say, at a local guild meeting or in a woodworker's shop, could offer an incisive and helpful review of the work. The time spent, I think, would surely benefit both judges and judged.

—Mac Campbell, Harvey Station, N.B.

Front-end alignment



Although it's doubtful that any of Greg Harkins' clients will want to park their Mercedes on his chairs, he figures it can't hurt business to demonstrate that it can be done. Harkins turns out about six traditional Mississippi straightback chairs and rockers a week in his Vaughan, Miss., workshop. The posts and rungs are oak; the seats are caned, some by Harkins, others he farms out. In addition to the odd Mercedes, Harkins also does a brisk business with two-legged celebrities—Ronald Reagan and Paul Harvey, among others, park their posteriors on Harkins chairs.

Want plans? Send away to yourself

*How high is a box?
How wide must it be?
What depth must it allow?*

*As high as an eye.
As wide as a thigh.
As deep as the cut of a plow.*

Nonsense, you say? I'll tell you what nonsense is. Nonsense is The Arbitraries, those formal plans which, for many, too many, are the sine qua non of woodworking. All right, you're beyond running traced plywood donkey cart planters through your jigsaw. But when, really, did you last trust your eyeball to generate a pleasing dimension?

This is not to argue with the measure-

once-cut-twice school. Quite the opposite. Planning and precision are the hallmarks of the successful woodworker. It's just those plans, those formal, undeviating, mail-order plans you must consider desisting from. Not your plans, mind you, just theirs.

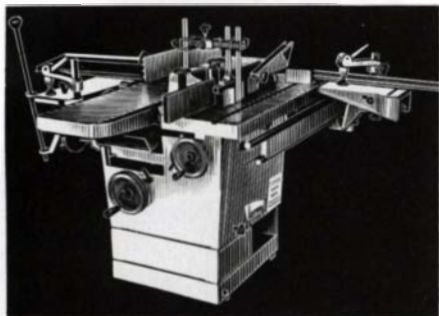
Your plans? Your own plans? You can't make them because you can't draw worth a stick, or even draw a stick? Yes you can. At least as well. A dimension is, after all, what its digits dictate, not what a pretty picture or pair of dividers dictates.

The upshot is, of course, that chicken scratches cum numbers will do well enough if you can intuit that your cabinet will look nice at an assigned height of three units to its assigned (and maybe slightly changed) width of two and depth of, say, this much.

If the dimensions feel right, there's a

LUREM UNIVERSAL WOODWORKERS

"for the woodworker
who needs more shop space"



The World Leader in design and manufacture of Universal Woodworking Machines for over 35 years to provide maximum performance in minimal work areas. They are ruggedly built from heavy castings for reliability, and will sustain hard and continuous operation. Standard features include tilting arbor saw, jointer, auto feed thickness planer, shaper, horizontal drill mortiser, and sliding carriage for cross cutting and tenoning. Four models available for the USA market with jointer/planer tables from 8" to 16" wide.

Send \$1.00 for Brochure
U.S. Importer (714) 549-3446
Int'l Woodworking Equipment Corp.
11577 A Slater Avenue
Fountain Valley, CA 92708



NEW! 4-IN-1 PLANER/MOLDER JOINTER/SANDER

New low-cost power shop makes you money... saves you money! Outperforms them all! Quickly turns rough lumber into high-value, finished stock. Molds all popular patterns... any custom design. Planes or joints without changeover. Quickly converts to power-feed drum sander! Comes complete with 115/230V motor, stand, knives, full instructions... ready to use. 30-DAY FREE TRIAL! Easy terms.

CALL TOLL-FREE 1(800)824-7888, Oper. 642

FREE INFORMATION KIT

Woodmaster Tools, Inc.
2908 Oak, Dept. PE29
Kansas City, MO 64108

☐ YES! Please rush my FREE Information Kit and details on your 30-Day Free Trial Guarantee.

Name _____
Address _____
City _____
State _____ Zip _____



WOODWORKERS FREE Catalog



Over 20 Domestic and
Exotic Hardwoods
Big Direct Mill
Savings

Buy top quality hardwoods
and veneers direct from our mill at
substantial savings.

Send for FREE Catalog

American
Woodcrafters®

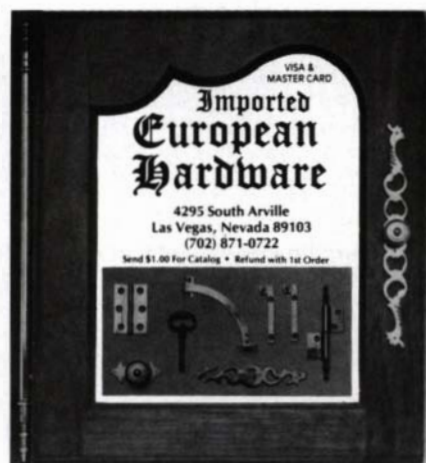
1025 South Roosevelt
Piqua, OH 45356 • Phone (513) 773-7414 Ext. 291

HONE- RITE

Powered rotary
hone to sharpen
knives, flat blades,
gouges, etc.
razor sharp



HONE-RITE CO.
P.O. Box 3177
Shawnee, KS 66203
(913) 268-8789



ONE-MAN Sawmill

The Only ONE-MAN
PORTABLE SAWMILL
Of Its Kind In The World

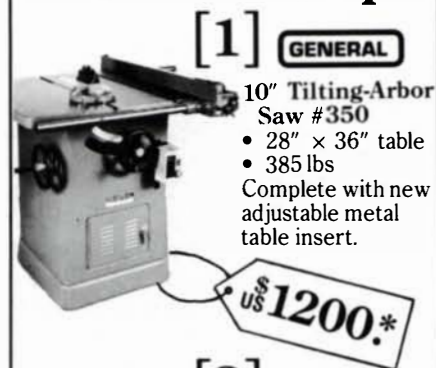
Don't let inflated lumber prices stop your important building projects. The Sawmill goes right to the trees and turns out smooth, true-cut lumber... even beginners get excellent results. Just one man (no crew needed) can easily cut enough on weekends to save hundreds of dollars over high lumberyard prices. Use as little as 25 horsepower. Factory-direct selling keeps price low, and convenient time payments may be arranged.

Rush coupon today for Free Booklet "How To Saw Lumber."

FREE BOOK Foley-Belsaw Co., 30461 Field Bldg., Kansas City, MO 64111
Please send Free Booklet with full details. No obligation,
and no salesman is to call. (Please Print Name)

Name _____
Address _____
City-State _____ Zip _____

Humfrey's Three Beautiful Basics For Your Shop



[1] GENERAL

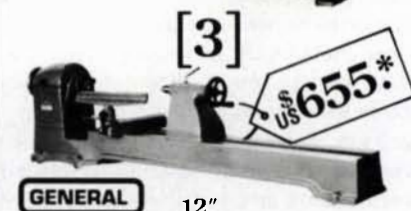
10" Tilting-Arbor
Saw #350
• 28" x 36" table
• 385 lbs
Complete with new
adjustable metal
table insert.

\$1200.*



[2]

GENERAL 15"
Wood Cutting
Band Saw #490
• 15" x 15" table
• 210 lbs
Enclosed metal stand
available



[3]

GENERAL 12"
Standard Duty Wood Lathe #160
• 38" centers
• 140 lbs
Metal cabinet-style stand available

COMPARE OUR REMARKABLY
REASONABLE PRICES
CALL TOLL-FREE TODAY!
MasterCard 1-800-387-9789 VISA

*Plus Electrics. Shipped freight collect.
No other charges

J. Philip Humfrey Ltd.



3241 Kennedy Road, Unit 7
(Dept. FWA 50),
Scarborough, Ontario,
Canada M1V 2J9
Telephone (416) 293-8624

SPECIAL OFFER!

Now, when you
buy our 32-page
Catalog, you
will receive 3
credit vouchers
redeemable on
any catalog
purchase for
\$10.00 per
machine - a
total of \$30.00

☐ Please rush me your
latest catalog.
I enclose \$1.00 (refundable
against purchase)

Name _____
Address _____
City _____
State _____
Zip _____

good chance they'll be right. The satisfaction you feel upon contemplating a piece you dimensioned yourself is infinitely greater than what you get from going out the window with numbers by *Popular Mechanics*. The toughest thing about designing is believing that you can do it as well as the published designers.

The teaching of design needn't necessarily be formal. Select a project. Then seat yourself at the drawing board of common sense. Dust off your mind. Haul out the foolscap and make some marks on it. Start somewhere, anywhere. Doodle a cube. Stretch the cube into a rectangular prism. Stand it on end. Add two, no, three drawers, two wide and one, in the middle, narrow. Finger-joint the edges or go all the way with dovetails. Screw on, better yet, rabbet in a back. Leave it optional, you'll decide when you get to your bench.

Send away for plans if you must, but aren't you better off sending away to yourself for better ones? No one, to my knowledge at least, has ever said, "My, what beautiful plans you bought."

—Saul Isler, Cleveland, Ohio

Money matters

Why does lumber cost so much? I operate a small wholesale and retail lumber business, serving small-shop and hobbyist woodworkers, and I've often heard the question. Here's my answer, based on a hypothetical hardwood, something between poplar and oak in value. These figures reflect costs at a retail yard that buys from wholesalers. Big companies and small firms like mine can cut expenses by eliminating some of the middlemen.

The logs themselves will cost \$250 per thousand board feet (M). Logging and hauling the logs to the mill adds \$250/M, the sawyer's fee another \$150. Stacking and sticking for air-drying will run \$50/M, subsequent kiln-drying will be \$150. Add \$100/M for the 12% interest on the investment for the year's drying time. The stack of dried lumber at the mill, then, will be \$950/M.

Approximately 25% of the lumber will be lost to checks, splits and other degradation, tacking on another \$237.50/M. The broker who handles the sale of the wood from the mill gets \$15/M; trucking, handling and storage fees add another \$30, bringing the total paid by the retailer to \$1232.50/M. The retailer's 50% mark-up, covering his overhead as well as his profit, amounts to another \$616.25, bringing the total to \$1848.75/M.

And that's why the board foot that cost \$.25 on the stump in the forest costs you \$1.85 off the pile at the local lumberyard.

—Richard Layman, Lugoff, S.C.

Thoughts on Thonet

I have always felt a particular fondness for the work of Michael Thonet, an Austrian cabinetmaker who lived from 1796 to 1871 (*FWW* #20, pp. 38-45). Almost everyone has seen or sat on one of his bentwood chairs or rockers. I'd like to tell why I admire his work and why I don't believe his approach would be successful were he to pioneer it today.

Thonet's chair #14 (photo at right), designed in the late 1850s, was his least expensive and best-selling chair—40 million sold by 1900. The epitome of the bentwood style, #14 is charming, elegant and unpretentious. It has a delicate, feminine quality, something rarely found in anything mass produced.

Chair #14 was well engineered. It consists of only six pieces of bent wood, ten screws and two washers. The grain of the bent wood always runs in the direction of the stresses imposed on the chair, so the design can be lightweight as well as strong. Each part of Thonet's chair was made by quick, decisive operations, and the chair was assembled in the same manner. Even though many of the steps required handwork, each discrete step required little judgment on the part of the craftsmen. This is what made the chair inexpensive and mass-producible, though by today's standards it needed far too much hand labor for an inexpensive chair.

The design also has a visual simplicity. Each part relates to the whole, creating a well-proportioned, unified statement. All decoration is integral to the construction of the chair. The chair *is* the decoration, with no decorative elements added—an important point, considering that the design quality of mass-produced items was at its worst in the 19th century.

To my eye, straight lines and simple geometric shapes define structure, and I think them to be rational and theoretical. Conversely, curved lines and curved forms are more associative and emotional. Designing with curves is quite difficult—it is hard to create a simple and harmonious rational structure out of seemingly irrational elements. It is even harder to do this *and* maintain economy of production and materials. Each of #14's curves helps define the chair structurally as well as emotionally, while allowing economical production.

Only a craftsman is innovative with materials and only a designer/craftsman will make innovative use of materials and integrate them with innovative design. Moreover, only a craftsman can figure out how to combine technique with the industrial process without losing quality of design. Michael Thonet was the first furniture designer/craftsman of the machine age and truly a master of his art.



Michael Thonet's chair #14 is one of the most popular chair designs of all time.

Having designed and made his chair, Thonet then had to overcome the hurdle of marketing a totally new style of chair. Other chairs of the era were more historically inspired, and therefore familiar and acceptable to consumers. And I imagine that a simple ladderback chair with a rush or slat seat would have been cheaper. That consumers so quickly accepted Thonet's new style is a testament to its excellence of design.

Today, Thonet factories in America and Europe are still churning out bentwood chairs, and to date more than 150 million have been sold. Yet no one is seriously challenging Thonet for part of this enormous bentwood market. Most new bentwood designs are just a mix and match of old parts or a revival of old designs. No really new bentwood styles are being produced.

To understand why, let's look at some of the difficulties Thonet would face if he were to design and introduce #14 today. Initial tooling would be very expensive. Each curve requires a great many bending/cooling jigs, which along with other special equipment would cost much more than the tooling for other wooden chairs being produced today. This expense would be acceptable if labor costs could be proportionately reduced. Unfortunately, the reality is just the opposite. As for de-

BRIDGEWOOD
HJ12L ALL CAST IRON

LONG BED JOINTER

12" x 72" BED
WITH 3 HP MOTOR



\$1,995.00

FREIGHT FREE
1010 lbs



SEND \$1.00 FOR CATALOG

WILKE MACHINERY CO.

S.W. Corner Exit 11 I-83
120 Derry Ct., R.D. #22, York, PA 17402
Phone (717) 846-2800

ROUTER AND SHAPER BITS

Zac Products has developed a selective line of quality carbide router and shaper bits. We feel that seeing is believing and want you to try our three most popular bits (all bits have a 1/4" shank, bit #2, straight cut 1/4" cut diam., & 1" cutting edge, #26, 3/8" radius round over, #36 flush trim 1/2" diam. & 1" cutting edge) at a special introductory price of \$26.50 delivered or both sets for \$105 delivered. If you are thinking of building or remodeling your kitchen or bathroom, our door shop will do the job. This clever set of router bits easily makes beautiful raised panel and

frame doors with the use of your router and router table.

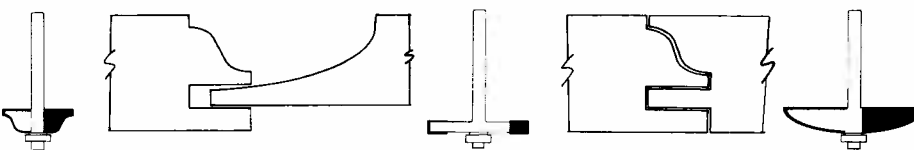
The door shop set has three bits, two for style and rail and one for raised panel.

These sets and your router are an economical alternative to the shaper. As a bonus, you will receive our 32 page illustrated catalog which contains 64 types of router bits, 58 types of shaper cutters, 4 types of router bit adaptors for the shaper, along with hundreds of moulding shapes, door style & rail sets, raised panel cutters, and much more. All at the best possible prices. C.O.D. orders accepted, add \$3.

BIT 2

BIT 26

BIT 36



CALL FREE

INSIDE
NY STATE
1-800-
522-6622

OUTSIDE
NY STATE
1-800-
441-0101

ZAC

PRODUCTS, INC.
533 West 34th Street, NYC, NY 10001

TO ORDER FILL IN COUPON BELOW TO RECEIVE CATALOG SEND \$1.50 N.Y. RESIDENTS ADD 8 1/4% TAX.

☐ CK/MONEY ORDER ENCLOSED ☐ CHARGE MY VISA/MASTERCARD
☐ CATALOG & BITS 2, 26, 36, & DOOR SHOP \$105 PPD. ☐ C.O.D. add \$3
☐ CATALOG & DOOR SHOP \$89.50 PPD. ☐ CATALOG & BITS 2, 26 & 36 \$26.50 PPD.
ACCOUNT NO. _____ EXP. DATE _____
NAME _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____

INDEX TO ADVERTISERS

Addison Hardware	8	Garrett Wade	109	Pootatuck	8
American Woodcrafters	111	General Woodcraft	105	Primrose Center	26
The American Woodworker	11	Gilliom Mfg.	103	Pro Shop	103
AMI	102, 105	Glenn Wing Power Tools	13	Quest Industries	97
Anderson & McQuaid	17	Grizzly Imports	15, 93, 107	Real Woods	92
Armor Products	8	Hardwoods of Memphis	17	Reliable Grinding	97
Arrowmont School	25	Hida Japanese Tool	94	Rhode Island School of Design	26
Aristry in Veneers	96	Highland Hardware	102	Ring Master	89
Ashman Technical	13	Hiller Hardware	97	Rochester Institute of Technology	26
Aviation Industrial Supply	98	The Home Shop Machinist	25	Rockledge	89
Ball & Ball	97	Hone-Rite	111	The Rustic Shop	88
Ballew Saw & Tool	98	Horton Brasses	28	The Sawmill	7
The Bartley Collection	105	Hot Tools	8	Seven Corners	86, 87
Berea Hardwoods	102	HTC Products	28	Shaker Workshops	96
Biesemeyer Mfg.	84	Hubbard Harpsichords	7	Shophelper	87
Boston University	26	J. Philip Humfrey	5, 111	Singley Specialty	106
Box-Art	89	Imported European Hardware	111	Sperber Tool Works	28
Brady Corp.	98	Industrial Abrasives	5	Sterling Publishing Co.	88
Bratton Machinery & Supply	104	Intl. Woodworking Equip.	111	Stocks Tool	103
Bridge City Tool Works	25	Jack Dale	7	Sunhill Enterprises	7
Larry & Faye Brusso	109	The Japan Woodworker	17	Talarico Hardwoods	105
Cane & Basket Supply Co.	96	Jegt Industries	13	The Taunton Press	29, 82, 82A-D, 83
The Wendell Castle Workshop	26	Kassner Woodcraft	89	TCM Industries	109
Cherry Tree Toys	88	Kaymar Wood Products	109	Tools, Etc.	9
Classified	99, 100, 101	Kirby Studios	25	Toy Designs	94
College of the Redwoods	26	Klockit	7	Trend-Lines	84, 95
Maurice L. Condon	15	Kuster Woodworkers	21	Turning Point	13, 88
Conover	94	Kwick Kleen	89	Weird Wood	94
Constantine	93	Leeds Design Workshops	26	Wetzler Clamp	92
Cornerstone Design	7	Leigh Industries	21	Wilke Machinery	113
Craftmark Products	98	Lignomat	17	Willard Bros. Woodcutters	97
Craftsman Wood Service	94	Lyon Electric	28	Williams & Hussey	17
Craftwoods	5	Mafell	23	Windsor Classics	28
The Cutting Edge	92	Mahogany Masterpieces	97	Wood Shed	13
Dallas Wood & Tool Store	98	Makita U.S.A.	85	Wood-Mizer	109
DeCristoforo Designs	89	Manny's Woodworker's Place	92	Woodcraft	89
Deft	15	Mantis Mfg.	109	Woodmachine	17
Delmhorst Instrument	98	Mason & Sullivan	87	Woodmaster Power Tools	88, 96, 98, 111
Delta	27	Masterpiece Tools	86	Woodshop Specialties	5
DML	19	McDonald-Harrington	105	Woodworking World: Houston/	
Duds Dowel Cutters	13	Mini Max USA	115	Toronto	11
Educational Lumber	25	MLCS	21	Worcester Craft Center	25
Elektra Beckum U.S.A.	86	Morgan Veneers	103	Workbench Tool Co.	105
Emperor Clock	28	Native American Hardwoods	8	Wyndham Woods	28
Factory Lumber Outlet	88	Nord Abrasives	7	X-Acto	15
Fine Tool & Wood Store	94	Nova Tool	94	Xylophile's Co.	103, 106
Fine Tool Shops	107	Oda Hardware Supply	94	Yukon Lumber	101
Fisher Hill Products	96	C.R. Onsrud	92	ZAC Products	113
Foley-Belsaw Co.	105, 111	Parker's	106	Russ Zimmerman	25
Forrest Mfg. Co.	23	Parks Woodworking Machine	101		
Freud USA	2, 90, 91	Paxton Hardware	88		
Furniture Designs	106	Philipps Bros. Supply	92		

Fine Woodworking Reader Service

To make use of any of the services listed here, write your name and current address below.

Name _____
Address _____
City _____
State _____ Zip _____

MOVING? So you won't miss an issue, please give us your new address at least six weeks before the next issue.

Name _____
New Address _____
City _____
State _____ Zip _____

SUBSCRIBER LIST. We're now renting our subscriber list to carefully selected companies—only those we believe you'll want to hear from. If you don't want your name on the lists we rent, check the box below and we will remove it at the first opportunity.

☐ Please do not rent my name.

PROBLEMS. If you've run into a subscription-related problem, write to our Subscription Department. We will do our best to help.

The Taunton Press Box 355, Newtown, CT 06470

sign, #14 is perhaps a little small and rather uncomfortable by today's standards.

Thonet's work in general, and chair #14 in particular, exemplifies truly great design. His furniture is original in both technique and form. It was inexpensive for its time and well-engineered, and its delicate feminine qualities have found a place in people's hearts. We must look to his success for inspiration and instruction. Naturally, we must each find our own visions of beauty with function. I hope to do as well.

—Peter Danko, Alexandria, Va.

Want to praise your favorite piece of furniture (or other wooden work), or damn your least favorite? Squeeze your thoughts into 1500 words or less and send them to Notes and Comment.

Dallas show swells guild ranks

During the past couple of years, the climate-controlled splendor of the local shopping mall has become a popular place for woodworking shows, a trend that serves two constituencies. Storekeepers draw more customers and—in the absence of willing craft galleries or their own showrooms—woodworkers get an all-too-rare chance to exhibit their stuff before hundreds of people. From a commercial standpoint, the stores come out ahead. Most of us suffer the crowds and navigate the sea of cars in the parking lot to buy a pair of socks or a record album, not to plunk down three grand for a new dining table.

Realizing that a shopping-center exhibition draws more fellow woodworkers than potential buyers, the North Texas Woodworker's Guild organized a mall show last September with another goal in mind: to recruit new members. Guild volunteers, equipped with armloads of printed forms, signed up more than a hundred new members, about doubling the group's size in just one weekend. Mick Simon, who two years ago helped found NTWG and served as its first president, wisely figured that an infusion of enthusiastic new members (mostly amateurs) would see the guild through the blahs that inevitably affect groups whose newness has worn off.

The show itself, held in Dallas' Northpark Shopping Center, was judged by a panel made up of a local furniture designer, an architect, and an art professor from Southern Methodist University. Of the 43 entries, they selected 26 for display at the shopping center and awarded prizes in five categories. Among the winners was John Hines, a former corporate publications writer who turned to professional wood-



John Hines showed this booted chest at the North Texas Woodworker's Guild show.

working about a year ago. His "Texas highboy," which sports a carved cowboy boot on each front leg, gave the show a refreshingly regional flavor. Hines made the chest's frame out of solid pecan; the panels are mesquite veneer. Other pieces of note included Stefan and Brenda Crane's maple table (it sold for \$4,800), a pair of nicely carved Chippendale dining chairs by Gloria Jacobus, and a walnut coffee table by Todd and Kyle Babick.

For more about the NTWG, contact Mick Simon at 3118 Mayfair, Carrollton, Tex. 75007.

Another Texas showcase is planned for February 1985. "Made in Texas" is a furnishing design competition intended to spotlight innovative work and generate commercial as well as critical interest. The jury will select 50 to 60 pieces for display

at Requisitions, a Houston gallery, and will distribute \$22,500 in prize money, with \$10,000 going to the winner. A dozen prize winners will tour the United States, Europe and Japan. Entry deadline is Jan. 7, 1985. For more information, call Mimi Davies at (713) 224-4422.

—Paul Bertorelli

Notes and Comment

Got an idea you'd like to get off your chest? Know about any woodworking shows, events or craftsmen of note? Just finished a great project? If so, we'd like to hear about them. How about writing to us? And, if possible, send photos (preferably with negatives) to Notes and Comment, Fine Woodworking, Box 355, Newtown, Conn. 06470.

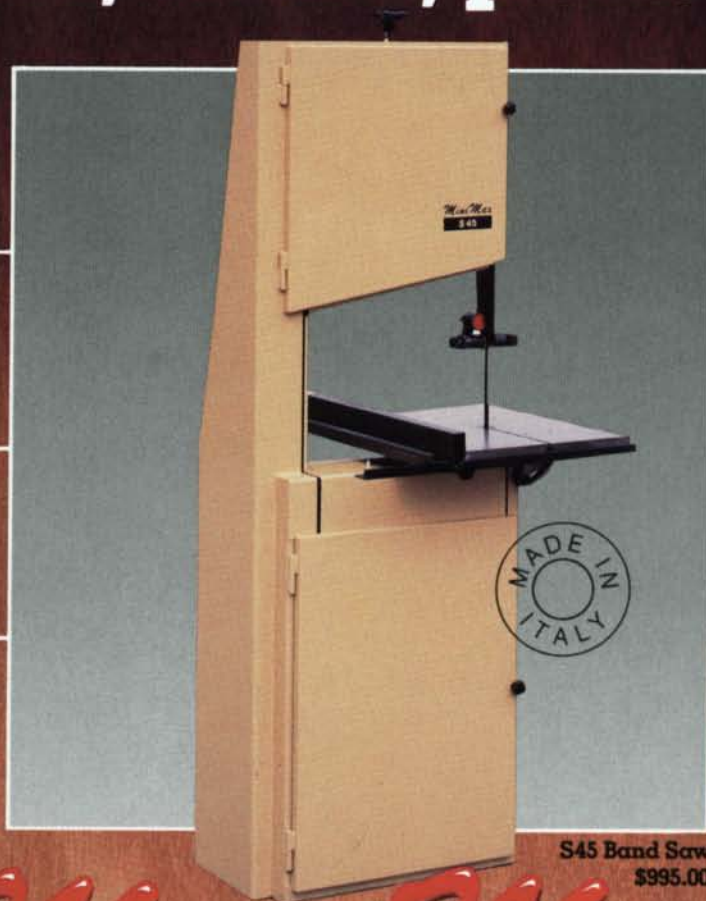
We can cut it

...turn it, sand it, plane it, etc.

S45 Band Saw

Diameter of wheels 17.7"
Maximum cutting height 11.8"
Maximum cutting width 17.25"
Length of blade 12 feet
Width of blade 1/4" - 3/4"
Band speed 3,000 SFPM

Wheel speed 660 RPM
Work table 20" x 20"
Motor 1.5 HP
Net weight 330 Lbs.
Height 67.7"
Width 30.7"
Length 21.2"



Price
Breakthrough

\$995.00

S45 Band Saw
\$995.00

MiniMax



T100 Lathe \$650.00
shown with duplicator



C22 Combination Machine
\$2,495.00



L55 Belt Sander
\$2,995.00



PRO 32 Band Saw
\$695.00

Mini Max offers a versatile selection of compact woodworking machinery.

Ideal for a factory or small shop, you'll find that Mini Max takes up less space than its larger counterparts, yet there's no compromise. Mini Max is specially engineered to do the work of larger machines in less space and surprisingly, for less money.

For more information and specifications on these and many other Mini Max machines, use the coupon provided on this page.

Dealer inquiries welcomed.

MiniMax

Please send more information on Mini Max products to:

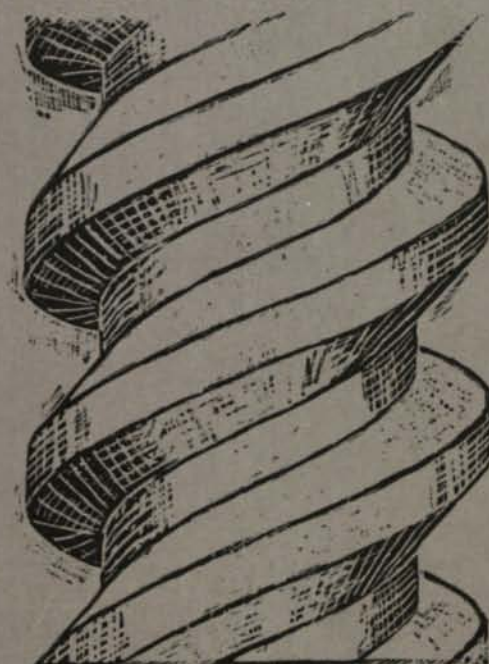
Name

Street Address

City State Zip

Clip and mail this coupon to:
MINI MAX USA, Inc.
3642 N.W. 37th Avenue
Miami, FL 33142
Tel: 153506 "MINIMAX"

Fla. Toll-Free Line: 1-800-432-2454
National Toll-Free Line: 1-800-327-4022



Finding no dies large or coarse enough, Lewis McClure, left, hand-carved the wooden screw for his replica of the Gutenberg printing press.



GUTENBERG REVIVED

This working replica of Johann Gutenberg's wooden press sprang from Whitney Seymour's lifelong fascination with printing. Seymour, an attorney and avocational publisher, asked his woodworker neighbor Lewis McClure to build the press. Working from old picture postcards, McClure drew up plans, had them confirmed by a German museum that owns another replica, and documented the entire project in a book entitled *The McClure Press*, published by Seymour's Lime Rock Press in Salisbury, Conn.

McClure had to overcome the same technical obstacles that dogged pressmakers in the 1450s—fabricating the heavy wooden screw that presses paper against the inked

type. Finding no modern taps and dies up to the task, McClure followed the example of Gutenberg's contemporaries: he laid out the screw on a fat dowel, then painstakingly carved it by hand, using dense bubinga so the threads would survive the stress the screw would be subjected to in use. "I spent about a third of the two years it took to make the press working on the screw and the nut it runs in," says McClure. "The rest was child's play."

McClure's 32-page book gives construction details for a $\frac{5}{8}$ -scale reproduction of the original. His replica is on display in Salisbury's Scoville Library, which is, appropriately, the oldest public library in the United States.