

TAUNTON'S

Fine Woodworking

Teach • Inspire • Connect

The ABCs of letter carving, p. 48

Build a classic stool

Great recipe for ebonizing wood

Road map to reading wood grain

Make strong, stable curved doors

Resawing by hand is easier than you think





Grizzly Industrial

— PURVEYORS OF FINE MACHINERY®, SINCE 1983! —

- ALMOST A MILLION SQUARE FEET PACKED TO THE RAFTERS WITH MACHINERY & TOOLS
- 2 OVERSEAS QUALITY CONTROL OFFICES STAFFED WITH QUALIFIED GRIZZLY ENGINEERS
- HUGE PARTS FACILITY WITH OVER 1 MILLION PARTS IN STOCK AT ALL TIMES
- TRAINED SERVICE TECHNICIANS AT BOTH LOCATIONS • MOST ORDERS SHIP THE SAME DAY
- BUY DIRECT & SAVE!

14" RESAW BANDSAW

- Motor: 1.75 HP, 110V/220V, (prewired 110V), single phase, 15A / 7.5A
- Table size: 16 1/4" x 21 1/4" x 1 1/2"
- Table tilt: 5° left, 45° right
- Floor-to-table height: 44 1/2"
- Cutting capacity/throat: 13 1/2"
- Max. cutting height: 12"
- Blade size: 104" to 105" (1/4" to 3/4" W)
- Blade speed: 3000 FPM
- Overall size: 26" W x 31" D x 78" H
- Footprint: 16" L x 18" W
- Approximate shipping weight: 337 lbs.



EXTREME SERIES

New!



MADE IN AN
ISO 9001
FACTORY

\$119
shipping

G0555XH **ONLY \$895⁰⁰**

10" HYBRID TABLE SAW WITH RIVING KNIFE

MADE IN AN
ISO 9001 FACTORY

- Motor: 2 HP, 110V/220V (prewired 220V), single-phase, 16A / 8A
- Precision-ground cast-iron table with wings measures: 40" W x 27" D
- Table height: 34"
- Arbor: 3/4"
- Arbor speed: 3850 RPM
- Capacity @ 90°: 3 1/8"
- Capacity @ 45°: 2 3/8"
- Cutting capacity: 30" right, 12" left
- Overall size: 62" W x 39" D x 48" H
- Footprint: 20 1/2" L x 19 1/2" W
- Approx. shipping weight: 416 lbs.



FREE 10" X 40T
CARBIDE-TIPPED
BLADE

\$119
shipping

G0833P **ONLY \$1145⁰⁰**

THE ULTIMATE 8" x 83" JOINTER WITH EXCLUSIVE DIGITAL HEIGHT READOUT

- Motor: 3 HP, 220V, single-phase, TEFC, 3450 RPM, 15A
- Total table size: 8" x 83"
- Infeed table size: 8" x 42"
- Cutterhead: 4-row spiral w/ 36 indexable, solid-carbide inserts
- Cutterhead speed: 7000 RPM
- Cutterhead diameter: 3 1/8"
- Floor-to-table height: 31"
- Fence stops: 45°, 90°, 135°
- Deluxe cast iron fence size: 1 1/2" W x 38" L x 4 1/4" H
- Approx. shipping weight: 796 lbs.



FREE SAFETY
PUSH BLOCKS

MADE IN AN ISO
9001 FACTORY!

Fine WoodWorking
MAGAZINE

Fine WoodWorking
MAGAZINE

\$169
shipping

G0495X **ONLY \$2495⁰⁰**

20" 5 HP SPIRAL CUTTERHEAD PLANNER

- Motor: 5 HP, 220V, single-phase, 30A
- Table size: 25 1/4" x 20" (56" x 20" with extensions)
- Max. cutting width: 20"
- Max. cutting height: 8"
- Max. cutting depth: 1/8"
- Min. stock length: 7"
- Min. stock thickness: 1/4"
- Feed rates: 16 & 20 FPM
- Cutterhead diameter: 3 1/4"
- Cutterhead speed: 5000 RPM
- Overall dimensions: 56" L x 39" W x 41" H
- Approximate shipping weight: 909 lbs.

MADE IN AN ISO
9001 FACTORY!



\$199
shipping

G1033X **ONLY \$3595⁰⁰**

17" HEAVY-DUTY BANDSAWS

- Motor: 2 HP, 110V/220V, single-phase, 19A/9.5A (G0513X2), single-phase, 8.7A (G0513X2BF)
- Precision-ground cast-iron table size: 23 3/8" x 17 1/4" x 1 1/2"
- Max. cutting height: 12"
- Blade size: 131 1/2" L (1/4"-1" W)
- Blade speeds: 1700 & 3500 FPM
- Quick-release blade tension lever
- Cast-iron wheels
- Approx. shipping weight: 418 lbs. (G0513X2), 460 lbs. (G0513X2BF)



EXTREME SERIES

MADE IN AN
ISO 9001
FACTORY

Fine WoodWorking
MAGAZINE

G0513X2
SHOWN

\$119
shipping

G0513X2 **ONLY \$1195⁰⁰**

WITH FOOT BRAKE MICRO-SWITCH

G0513X2BF **ONLY \$1499⁰⁰**

10" SLIDING TABLE SAW

- Motor: 5 HP, 230V, single-phase, 19A
- Main table size: 14 1/8" x 27"
- Sliding table size: 12 1/4" x 63"
- Main blade arbor: 5/8"
- Main blade speed: 4000 RPM
- Scoring blade size: 3 1/8"
- Scoring blade arbor: 22mm
- Depth of cut: 3 1/8" @ 90°, 2 1/4" @ 45°
- Max. rip capacity: 33"
- Approx. shipping weight: 688 lbs.



EXTREME SERIES

MADE IN AN
ISO 9001 FACTORY



\$169
shipping

G0623X **ONLY \$3375⁰⁰**

15" PLANERS

- Motor: 3 HP, 220V, single-phase, 12A
- Max. cutting width: 15"
- Max. cutting height: 6"
- Max. cutting depth: 1/8"
- Min. stock length: 6"
- Min. stock thickness: 3/16"
- Feed rates: 16 FPM & 20 FPM
- Cutterhead speed: 5000 RPM
- Approx. shipping weight: 540 lbs. (G1021Z), 581 lbs. (G1021X2)



EXTREME SERIES

G1021X2
SHOWN

MADE IN
AN ISO
9001
FACTORY!

\$169
shipping

WITH 3-KNIFE CUTTERHEAD

G1021Z **ONLY \$1395⁰⁰**

WITH SPIRAL CUTTERHEAD

G1021X2 **ONLY \$1995⁰⁰**

HUGE SELECTION OF FESTOOL®

New!



IN STOCK

Due to rapidly changing market conditions and tariffs our advertised prices may be increased at any time without prior notice.

PRICING CODE
19FINE
MENTION THIS CODE
WHEN PLACING YOUR ORDER

1-800-523-4777

grizzly.com®

TECHNICAL SERVICE: 570-546-9663 • FAX: 800-438-5901

2 GREAT SHOWROOMS!

BELLINGHAM, WA • SPRINGFIELD, MO

VIEW VIDEOS AT
grizzly.com



**BUY NOW,
PAY LATER**
with Affirm
Choose your
monthly payments
at checkout



20258



40

READING GRAIN



56

MODERN DINING TABLE

features

30

COVER STORY

Build a Curved-Leg Stool

Simple bends provide stability and visual flair

BY PETER GALBERT

40

Don't Fight the Fibers

Better ways to read grain and make the most of your lumber

BY JASON ROBERTS

48

The ABCs of Letter Carving

A few key techniques handle every letter in the alphabet

BY CLARK KELLOGG



62

CURVED DOORS

56

Modern Dining Table

Subtle lines and details create a table for any home

BY PHILIP MORLEY

62

Curved, Veneered Doors

No-hassle coopering is the core of this low-tech method

BY GARRETT HACK



48 LETTER CARVING



Tablet editions free to subscribers

Magazine content, plus searchability and interactive extras. Download the app at FineWoodworking.com/apps. Access is free with your print subscription or FineWoodworking.com online membership.

departments

6 On the Web

8 Contributors

10 Letters

12 Workshop Tips

- Jig holds long boards for planing
- Bandsaw push stick

18 Tools & Materials

- Versatile spokeshave
- New sander kit

22 Handwork

Resawing by hand

28 Designer's Notebook

Inspiration surrounds us

72 Gallery

78 Finish Line

Ebonizing

86 From the Bench

Tools from my father

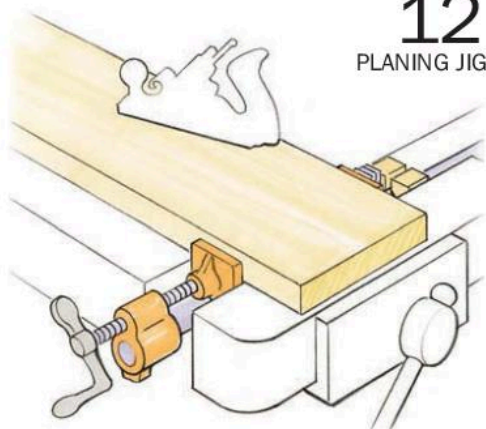
Back Cover

Sitting in the Krenovs' kitchen



73

GALLERY: BLOCK-AND-SHELL CHEST



12

PLANING JIG



28

DESIGNER'S NOTEBOOK



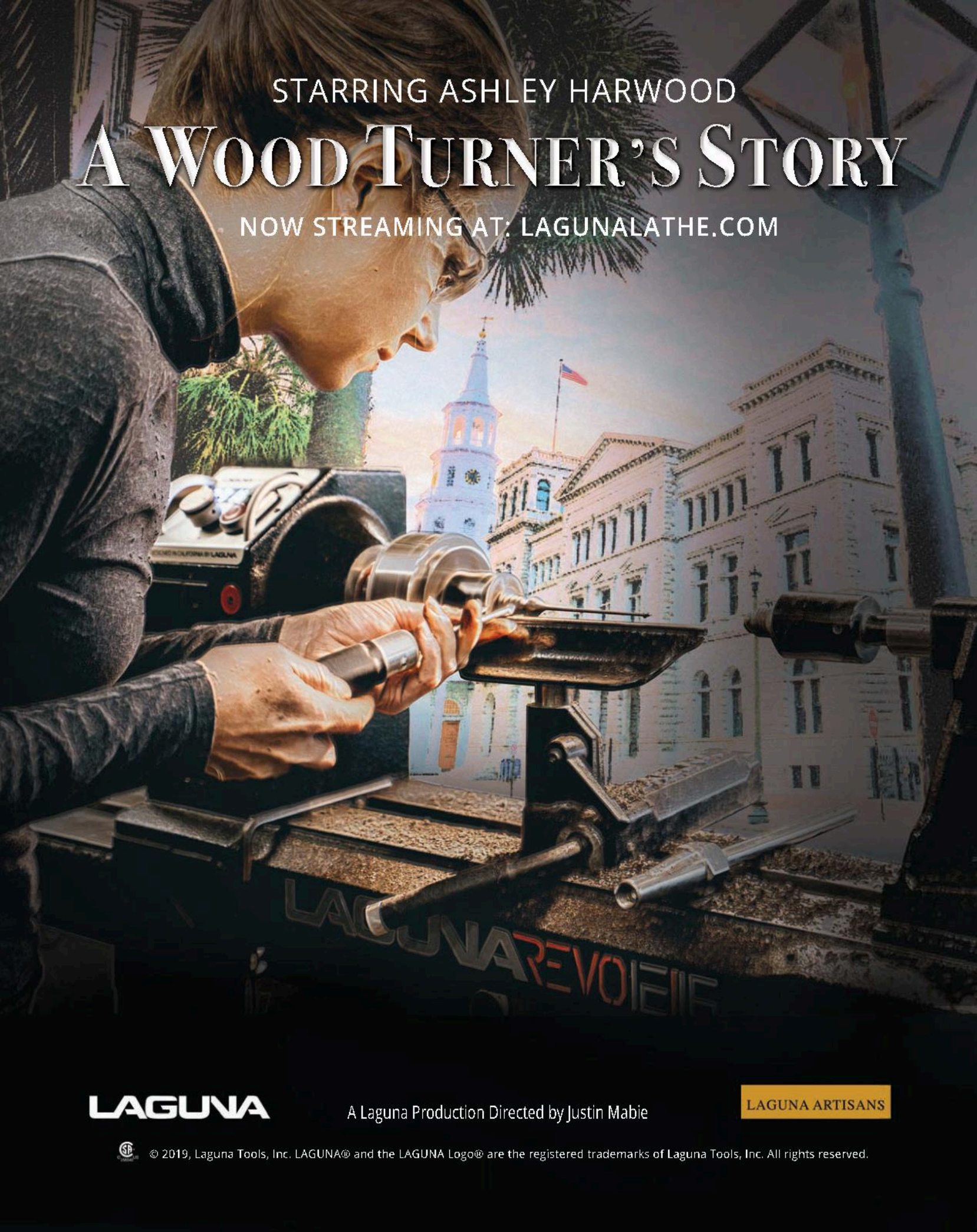
NEW CLAMP FROM BESSEY **18**



22 RESAWING



The Taunton Press
Inspiration for hands-on living®



STARRING ASHLEY HARWOOD

A WOOD TURNER'S STORY

NOW STREAMING AT: LAGUNALATHE.COM

LAGUNA

A Laguna Production Directed by Justin Mabie

LAGUNA ARTISANS



© 2019, Laguna Tools, Inc. LAGUNA® and the LAGUNA Logo® are the registered trademarks of Laguna Tools, Inc. All rights reserved.

Fine WoodWorking[®]

UNLIMITED

For members

Our Unlimited membership provides exclusive access to a dynamic menu of woodworking talent, techniques, and projects—combining our print subscription with our online membership—all for \$99 a year. For details on all the benefits, go to finewoodworking.com/members.



VIDEO

Blacks and blues

Michael Robbins's ebonizing technique (p. 78) is great for imparting deep blacks and charcoals to wood. But what if you want a lighter, blue-gray tone? In this video, he demonstrates an oxidizing technique for tannin-light woods.



VIDEO

Tapered mortises

In this two-part video series on Windsor chair mortises, Peter Galbert (p. 30) demonstrates how to ream mortises that create a super-tight fit for tenons.

VIDEO

The hunt for old saws

Antique tool dealer Joshua Clark teaches us what to look for when buying an antique saw.

Additional perks of Unlimited

ONLINE ARCHIVES

Get on-demand access to the complete *Fine Woodworking* magazine archive. That's more than 1,900 in-depth articles!

DIGITAL LIBRARIES

Unlimited includes two digital book collections: *The Complete Illustrated Guide to Woodworking* and *Methods of Work*.

VIDEO WORKSHOP

Build a splay-legged table

Garrett Hack guides you through the construction of an elegant side table full of whimsical details, including a swing-out drawer that will put your skills to the ultimate test. Highlights include:

- Working with patterns
- Handling tricky leg angles
- Curved drawer joinery



Online extras

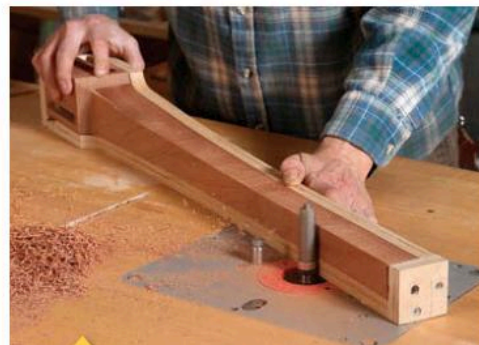
Free content at finewoodworking.com/275



VIDEO

Resawing the Williamsburg way

When resawing by hand, Colonial Williamsburg's Bill Pavlak typically goes it alone (p. 22). But for wide stock, he chooses to enlist some Hay Shop help.



VIDEO

Shaped and tapered legs

The techniques for making Phillip Morley's elegant table legs (p. 56) are a lot more approachable than you might think. Here he demonstrates how to make a run of these curved and tapered parts.

VIDEO

Understanding grain

It's essential to understand tearout so that you can prevent it. Michael Pekovich demonstrates his methods for reading the grain while hand planing.

SHOP TALK LIVE

LISTEN UP, LISTEN IN

Tune in to our biweekly podcast for lively conversations about the craft with our staff and other experts. Listen on iTunes, or watch it on YouTube or at FineWoodworking.com/shop-talk-live.



FOR WHEN ENDURANCE MATTERS.

3M™ PRO GRADE PRECISION™ DUST CHANNELING SANDING BLOCK SPONGE

Dust-channeling design for less clogging and a faster finish.* It's a dual-purpose tool for both detail and flat sanding. A tool that's engineered for endurance.

BUILT TO PERFORM

3M

*Compared to 3M conventional sanding sponges.

© 3M 2019. All rights reserved.
3M and PRO GRADE PRECISION are trademarks of 3M.

[3M.com/Sanding](https://www.3m.com/Sanding)



contributors

Jason Roberts (“Don’t Fight the Fibers”) realized in college that he didn’t want a job sitting at a desk. While working construction after graduation, he began woodworking on the side, enjoying the tighter tolerances and beautiful woods, and selling the occasional piece. After studying the craft at The Krenov School (formerly College of the Redwoods) and working in shops in the United States and France, he transitioned from making furniture to selling specialty lumber, which allowed him more time to raise his daughter. Twelve years later, he is retooling his big backyard shop in Olympia, Wash., and adding furniture making back into the mix.



Jennifer Anderson (Designer’s Notebook: “Inspiration surrounds us”) carried the keys to half the college woodshops in southern California before accepting a full-time teaching position at Palomar College in San Marcos. Anderson, who studied with James Krenov at The Krenov School and Wendy Maruyama at San Diego State University, builds furniture and leads classes across the nation in art, design, and woodworking. Most recently, she and her partner have been hard at work renovating an old dairy barn, the Cypress Street Barn, into a community woodshop and art gallery in Fort Bragg.



Bill Pavlak (Handwork: “Resaw by hand”) has worked in the Anthony Hay Shop at Colonial Williamsburg since 2005, where he explores 18th-century furniture and material culture by re-creating pieces with period-appropriate tools and techniques. He is particularly interested in adapting his approach to reflect the myriad idiosyncratic approaches to design and construction that characterize the furniture of early American makers. In addition to building, carving, and studying furniture, Bill enjoys collecting and listening to sound recordings—especially vinyl records.

Longtime contributing editor **Garrett Hack** (“Curved, Veneered Doors”) travels the world to teach. In 2018 alone, he taught classes in Canada, Germany, Australia, and Israel. He’s talked about making fewer trips by picking only the best places to travel—but then admitted that everywhere he’s been invited is too good to turn down. He’s still building plenty of furniture, too, like Pleated, the cabinet featured in his article and completed last year, as well as a king-size bed made of stunning pear, which was in the works during the photo shoot for this issue.



We are a reader-written magazine. To learn how to propose an article, go to FineWoodworking.com/submissions.

Fine Woodworking

Editorial Director	Thomas McKenna
Creative Director	Michael Pekovich
Deputy Editor	Jonathan Binzen
Deputy Art Director	John Tetreault
Associate Editor	Anissa Kapsales
Associate Editor/ Social Media	Barry NM Dima
Managing Editor/ Production	Elizabeth Healy
Administrative Assistant	Betsy Engel
Contributing Editors	Christian Becksvoort Garrett Hack Roland Johnson Steve Latta Michael Fortune Chris Gochmour

FineWoodworking.com

Digital Brand Manager	Ben Strano fw-web@taunton.com
Manager, Video Studio	Jeff Roos
Video Director	Colin Russell
Executive Editor, Books	Peter Chapman

Fine Woodworking (ISSN: 0361-3453) is published bimonthly, with a special seventh issue in the winter, by The Taunton Press, Inc., Newtown, CT 06470-5506. Telephone 203-426-8171. Periodicals postage paid at Newtown, CT 06470 and at additional mailing offices. GST paid registration #123210981.

Subscription Rates: U.S., \$34.95 for one year, \$59.95 for two years, \$83.95 for three years. Canada, \$36.95 for one year, \$63.95 for two years, \$89.95 for three years (GST included, payable in U.S. funds). Outside the U.S./Canada: \$48 for one year, \$84 for two years, \$120 for three years (payable in U.S. funds). Single copy U.S., \$8.99. Single copy Canada, \$9.99.

Postmaster: Send all UAA to CFS. (See DMM 707.4.12.5); NON-POSTAL AND MILITARY FACILITIES: Send address corrections to *Fine Woodworking*, PO Box 37610, Boone, IA, 50037-0610.

Canada Post: Return undeliverable Canadian addresses to *Fine Woodworking*, c/o Worldwide Mailers, Inc., 2835 Kew Drive, Windsor, ON N8T 3B7.

Printed in the USA





FREE UPGRADE

ON ANY NEW
PROFESSIONAL
CABINET SAW
\$249 VALUE
USD



**OVERARM DUST
COLLECTION**

- OR -

**INTEGRATED
MOBILE BASE**

BUY A NEW 3.0 HP OR 1.75 HP PROFESSIONAL CABINET SAW
BETWEEN MARCH 1 AND APRIL 30, 2019, AND WE'LL OFFER YOU

**A FREE OVERARM
DUST COLLECTION***

-OR-

**A FREE INTEGRATED
MOBILE BASE****

**Not compatible with the In-Line Router Table.

*Overarm Dust Collection requires a Dust Collection Blade Guard (TSG-DC), which is included with the 3.0HP Professional Cabinet Saw but must be purchased for the 1.75HP model.

SAWSTOP.COM/UPGRADE

From the Editor

HANDS ON was a hands-down success

Events are a large part of Fine Woodworking these days. At the heart of our efforts is Fine Woodworking Live (finewoodworkinglive.com), which has become an annual tradition in woodworking instruction, inspiration, and camaraderie. Live also was the launching pad for our first-ever HANDS ON event, which took place last February in Tampa. Unlike Live, which is based on lecture-style instruction with lots of social interaction, this new event features a series of skill-building workshops with small classes that encourage one-on-one instruction.

Planning any event is nerve-racking. There are a lot of moving parts—instructor and attendee logistics, website construction, event sales and promotions—and anxieties increase when the event is happening 1,300 miles away from home.

Thanks to great collaboration between Fine Woodworking and Kate Swann's team at the Florida School of Woodwork, HANDS ON Tampa was a resounding success. We put together a star-studded program, featuring Jennifer Anderson, Dixie Biggs, Michael Cullen, Dave Fisher, Michael Fortune, Peter Galbert, Mary May, and Kelly Parker, who challenged and inspired their students. We had wonderful sponsors: Rikon, Lie-Nielsen Toolworks, NOVA, and Varathane. We had food trucks serving up amazing local flavors. We had great gatherings after the day's work. We even had custom-brewed beers: Rikon Pale Ale and HANDS ON Pilsner. Best of all, though, we had wonderful attendees, a diverse group who arrived with passion for their craft and an unbridled eagerness to learn new skills. Challenges were plenty, and the schedule was tight, but this group of students showed impressive progress over the three days of intensive instruction.

When I announced HANDS ON back in our December issue, I wrote, "I have a feeling it's the beginning of something great." Predictions sometimes come true.

Thanks to everyone involved, HANDS ON will continue in another city this year, and we'll be back in Tampa next February. Wherever it may be, I look forward to seeing you all on the road.

—Tom McKenna, editorial director



A plug for polarization

I just read Christian Becksvoort's article "Swing-Arm Lamp" (*FWW* #274, pp. 56–63). In his wiring instructions, he shows the use of a polarized plug but fails to mention that proper polarization should be maintained through all the wiring.

With a polarized plug, the wider prong connects to the return (ground) side of the receptacle. The return wire should be carried through to the outer (threaded) side of the lamp socket. Depending on the cable, the return side is typically silver colored or may have ribbed insulation. In addition, if an inline switch is used it should be on the supply (hot) side.

The lamp will still function if polarity is not maintained. However, maintaining polarity adds a no-cost incremental safety improvement that makes it more difficult to accidentally touch a live conductor.

—LARRY ZEAFLA, via-email

That's an expensive coping saw

I look forward to the arrival of each issue and usually read them cover to cover, including all the ads!

I have to wonder, however, if you don't need to survey your readership again. Under the Tools & Materials section (*FWW* #274, p. 20), I found the price of the reviewed Blue Spruce coping saw eye-popping! I'll bet 90% of your readers feel the same way! Please stick to applying your insightful and helpful reviews to things we might actually want.

—CHRIS RICHARDS, Camano Island, Wash.

Woodworking career inspired by *FWW*

I began my love affair with woodworking as a young boy watching the men my grandfather hired to work on his projects. I renovated my first house at age 23 and today I am on house No. 15. I worked in suit-and-tie jobs until I was 40 and then I kicked over the traces, so to speak, and I went back to the roots of my soul. Based on what I learned from *Fine Woodworking* starting the year I graduated from high school in 1975, I became an artistic cabinetmaker. I have never regretted my decision to live the dream. Thanks for the education over the years.

—JIM LE MAISTRE, Aldergrove, B.C., Canada

Fine Woodworking®

Publisher **Renee Jordan**
 Associate Publisher, Advertising & Marketing Director **Alex Robertson**
 203-304-3590
 arobertson@taunton.com
 Director of Digital Advertising Operations **John Maher**
 Sales & Marketing Assistant **Tricia Muzzio**
 203-304-3415
 tmuzzio@taunton.com
 Marketing Manager **Matthew Ulland**

To contact us or submit an article:

Fine Woodworking
 The Taunton Press
 63 South Main St.
 Newtown, CT 06470

Email us at fw@taunton.com
 Call 800-309-8955

To contact customer service:

Email us at customerservice@finewoodworking.com
 Visit finewoodworking.com/customer-service
 Call 866-452-5141

Member
 BPA Worldwide

Single Copy Sales  MEDIAWORKS 360



The Taunton Press

Inspiration for hands-on living®

Independent publishers since 1975
 Founders, Paul & Jan Roman

President & CEO **Dan McCarthy**
 CFO **Mark Fernberg**
 CTO **Brian Magnotta**
 VP, Human Resources **Carol Marotti**
 SVP/Group Publisher **Renee Jordan**
 VP, Customer Acquisition and Engagement **Erica Moynihan**

Publishers of magazines, books, videos, and online
Fine Woodworking • *Fine Homebuilding*
Threads • *Fine Gardening* • *Fine Cooking*
taunton.com

The Taunton guarantee:

If at any time you're not completely satisfied with *Fine Woodworking*, you can cancel your subscription and receive a full and immediate refund of the entire subscription price. No questions asked.

Copyright 2019 by The Taunton Press, Inc. No reproduction without permission of The Taunton Press, Inc.

Learning by Doing

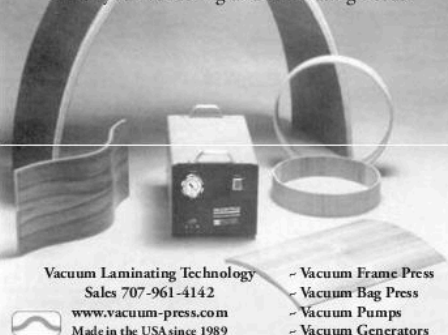
Connecticut Valley School of Woodworking

Bob Van Dyke – Director
 Featuring hands-on classes for all skill levels taught by nationally known craftsmen including Will Neptune, Steve Latta, Peter Follansbee, Darrell Peart, Mike Pekovich and more!

249 Spencer St., Manchester, CT 06040 • 860.647.0303
www.schoolofwoodworking.com

Vacuum Presses

for all your veneering and laminating needs



Vacuum Laminating Technology
 Sales 707-961-4142
www.vacuum-press.com
 Made in the USA since 1989

- Vacuum Frame Press
- Vacuum Bag Press
- Vacuum Pumps
- Vacuum Generators

Grind Away ANY Size Stump FAST!

DR® STUMP GRINDER

- Quickly eliminate any stump!
- Carbide-tipped cutters.
- No more digging!

Self-Propelled
 Model Available!

FREE SHIPPING
6 MONTH TRIAL

Some Limitations Apply

Go Online or Call for FREE Info Kit!

DRstumpgrinder.com

TOLL FREE 888-213-0916



19D54B © 2019

RENEW Your Driveway with the DR® POWER GRADER!

TOWS BEHIND your ATV or riding mower, filling in potholes and ruts.

LASTS 10X LONGER than ordinary box scrapers!



FREE SHIPPING
6 MONTH TRIAL

Some Limitations Apply

Saves You Money!

Go Online or Call for FREE Info Kit!

DRpowergrader.com

TOLL FREE 888-213-0916



19D54A © 2019

ZERO DAMAGE, HIGH ACCURACY



NEW

ORION®

WOOD MOISTURE METER



WAGNER METERS

wagnermeters.com

Call (844) 672-8200

workshop tips

Best Tip



Larry Poore's first woodworking project was a coaster, a downhill racer that kids built in the 1950s. His version even had a radio—with a raccoon's tail waving off the antenna. Soon after, he built a small plywood boat and a trailer he could tow behind his bike. Since he retired, his lifelong woodworking hobby has become "a serious obsession," Poore says, which his wife calls "the other woman in his life."

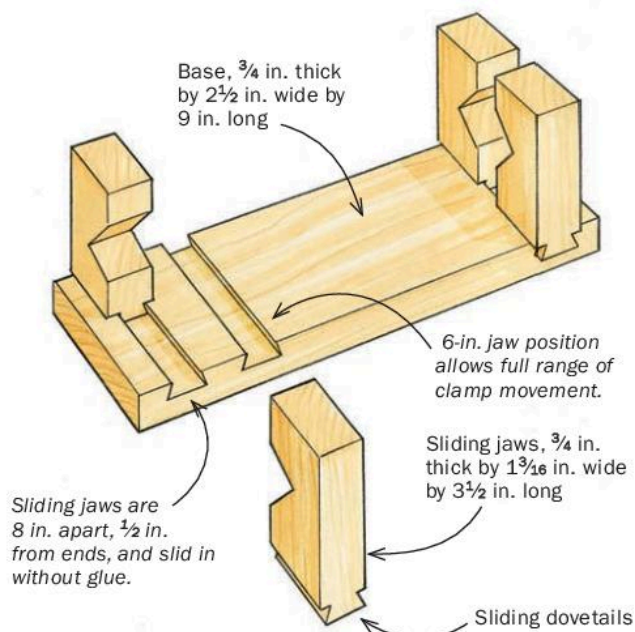
Pipe-clamp cradle holds long boards for planing

It's difficult to control long boards when face planing. Benchdogs don't always work, and a simple end stop doesn't control long boards well, especially when you skew the plane. This jig uses a pipe clamp to hold boards and panels of all sizes, grabbing them securely, holding them flat, and releasing them quickly.

I use it in my end vise, holding a pipe clamp perpendicular to the length of the bench, just high enough that the clamp jaws can grip the edges of the board while staying out of the way of my finely sharpened plane blades. The jig's jaws are attached with sliding dovetails, unglued, so the vise can push them inward to grab the pipe securely. The jaws protrude beyond the width of the base plate so they can be squeezed by the vise.

I remove the plastic clamp pads to allow the jaws to grip more securely in a low position, but if you are concerned about the metal jaws marring workpieces, use epoxy to attach leather pads. The jig shown will work for vises whose jaws have at least 4¼ in. of space above their guide rods or vise screw. If your vise is smaller, adjust the dimensions accordingly.

—LARRY POORE, Issaquah, Wash.



Four sliding jaws start as one piece, with notches cut on the outside edges and sliding dovetails routed on the ends.

Notches, 5/8 in. deep, with apex 1 5/8 in. from dovetail shoulder

Cradle goes in the vise, which pushes the jaws inward around a standard 3/4-in. pipe clamp.

The clamp's jaws grip workpieces tightly yet stay out of the way for face-planing.



A Reward for the Best Tip

Send your original tips to fwtips@taunton.com. We pay \$100 for a published tip with illustration; \$50 for one without. The prize for this issue's best tip was a Triton model TA1200BS 3x21-in. belt sander.

RIKON

NEW

STRITECH

14" Deluxe Bandsaw with Smart Motor DVR Control



Model 10-326DVR MSRP \$1699.99

DVR Features & Benefits

- **Infinitely Variable**
Cut at Any Speed
- **Continuous Torque**
For a Beautiful Finish
- **Safer Operation**
Fast Braking &
Load Spike Detection
- **Easy-to-Use**
One-Touch Speed Selection
- **Energy Efficient**
Limited Vibration and Heat
- **Effortless Cutting**
Through Any Material

RIKON & Striatech have combined their expertise to develop the **WORLD'S FIRST DVR SMART BANDSAW**

*It's been almost 200 years since the bandsaw was first produced.
In that time, the technology has barely changed... until now.*

By adding Striatech's smart switched reluctance motor, RIKON's 14" bandsaw series is better than ever before. Unlike previous bandsaw motors, the Striatech motor is infinitely variable, and offers continuous torque. This means a beautiful finish on your work piece, and a much easier user experience. Improved energy efficiency and quiet, vibration-free operation are added bonuses to this already amazing saw line up.

With an easy-to-read screen and DVR controller,
this technology adds much-needed features to the bandsaw.



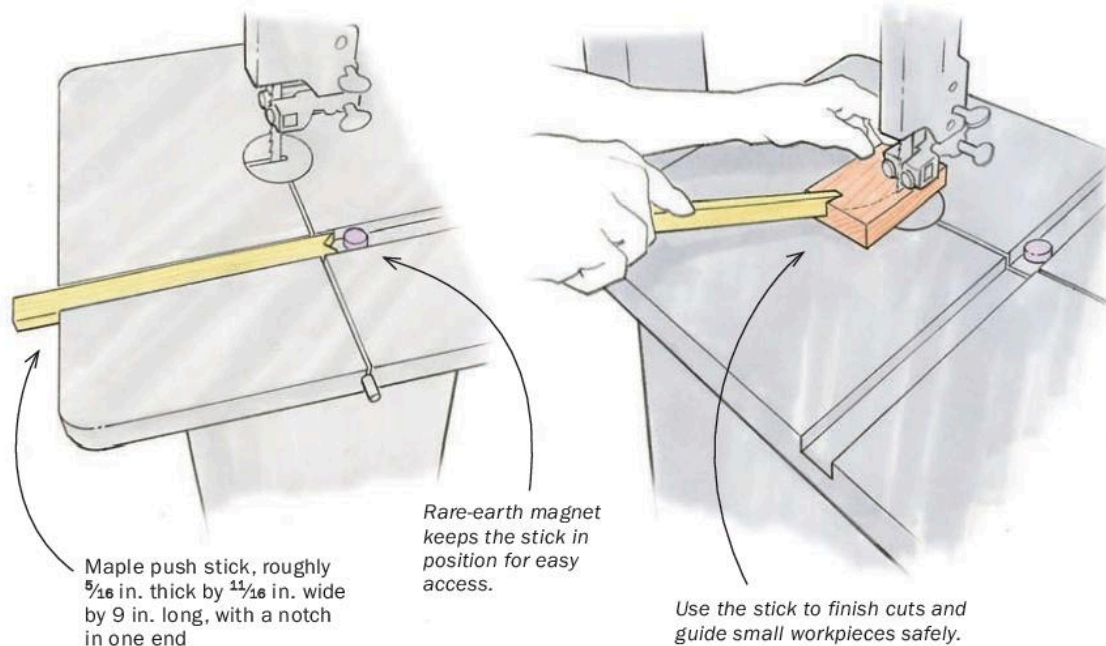
Call today for more information **877-884-5167**
or visit **www.rikontools.com** for a dealer near you!



Bandsaw push stick waits in the miter slot

This simple but effective push stick stores in the bandsaw's miter slot—out of the way yet close at hand. A small rare-earth magnet keeps it from sliding too far forward. Nearing the end of a cut, as my fingers approach the blade, I grab the protruding end of the stick and use it to finish the job. I also use it to control small workpieces safely and push cutoffs away from the blade.

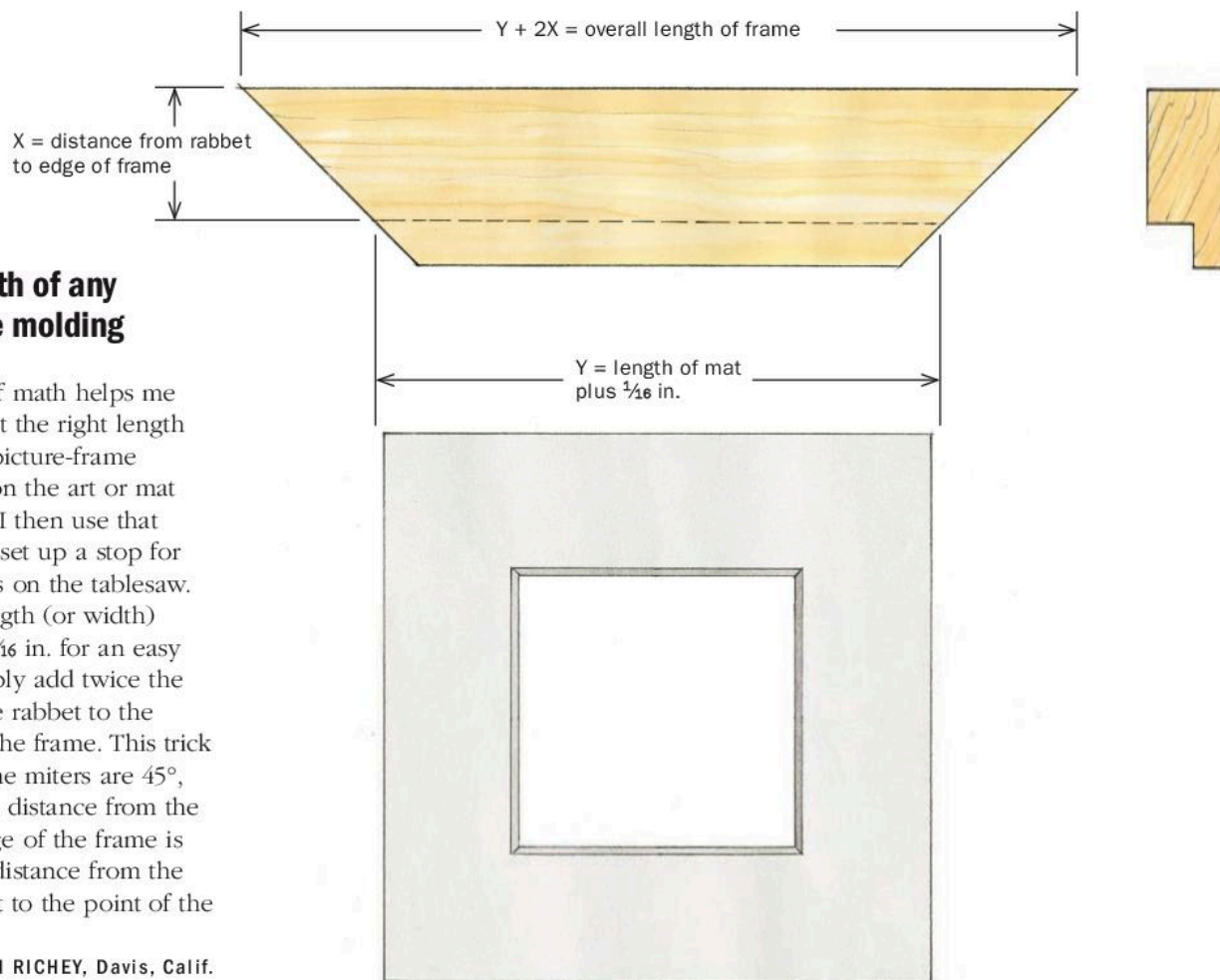
—BARRY THALHEIMER,
Prince Albert, Sask., Canada



Find the length of any picture-frame molding

This simple bit of math helps me quickly figure out the right length for any mitered picture-frame molding, based on the art or mat that goes inside. I then use that overall length to set up a stop for mitering the ends on the tablesaw. Start with the length (or width) of the mat, add $\frac{1}{16}$ in. for an easy fit, and then simply add twice the distance from the rabbet to the outside edge of the frame. This trick works because the miters are 45° , which means the distance from the rabbet to the edge of the frame is the same as the distance from the end of the rabbet to the point of the miter.

—TOM RICHEY, Davis, Calif.



Forrest Blades

Serious woodworkers count on American-made Forrest saw blades for smooth, quiet cuts, everytime... without splintering, scratching or tearouts. No matter what your application, Forrest blades are simply the best money can buy. That's why discriminating craftsmen prefer them!

"[Your blades] cut true, with no vibration. I can say with confidence that Forrest blades are the best."
Carl Stude - Burbank, CA

NEW Website! More Blades!



Our Most Popular Saw Blades:

Woodworker II - This award-winning all-purpose blade is the finest of its type.

Chop Master - Produces perfect miters with smooth edges... and no bottom splinters.

Ask for Forrest blades at a fine dealer

or retailer, order online, or call the factory directly. Your satisfaction is guaranteed... or your money back!

FORREST
The First Choice of Serious Woodworkers Since 1946

www.ForrestBlades.com
1-800-733-7111
(In NJ, call 973-473-5236)

Code FW © 2019 Forrest Manufacturing

Woodworker II
Fine Woodworking

Chop Master
Woodshop News

Duraline Hi-AT
Woodshop News

Dado King
WOOD Magazine



Woodpeckers® Slab Flattening Mill

Woodpeckers Slab Flattening Mill, along with your router, puts the power to flatten oddly shaped and oversized slabs right in your own shop. Warps, twists and mill marks are cut away leaving a flat, smooth surface that needs only light sanding afterwards.

Don't put off tackling your live edge slab project any longer. Find out more about the Slab Flattening Mill at woodpeck.com.

Woodpeckers, LLC • Strongsville, Ohio • 800.752.0725 • woodpeck.com



Oneida®
Air Systems

The Industry Leader in Dust Collection

V-SYSTEM™

HEPA CYCLONE DUST COLLECTORS



Shown with Stacking Sound Filter.

U.S. Patent #
8,377,160 B2
8,496,719 B2



- Industrial U.S. made motor available in 1.5 or 3HP
- HEPA filtration
- High-efficiency molded cyclone separator
- Steel angle bracket stand
- Dust Sentry - infrared dust bin level sensor
- Stacking Sound Filter
- 35 gallon steel dust bin included (larger sizes available)

The Oneida Air Systems V-System™ patented design has a compact shape and sound dampening features which make it the perfect solution for garage and basement shops where size and noise play a significant factor. The Stacking Sound Filter makes it even quieter.



Stacking Sound Filter reduces sound by an additional 6-8 dB.

1-833-438-4422 • oneida-air.com

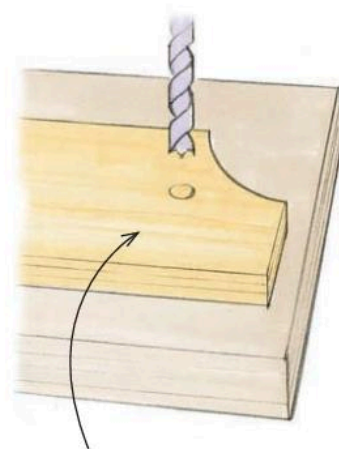
MADE IN THE USA SINCE 1993

Simple jig delivers perfect T-nuts

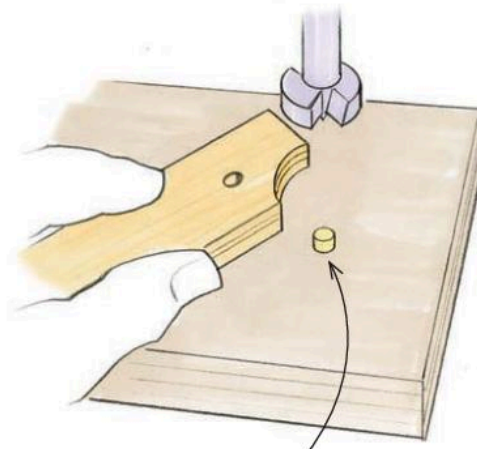
T-nuts are super handy for making jigs, but tricky to locate accurately. That's because the layout often happens on the top face of the workpiece, but then you have to transfer that layout to the back side to drill the counterbore for the T-nut's flange. I've tried lots of methods for transferring the hole location to the back, including drilling partway through, but this little setup works best, delivering a centered counterbore and a very clean-looking result.

Start by laying out the T-nut locations and drilling the body holes through the workpieces—for example, $\frac{5}{16}$ in. for a $\frac{1}{4}$ -20 T-nut—with a sacrificial piece of plywood clamped below. When all the holes are drilled, put your workpieces aside and place a short piece of the same-size dowel into the hole in the plywood. Now you can flip over the workpieces, drop each hole onto the dowel, and drill perfectly centered counterbores.

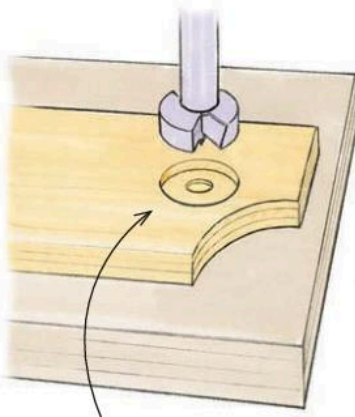
—LEO LITTO, Austin, Texas



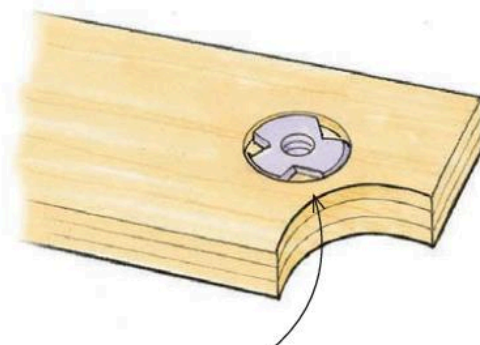
1. Lay out and drill the through-holes for the T-nuts in the workpiece, with a piece of plywood clamped to the drill-press table.



2. Place a short, same-size dowel in the hole in the plywood.



3. Flip the workpiece, and locate it on the dowel. Drill counterbores, centered on each hole.



4. Hammer in the T-nuts for a perfect result.



Large, pad-type floor sander can flatten and smooth figured slabs.

20-grit paper works relatively quickly, leaving a surface ready for final smoothing with a handheld sander.

Use a floor sander to surface big slabs

About four years ago I bought a share of a remarkable local find: a large, entirely quilted broadleaf maple tree. When I began working the wood, I found that I couldn't use a handplane on the amazing grain without massive tearout, no matter how sharp my blade was or how I skewed the plane. Sanding seemed to be the only solution.

Faced with a pile of rough slabs, I went to my local home center and rented an orbital floor sander. The sander I rented has one 12-in. by 18-in. pad on the bottom, which bridges high points, letting me flatten the slabs and erase sawmill marks at the same time. The 20-grit paper works fast, and makes coarse dust that is easily grabbed by the sander's on-board collector. It took all day, but I was left with a pile of flat lumber ready for finish sanding.

It's important to note that the slabs did start with relatively consistent thicknesses. Also, there was one slab that was so cupped that I couldn't deal with it. As for the rest, I was able to achieve beautiful workpieces from slabs that I couldn't have handled otherwise.

—BOB GOUGEON, Nanoose Bay, B.C., Canada

The Country's Largest Selection of Unique Slabs and Burls



**BERKSHIRE
PRODUCTS**

Sheffield, Mass
413-229-7919
BerkshireProducts.com

DOWELMAX

PRECISION ENGINEERED JOINING SYSTEM

JOINT STRENGTH IS DIRECTLY PROPORTIONAL TO ACCURACY



Mitered Drawer Corner with Exposed Dowels on Chess Table
Built In House by Dowelmax with 100% Dowel Construction

Full System Not Shown-Main Unit Only

OUR GUARANTEE: Joints Made
with Dowelmax are Test Proven
Stronger and More Accurate than
Comparable M&T or Domino Joints.



Call 1.877.986.9400 or visit dowelmax.com

**Oneida®
Air Systems**

The Industry Leader in Dust Collection

DUST GORILLA® PRO

DUST COLLECTORS WITH SMART BOOST™

Stacking Sound Filter
reduces sound by an
additional 6 - 8 dB.



- 24" of static pressure, up to 2x the vacuum of standard dust collectors
- HEPA filtration
- Industrial U.S. made motor available in 3 or 5 HP
- Wireless RF remote
- 35 or 55 gallon steel drum
- Dust Sentry - infrared bin level sensor
- Angle iron stand
- Stacking sound filter and internal silencer
- Easily assembled

Smart Technology
U.S. Patent #
8,491,685



The Dust Gorilla® PRO with patented SMART Boost technology monitors your system for suction loss and automatically adjusts the fan motor's speed to deliver maximum air volume and higher suction when needed.

Ask about our
complete line of
ductwork and ductwork
design services!

1-833-438-4422 • oneida-air.com

MADE IN THE USA SINCE 1993

tools & materials

■ ACCESSORIES

Clamps with clearance

THE HANDLE OF BESSEY'S NEW F-STYLE CLAMP, the GearKlamp, is on its metal rail, allowing you to use the tool in tight spaces. A series of plastic gears rotates the threaded rod that tightens and loosens the clamp pad, and there's a quick-release button that lets you slide the head quickly along the rail. The large stationary pad is quite useful and has V-grooves to help hold odd-shaped pieces. The clamps come in lengths of 6 in. to 24 in.

My pair of 12-in. clamps have performed nearly flawlessly. When clamping, instead of needing room for the jaws and handle, you now need room only for the jaws. This is great for those times when a traditional F-style clamp handle would be sandwiched against the surface of a bench or machine fence, leaving no room for your hand, so you desperately try to tighten the clamp with just your finger and thumb. This isn't a problem with the GearKlamps. They're also nice for holding cauls in place because they won't interfere with other clamps.

I found an issue with the pad on the GearKlamp's movable jaw, though: It can pop off of the ball joint. It snaps back on easily enough, but I keep an eye out so as not to lose one.

—Kelly Dunton makes furniture in Connecticut.



Room to turn. The position of the GearKlamp's handle left Dunton plenty of space to operate it. Here he's securing a stop block to his miter gauge and his fingers don't get trapped between the handle and the saw table.



GearKlamp by Bessey

\$18-\$24

■ HAND TOOLS

Planing stop with bite

FOR EXTRA GRIP WHILE PLANING against a stop, woodworkers have traditionally used toothed, metal hardware that bites into a board's end grain. Conventional stops are either metal versions mortised into the benchtop and flipped up when needed or blacksmith-made accessories that are driven into a wooden stop. Both work, but neither is particularly versatile or accessible. The BT&C stop addresses both issues.

This stop has a sharp, scalloped edge cut into a thin steel plate that can be screwed down. I tested it with boards 4 in. to 12 in. wide and with different degrees of twist. The teeth bit deeply and securely into wood, making their grip as effective as any I've used. I tested the mild steel version; BT&C also has a hardened model. I had no issues with the teeth dulling. The three countersunk holes allow it to be affixed almost anywhere and easily moved. I screwed it to the top of a benchdog, a block mortised into my bench, and a board screwed to the end of my bench, and all worked well. Just be mindful when screwing into end grain, as the screws can work loose. However, mine didn't fail even after hours of use.

—Bill Pavlak is the supervisor at the Anthony Hay Cabinet Shop at Colonial Williamsburg in Virginia.



Toothed planing stop by Brooklyn Tool & Craft

\$19-\$33



No-fuss mounting.

The countersunk holes on the stop let you mount it wherever it's convenient. There's no need to mortise it into your bench, like a traditional version. Here, the stop is screwed to the top of a 3/4-in. benchdog.

Now in store



Our 100% washed chino
Fine Woodworking hat
is soft and strong, with
an adjustable strap.

**Made in
the USA**

Shop TauntonStore.com/gear

BURN SAFELY

BurnCage™

PERFECT FOR:

- Sensitive financial documents
- All burnable household waste*
- Old leaves and branches

* Always check local ordinances before burning.

Go Online or Call for FREE Info Kit!

BurnCage.com

TOLL FREE 888-213-0916



Now In
3 Sizes!

19D51X ©2019



PERFECT FOR SLAB MAKING!

MEGA DADO

EXCLUSIVE PLANER ROUTER BIT

"This bit was fantastic. It cut with almost no tearout, even around the knots and irregularities. After the two slabs were flattened, the bit was still sharp."

Nick Offerman, Fine Woodworking, No. 222

Shop 1000's of
Innovative Tools!

INFINITY
CUTTING TOOLS

- 2+2 Shear Angle Geometry
- 2" Cutter Diameter
- 1" Cutter Height



WATCH
VIDEO
ONLINE!

Item: 52-506

INFINITYTOOLS.COM • 877-USA-BITS

CENTER for FURNITURE CRAFTSMANSHIP

Teaching Creative Excellence

WORKSHOPS

FURNITURE INTENSIVES

TURNING INTENSIVE

NINE-MONTH COMPREHENSIVE

STUDIO FELLOWSHIPS



COME LEARN WITH US

Rockport, Maine

207-594-5611

www.woodschooll.org

BERDOLL SAWMILL

LIVE EDGE SLABS • NATIVE TEXAS LUMBER • WOODSHOP SERVICES • MANTELS



KILN DRIED AND SURFACED FLAT - GUARANTEED

berdollsawmill.com • 512.629.3625

■ POWER TOOLS

New sander kit

SEVERAL MONTHS AGO in issue #272, I reviewed a collection of 5-in. random-orbit sanders. The Triton TROS125 wasn't available to us at that time, so when one came into my hands, it was only natural to give it a spin.

The sander was nice and tall, affording plenty of places to grip. It was also well-balanced and handled easily when I stuck with on-board dust collection. The tool fought me a bit when hooked up to a vacuum, but it never got out of control. The variable speed control knob lets you dial in the speed between 7,000 rpm and 12,000 rpm. The kit includes several mesh sanding disks and a circular dust port adapter, which is probably necessary, since the connection is rectangular with rounded corners. Everything comes in a handy carrying bag.

When using the built-in dust collection, the sander removed an average 5.7 grams of material, collecting about 57.9% of it. When hooked up to a vacuum, the TROS125 removed an

average of 7.0 grams but collected 90%. It took 2.35 seconds to power off. When compared to other sanders in the review, its numbers trailed the pack in nearly every category.

—Barry NM Dima is an associate editor.

Sander by Triton
Model TROS125
\$80



■ HAND TOOLS

Versatile spokeshave

THE CALEB JAMES SPOKESHAVE is a throwback to a traditional wooden-bodied tool that functions differently than most other spokeshaves available today. There's a slight curve to the sole, and the blade is fixed in place with no knobs or adjusters to set the depth of cut. Instead, to take a thicker or thinner shaving, you roll the spokeshave backward or forward, changing how much the blade projects in relation to your contact point on the sole. A full tilt backward and you're pulling off thick shavings; a quick tilt forward and you're taking thin curls. This functionality sold itself when I was shaping ladderback chair legs. I was able to quickly hog away material right up to my line before tilting the spokeshave to finesse the shape with the finest of cuts. Because I wasn't stopping to adjust my depth of cut or switch between tools with different settings, I worked more quickly.

Of course, this flexibility comes at a cost: A perfect cut is not guaranteed. There is nothing to stop you from cutting too deep by accidentally tilting the tool backward, making muscle

memory a must. But the infinite variability became second nature for me after just a little bit of practice; after months using the tool, I found my metal-bodied shave slow and frustrating in comparison. However, I still think modern shaves are best for those times when it might be difficult to keep a consistent tilt on the tool, such as on a tight curve or a long sweep.

A bit of warning: There's often a waitlist for this tool, but the wait is well worth it.

—Ben Strano, Fine Woodworking's digital brand manager, has a passion for chairmaking.

Spokeshave by Caleb James
\$185



Woodpeckers' Woodworkers Edge Rule



Our Edge Rules simplify your life by wrapping around the edge of your stock and giving you an accurate scale on both sides. The rule supports itself and makes it simple to mark both the face and the edge at the same time. Available in four lengths, individually or as a set.

Find out more about the Woodworkers Edge Rules at woodpeck.com

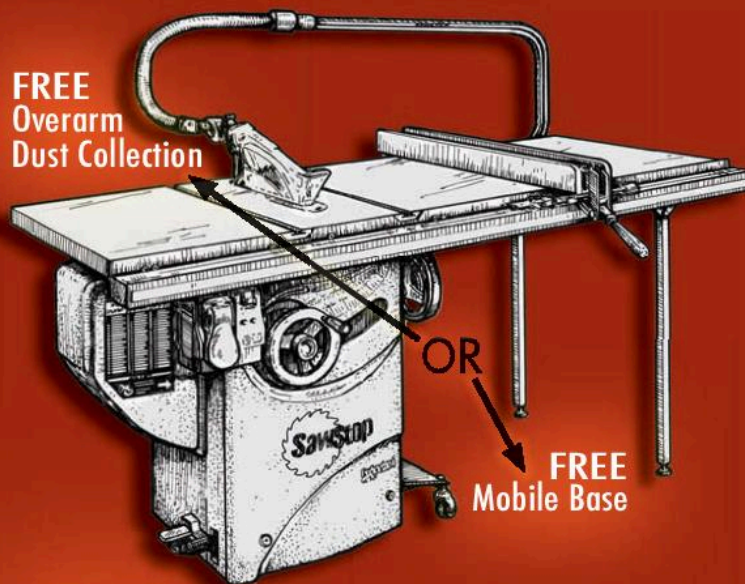
Woodpeckers, LLC • Strongsville, Ohio • 800.752.0725



800-241-6748 Atlanta, Georgia

highlandwoodworking.com

FREE
Overarm
Dust Collection



FREE Upgrade on any new Professional Cabinet Saw

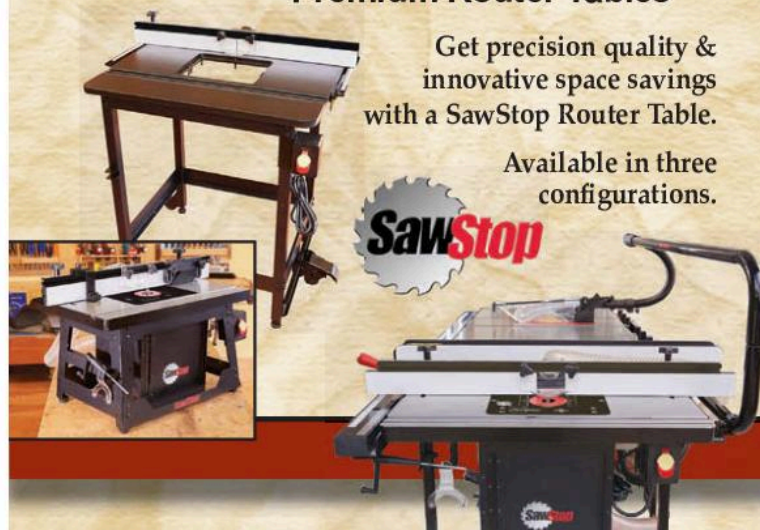
Buy a new SawStop 3.0 HP or 1.75 HP
Professional Cabinet Saw
between March 1 & April 30, 2019,
& we'll offer you

\$249 FREE Overarm Dust Collection
or
Value! FREE Integrated Mobile Base

NEW from SawStop – Premium Router Tables

Get precision quality &
innovative space savings
with a SawStop Router Table.

Available in three
configurations.



envi

WWW.EHEAT.COM
1-800-807-0107



ENERGY SAVING & SILENT
4 cents per hour!* & has no fan!

ULTRA-SAFE & HEALTHY
cool to the touch & doesn't blow dust

EASY TO INSTALL & SLEEK
installs in minutes & only 2 inches thin!

10% OFF 1 or more Envi Heaters
Coupon code: FW1910 / FREE SHIPPING!

Resawing by hand

WITH A GOOD, SHARP SAW, IT'S FASTER AND EASIER THAN YOU MAY THINK

BY BILL PAVLAK

Pick the right saw for the job

When selecting a saw for resawing, think large and aggressive. The teeth need to be filed for ripping and have some set, but not too much. Saws from modern makers should come sharp. If you buy an antique one, but aren't comfortable sharpening it yourself, send it out and let the sharpener know you'll be using it for resawing. Don't stress too much about the tool, though. The saw needs to be good and sharp, not great and perfectly sharpened.

A handsaw with a 26-in.-long blade works well for boards up to 12 in. wide. For wider stock, I grab a helper and a 4-ft.-long, two-person frame saw. Fortunately, that isn't often. I use a 5½ ppi (points per inch) saw. For really aggressive jobs, like cutting up backboards, I might use something coarser. I go finer for veneer. If your budget allows only one saw, go for 7 ppi.



Different teeth for different jobs. In the photo above, Pavlak is using a 5½ ppi saw, good for general-purpose work. When cutting veneer (left), Pavlak uses a 10-ppi saw. The higher tooth count affords more finesse and leaves a finer surface.

“I can’t imagine having to do all of that by hand.” Woodworkers often say this to me as I demonstrate 18th-century cabinetmaking at Colonial Williamsburg.

I try not only to get them to imagine it, but also to see that hand-tool techniques still have an important place in today’s shops. There is, however, one method where the conversation often stops: resawing by hand.

For starters, it looks exhausting. There’s also fear around following the line. But resawing by hand isn’t that hard or arduous; it just takes trying it a few times to realize that. And once you become proficient, your resawing will never be limited by your bandsaw—or lack thereof—again.

For the best results, there are a few things to keep in mind. Foremost, when sawing, advance the saw only down a line you can see. This means starting at the near corner, taking great care to advance the blade simultaneously across the end and the edge facing you. When you reach the far corner, flip the board and repeat. This process of cutting triangles (see pp. 24, 26) means you are sawing only the lines you can see.

Starting is the hardest and most crucial part. The wide blade will feel unwieldy until it’s buried in the board, so use the thumb of your off hand to position and steady it on the waste side of the cut. Generally, I saw off my line to leave a



GET READY

Begin with a reference surface. Because you’ll scribe the thickness off this face, make sure it’s flat and without wind.



Scribe the resaw thickness. Using a marking gauge, wrap the scribe line around the entire board. Make sure it’s clearly visible.



Clamp the board so it’s angled slightly away from you. A lot of force is generated while resawing by hand, so Pavlak recommends having a stout bench and a strong vise to handle the task.

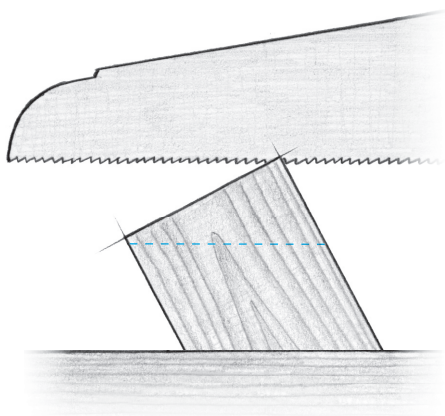
Online Extra

To watch a video of Bill Pavlak and a partner working together to resaw wide stock, go to FineWoodworking.com/275.

START THE CUT

SAW INTO THE NEAR CORNER

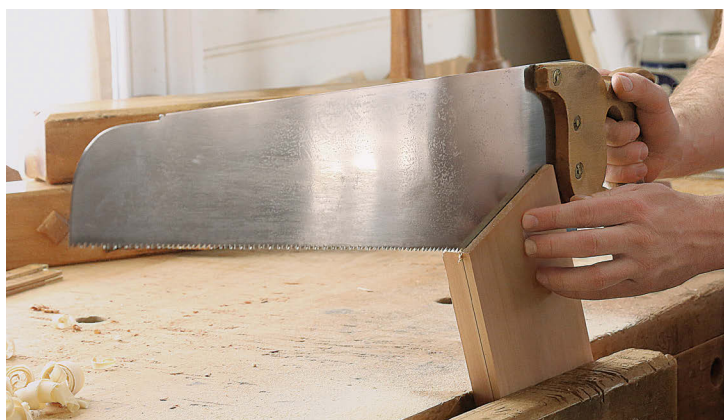
Begin by cutting a triangular kerf across the top end and partially down the edge facing you. When resawing, saw only down a line you can see.



Start just off your line. Pavlak is right-handed, so he keeps the waste to his right to better see his line. (Lefties should do the opposite.) He positions and steadies the saw with his thumb.



Course correct if necessary. Apply a little lateral pressure with a finger to allow the set in the teeth to push the tool back on track.

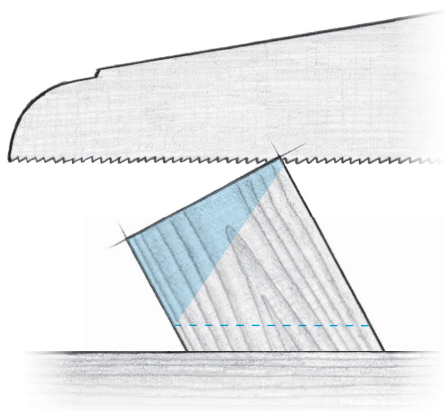


Take full-length strokes. From beginning to end, slip into a rhythm, using the entire length of the saw as soon as it feels stable in the cut.



SECOND CUT GUIDED BY FIRST

Within a couple of strokes from the new side, the saw will fall into the first cut's kerf, making it easier to guide.



Flip the board for the second cut. Once again, saw only what you can see while taking careful, deliberate strokes with the saw.



A CAN'T-MISS EVENT FOR WOODWORKERS

Fine Wood Working 2019 LIVE

April 26-28, 2019 | Southbridge, MA

Join us for classroom instruction, technique demonstrations, and design inspiration in a fun-filled weekend that's destined to be the event of the year for the woodworking community.

Hurry! Book now before it sells out
FineWoodworkingLive.com/Register

© 2019 The Taunton Press

Woodpeckers®

Unmatched Precision Unmatched Selection

Woodpeckers manufactures a range of squares covering every scale of woodworking, from jewelry boxes to complete kitchens. Each square guaranteed accurate to $\pm 0.0085^\circ$, a tolerance of less than the thickness of a human hair two feet from the reference edge.

Woodpeckers one-piece core and offset cheeks give you a square that starts square, stays square and helps you every step of the way in your projects.

See our full line of squares, plus all our precision woodworking products at woodpeck.com.



Woodpeckers, LLC • Strongsville, Ohio • 800.752.0725 • woodpeck.com



CONTINUE THE CUT

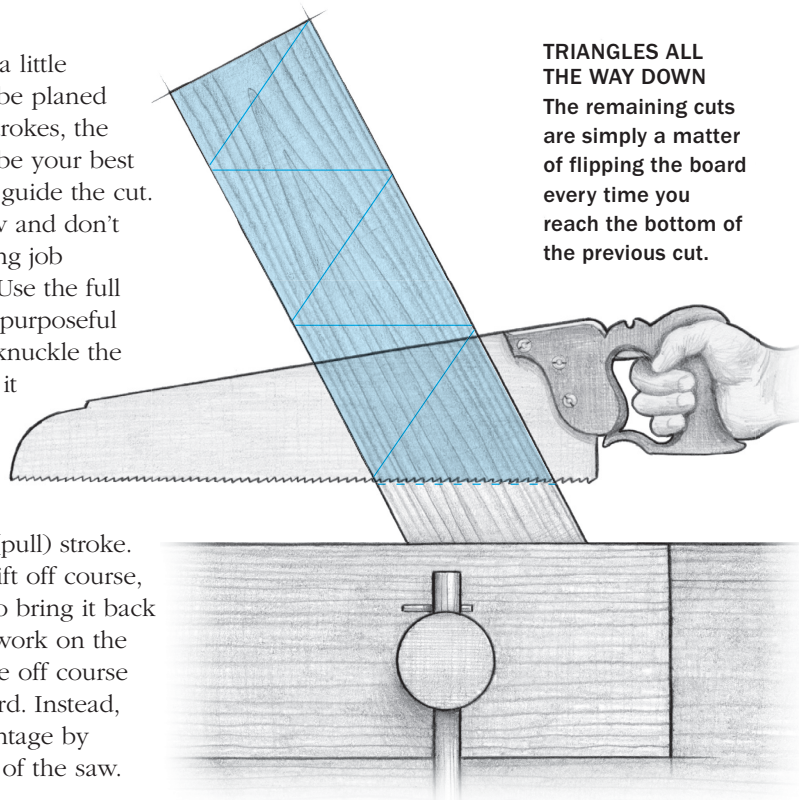
Keeping the board clamped at an angle maximizes the amount of blade in the board at any time, increasing stability.



little room for error and a little extra thickness that can be planed away later. After a few strokes, the once-wobbly blade will be your best friend as its width helps guide the cut.

Don't race with the saw and don't force it. A proper resawing job shouldn't wear you out. Use the full length of the blade with purposeful strokes, but don't white-knuckle the handle or bear down on it or the saw plate. Follow the old cliché: Let the saw do the work. Fall into a rhythm and let up a little on the return (pull) stroke.

If the saw begins to drift off course, don't twist it in the cut to bring it back on track. This will only work on the edge; the saw will still be off course in the middle of the board. Instead, use the set to your advantage by simply pressing the side of the saw.



TRIANGLES ALL THE WAY DOWN
The remaining cuts are simply a matter of flipping the board every time you reach the bottom of the previous cut.

TIP



Wedge the kerf open. Some boards may close up as you resaw them, pinching your saw. If this happens, put a wedge in the kerf to prevent it from closing.



WOOD WORKING

BEGINS HERE.

North America's Largest Woodworking Event of the Year is Here!
If you're a passionate Woodworking Enthusiast, Hobbyist, Own a Small Shop,
Then this is the Show for You.



GET YOUR PASS TODAY @ www.AWFSFair.org

Enter Promo Code: **FWM** and **SAVE**

July 17-20, 2019 | Las Vegas Convention Center | Las Vegas, Nevada

- ☒ North America's largest woodworking show in 2019
- ☒ Meet the Fine Woodworking staff at their booth to find out what's new, talk about your latest project or show off a picture of your shop
- ☒ Shop Talk Live on the show floor with guests throughout the show
- ☒ Shop the latest tools, machinery, finishing products, hand tools, and technology for home shops
- ☒ Live software and power tool demos
- ☒ Get answers to your questions in real time so that the tools, machines and supplies you invest in meet your current and future needs
- ☒ Expert-led seminars, demonstrations, workshops and panels
- ☒ Get an insider look at how pros succeed
- ☒ Talk tools with industry experts
- ☒ Be inspired by lighting and cabinet hardware options
- ☐ Register in advance and save \$20

This is the power of experiencing AWFS Fair live.

DON'T MISS IT. REGISTER NOW.

Enter Promo Code: **FWM** and **SAVE**



JULY 17-20, 2019

LAS VEGAS CONVENTION CENTER

LAS VEGAS, NEVADA

www.awfsfair.org

FINISH UP



Extend the kerf to the bottom corner before flipping the board end for end. This helps you direct your saw to the already-sawn cut and makes it a little easier for the board to pop open at the end of the cut.

If your saw keeps wandering off course, it's probably not you. Blame the tool. It needs to be sharpened or reset.

If all goes well, the triangular cuts will meet beautifully. Sometime during the last stroke all the resistance below the blade disappears and “thwump,” you’re through. That moment almost always comes as a sweet little surprise. For those other times, don’t worry. If the kerfs don’t meet but are past where they should have met, pull the boards apart and plane away the wood that remains. It doesn’t feel good when that happens, but you’ll still have a usable piece and it will be better the next time around.

Resawing by hand works just as well for veneer, and the technique’s the same—albeit much more deliberate and cautious. I won’t saw thinner than a heavy $\frac{1}{16}$ in. One of my coworkers has successfully gone down to $\frac{1}{32}$ in., but it wasn’t really worth the trouble.

In all honesty, it’s easier to resaw than to write or read about it. I’d dare you to try it for yourself if you don’t believe me, but there’s nothing daring about it. After a little, you’ll turn yourself into the highest-capacity bandsaw in the neighborhood. □

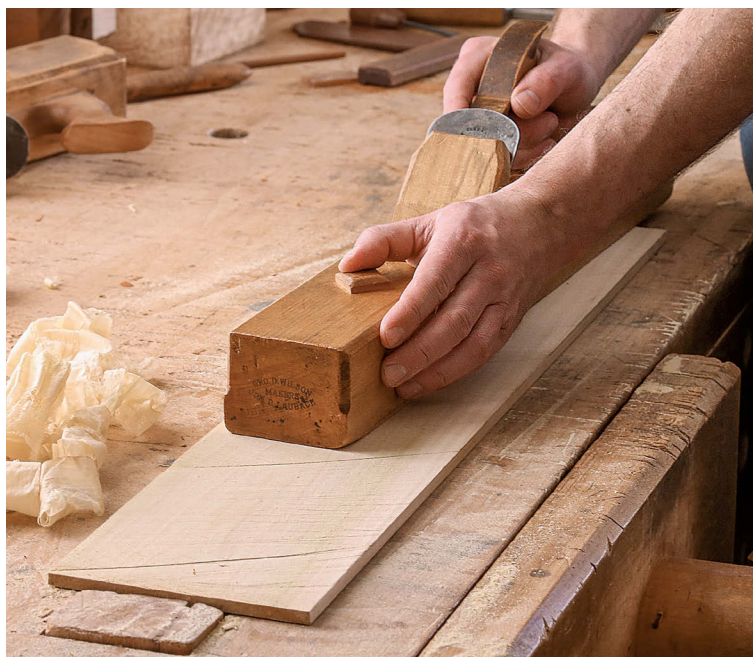
Bill Pavlak is the supervisor at the Anthony Hay Cabinet Shop at Colonial Williamsburg in Virginia.



Flip for the final cut. Follow your scribe line and aim for the small kerf at the far corner.



Inspect the sawn surface. You’ll likely see some roughness and sawmarks. For backboards, Pavlak leaves the stock right off the saw.



Plane if necessary. Boards resawn with good technique and the proper saw won’t take much to plane smooth.

Inspiration surrounds us

Nothing is more daunting to a woodworker than a pristine piece of white paper. And when it comes to design, we often fall back on reproducing work that already exists. This makes sense from the standpoint of learning techniques, like when a painter re-creates the *Mona Lisa* or a sculptor copies Michelangelo's *David*. To translate this example from fine art to furniture making, think of a woodworker who re-creates a Sam Maloof rocker. Often regarded as the pinnacle of woodworking, a Maloof rocker offers the craftsperson an education in a bevy of woodworking techniques.

But once you have a grasp on technique, where do you go from there? Most woodworkers look at other furniture for inspiration, taking the shape of a leg from one chair and the crest rail from another, or appropriating the top of one table and putting it on the base of another. When the stars align, the result is a functional object that is pleasing to the eye. But often the result just misses the mark. We've all been there.

A fresh path to inspiration

When I teach furniture design, I steer my students away from the cut-and-paste tactic by offering a variety of alternative approaches. One of my favorite methods is to find inspiration in all objects. Art, architecture, plants, animals—anything from

our everyday surroundings can be a rich source of inspiration. A good example of this methodology is a series of pieces I made where high-end fashion served as the spark.

While browsing through a newspaper, I came across the 2009 collection of fashion designer Zac Posen. I was blown away by the sculptural form of the arms and neckline of a dress, which were created by pleats. I immediately began thinking of furniture, and more specifically, how the soft folds of fabric might translate into a hard material such as wood. In that brief moment, without intention, inspiration was gleaned and the design process begun.

Sketch the spark into reality

With the dress as a reference, I began to sketch. One sketch led to another until I enlarged the shoulder and upper arm portion of the dress using a grid transfer technique. Drawing by hand allows you to discover information about an object that would otherwise be lost. As you draw, you become conscious of the





BY JENNIFER ANDERSON

object's attributes: repetition, geometry, symmetry, asymmetry, texture, color, and pattern. When I connected my hand and eye to draw the dress, I discovered that the repetitive peaks and valleys and gentle sweeping curves of the pleats created a visual movement I wanted to capture in my furniture.

From there I began researching other sources of inspiration with a similar aesthetic, such as icebergs, running water, and mushroom gills. Those images became sketches and those sketches led to more sketches. I drew the entire object,

When the stars align, the result is a functional object that is pleasing to the eye.

enlarged portions, colored some, until the curves, peaks, and valleys eventually found themselves incorporated into furniture forms.

Whether it's a Sam Maloof rocker or the pleats of a dress, inspiration can come from anywhere at any time. Our goal should be to remain open to it and harness that inspiration as it comes, and then turn it into the best work we can make. □

Jennifer Anderson is a designer, woodworker, and teacher at Palomar College in San Marcos, Calif.

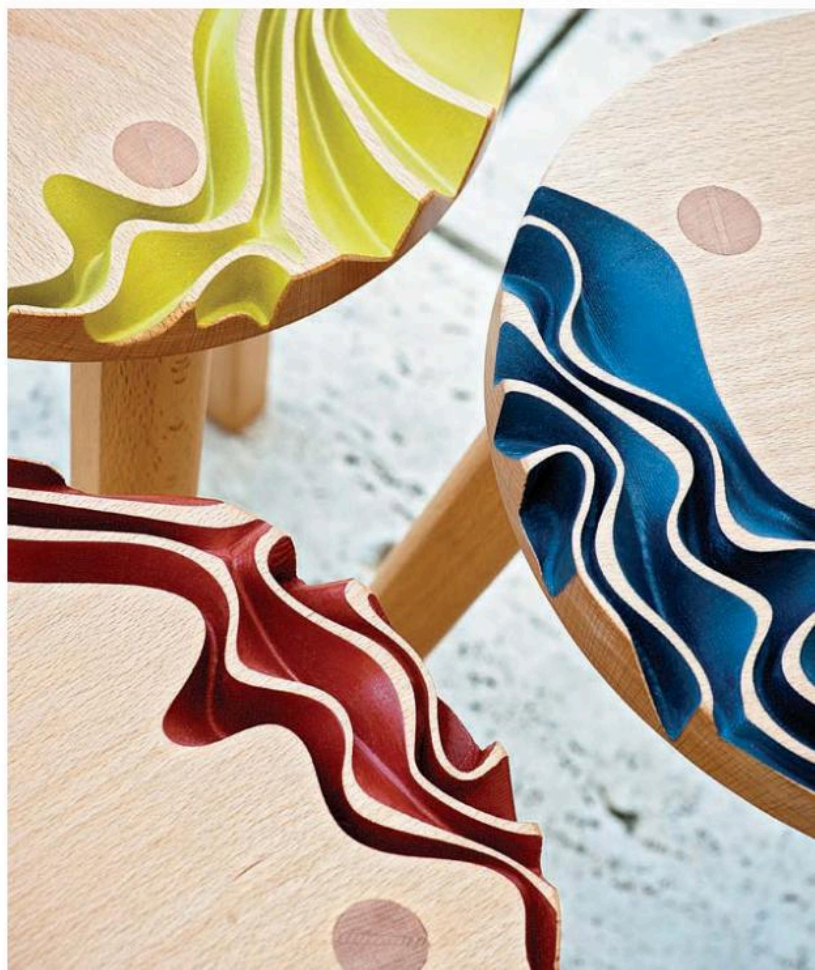


From fabric to furniture

Blending the concept—in this case, the pleated fabric of a dress—into furniture was not too difficult. Since visual movement would be the focal point, I wanted the furniture to serve as a backdrop. Simple forms in nondescript woods would highlight the carvings best. Using my sketches and the aid of friends with CNC machines, we developed a drawing using Rhinoceros software and began prototyping the carvings. After a few attempts, we established the cutting pattern and now have a file that can be used repeatedly. This type of carving can easily be farmed out to any fabrication company with a CNC machine for hire. These days it's very common and affordable.

The last carving path on the CNC leaves a fairly clean surface, with a fine grid-like texture. Using a medium-grit sandpaper, I knocked back any fuzz. Once I had a consistent surface I applied several coats of milk paint to the carved surfaces, lightly sanding between coats. I applied a hand-rubbed oil finish using a wet-sanding technique. This left a silky smooth finish akin to the pleats on the Posen dress.

—J.A.



Build a Curved-Leg Stool



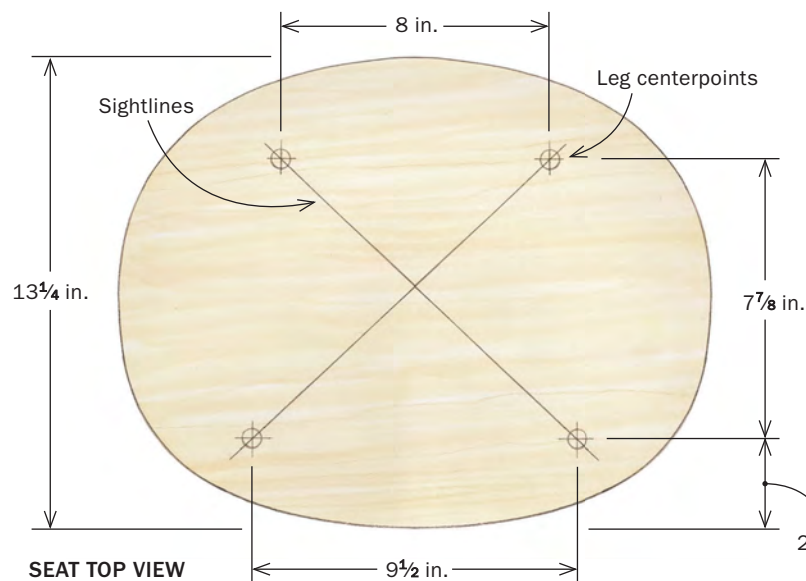
Simple bends provide stability and visual flair **BY PETER GALBERT**

Making my way into chairmaking was a long process, and between early chair attempts I built stools to help advance my turning, shaping, and joinery skills. Stools not only offered quick and invaluable lessons in the craft, but they also supplied my workshop and my house

with some of the most enduring and useful pieces that I've ever produced. Among my favorite designs is this curved-leg bar stool. It's comfortable, light, and useful, and its bent legs add an elegant flair, offering the stability of a larger footprint without affecting the slim silhouette of the piece.

Unlike most of my chairs, this stool can be made using wood from planks instead of logs, although care should be taken to select straight-grained material of a suitable strength and ability to bend. The bend is slight enough to be made in kiln-dried as well as air-dried wood.

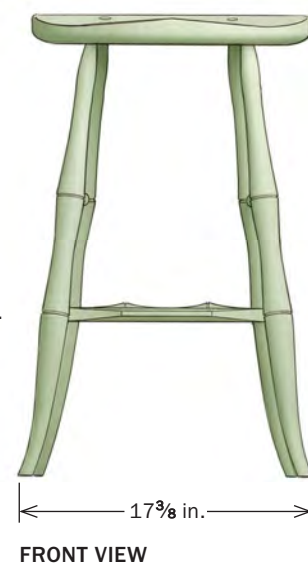
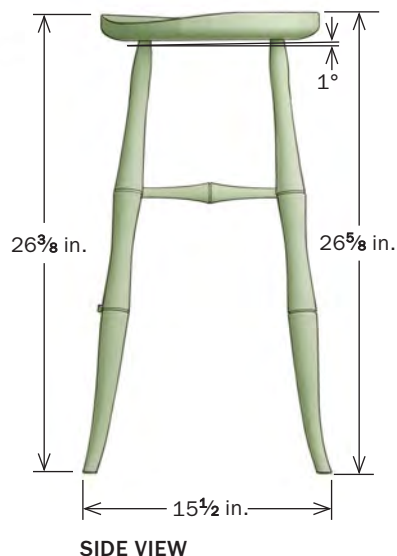
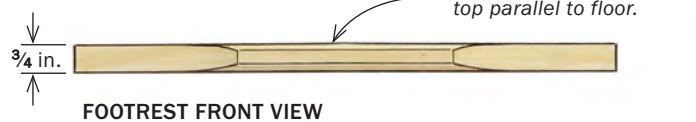
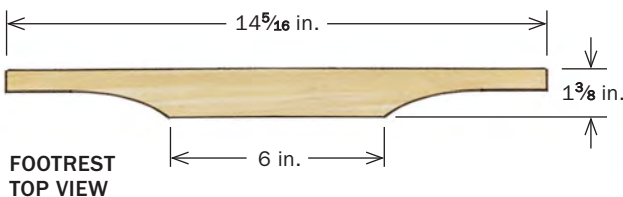
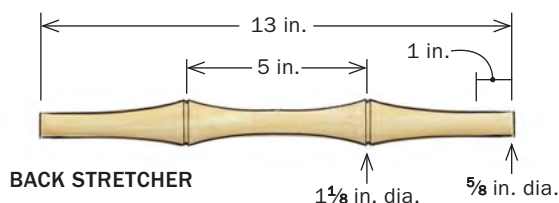
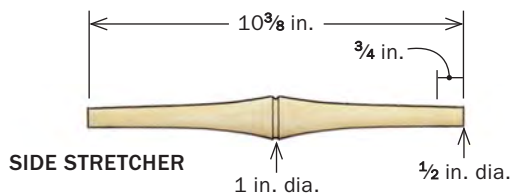
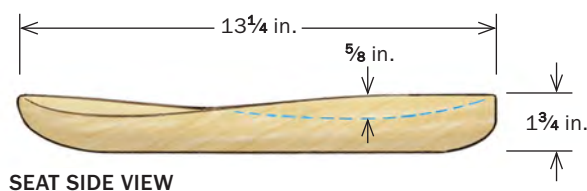
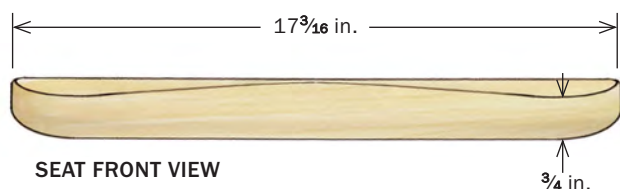
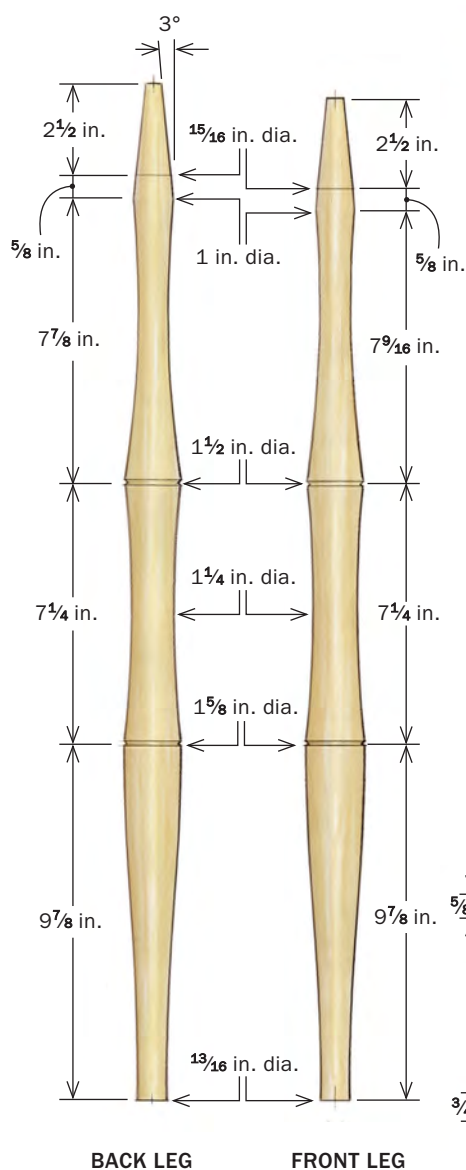
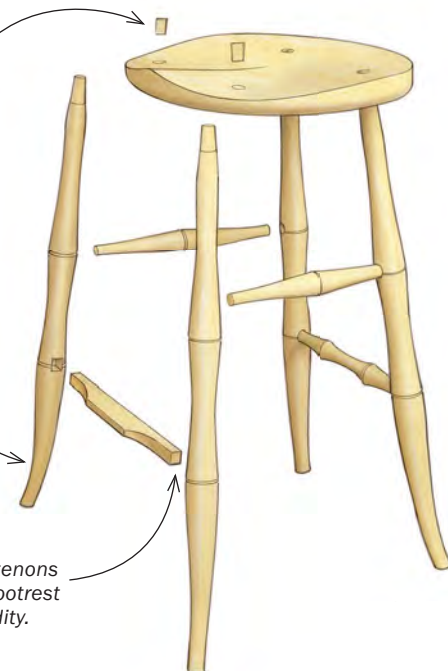
A STURDY, STYLISH STOOL



Wedged through-tenons attach the legs to the carved seat.

The legs are turned, then their bottoms are steam-bent.

Square tenons on the footrest add rigidity.



After fitting tenons, plane top parallel to floor.

Begin with the legwork

GET THE LEGS TO THE LATHE



Sawn or split. If you don't have green wood to split from the log, you can saw your leg stock from lumber.



Tapered tenons. While turning the tapered tenons at the top of the legs, Galbert uses a template placed on the lathe bed with a 6° taper drawn on it as a guide.



Double curve. To turn the S-curved bottom section of the leg, where the bend will be, first make a long shallow concavity, then complete the shape by cutting downhill to create the adjoining convex section.

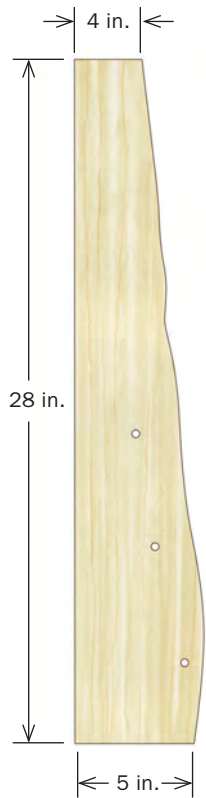
Turn and bend the legs

Turning the long, thin legs without letting vibration creep in takes patience and sharp tools. Be careful also with placement of the V-grooves, as they determine the location of the stretchers. And take care to get the shape of the lower portion of the leg just right. It's not a straight taper, but a slight reverse curve from convex to concave.

Once the legs are turned, it's time to build the bending form. It is made from two pieces of $\frac{3}{4}$ -in. plywood, each band-sawn to the shape of the leg's curve. Tilt the bandsaw table 25° for the cut, so when the two halves are screwed together, there's a channel along the curving edge to cradle the leg. I line the channel with $\frac{1}{2}$ -in. hard felt. When the leg goes into the form the felt compresses, conforming to the leg without making dents or flat spots. Three small clamping blocks, also V-shaped on the edge and lined with felt, are attached by swiveling arms to the main form.

Begin the bending by boiling 2 in. of distilled water in a tall pot. I make a plywood lid for the pot with a hole drilled in it for the leg. A rubber band wrapped around the leg acts as a stop and keeps the leg from getting stuck when it swells. Depending on the stock, as little as 45 minutes in the steam may suffice. When you pull the leg from the pot, insert the foot in the form and secure it with clamps. Then, using the length of the leg as a lever, draw the top of the leg to the form and clamp it in place. The leg can come out of the form once it has cooled (in an hour or so) or overnight if you want a more

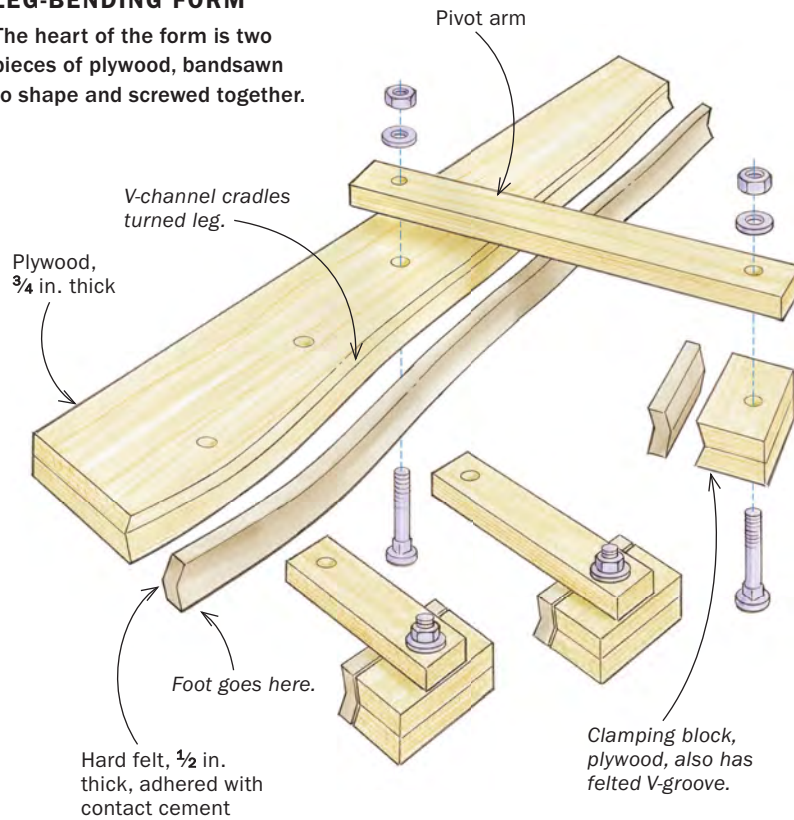
A GENTLE BEND



PLYWOOD PROFILE

LEG-BENDING FORM

The heart of the form is two pieces of plywood, bandsawn to shape and screwed together.



Bandsaw the bending form. With the bandsaw table tilted to 25°, Galbert saws a piece of 3/4-in. plywood to the shape of the leg bend. A second piece of plywood with the opposite angle will complete the bending form.



The form gets felted. After screwing the two halves of the form together, use contact cement to glue a strip of 1/2-in.-thick hard felt to the V-grooved edge.

One leg, well cooked. Boil 2 in. of distilled water in a good-sized pot with a lid you've drilled to accept the leg. A rubber band around the leg keeps it from getting stuck when it swells. In 45 minutes or so, the leg is ready to bend.



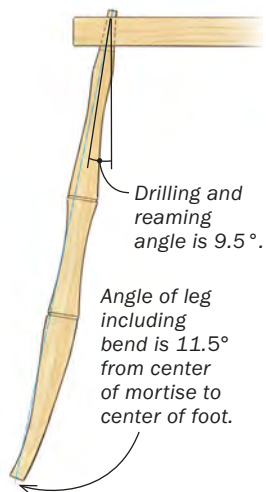
Foot first. After removing the leg from the steam, wrap the foot in plastic wrap (to keep it from losing moisture too quickly) and insert it into the bending form.



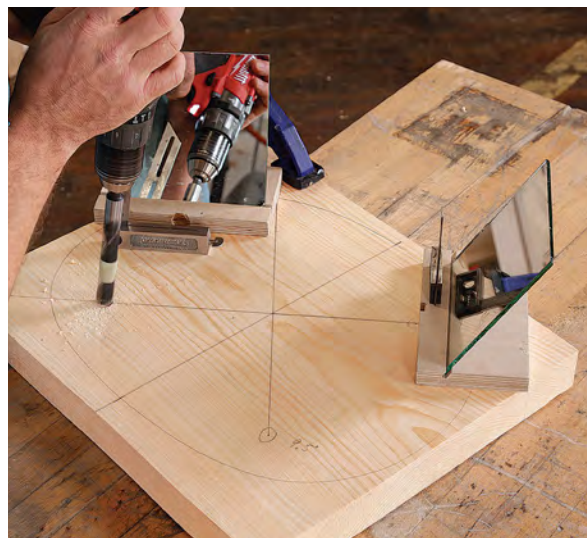
Clamp it to a curve. After clamping the foot in place, use the leg as a lever and make the bend, then lock the top end in place with a clamp. When placing it in the form, rotate the leg so the growth rings on the end grain are vertical.

Create the seat

DRILL AND REAM THE LEG MORTISES



Draw the drilling angles. To create the layout that will direct the drilling, connect the mortise center points on the top of the seat blank.



Two mirrors guide the drilling. To align the drill, place a bevel gauge set to 9.5° by the side mirror and a 90° square by the front mirror.

Online Extra

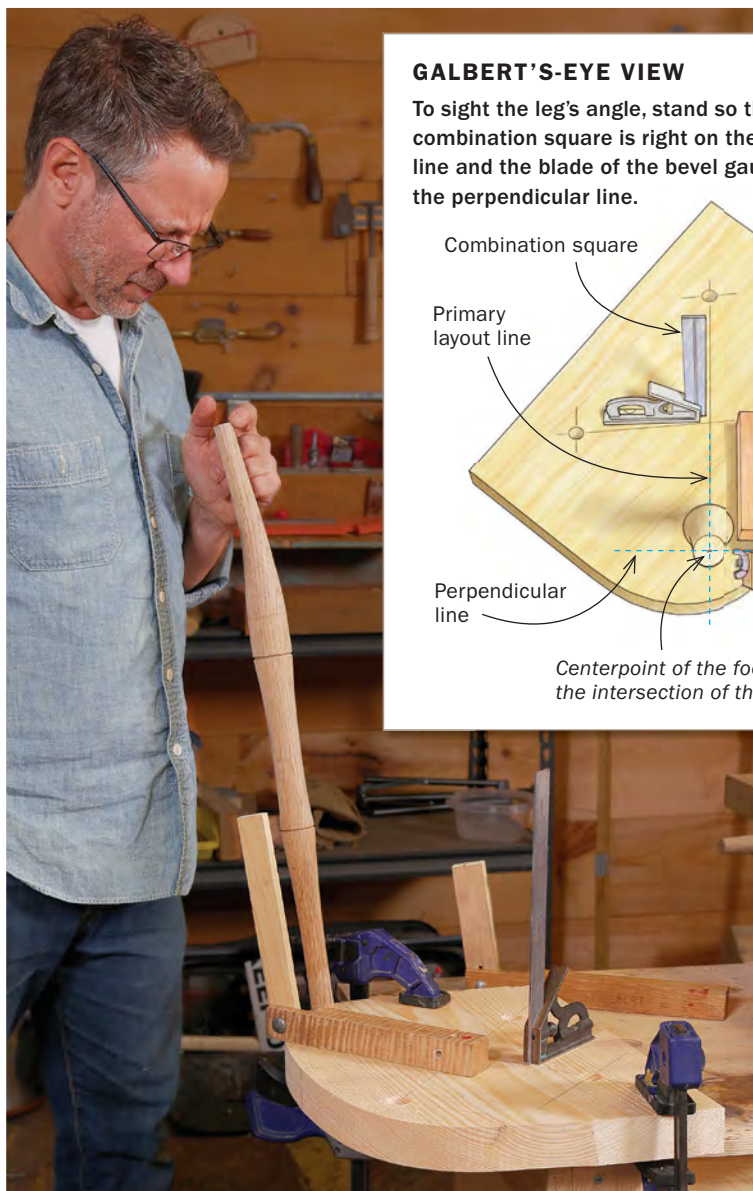
Learn how to ream mortises for a super-tight fit in a members-only video series at FineWoodworking.com/275.



Reaming comes next. After drilling through the seat blank from the top, then drawing sight lines on the underside, ream the mortises halfway home using the 9.5° angle.

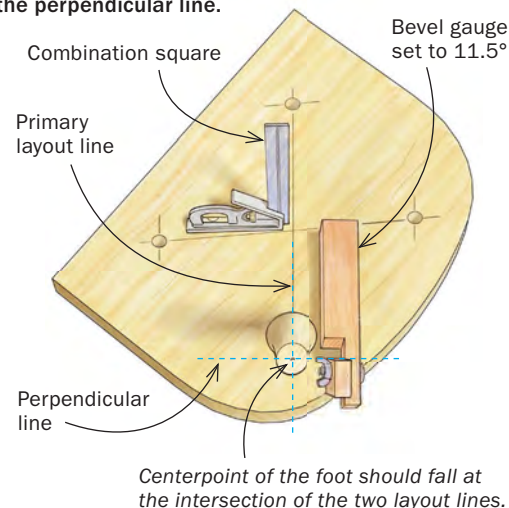


Aligning the leg. Sight down the leg, rotate it until the bent tip is pointing up, and mark the top end at that point. You'll use this to align the rotation of the leg with the seat's sightline.



GALBERT'S-EYE VIEW

To sight the leg's angle, stand so the blade of the combination square is right on the primary layout line and the blade of the bevel gauge just touches the perpendicular line.



Finish reaming. After the first reaming, use the leg as a reference to finish up. The leg angle including the bend should be 11.5° . Galbert uses a larger shopmade bevel gauge set to 11.5° to confirm the angle.

SEAT SHAPING



First the dish. Using an inshave (or a large gouge) relieve a wide oval-shaped area toward the back of the seat. Galbert drills two $\frac{5}{8}$ -in.-deep holes to guide the depth of the dish.



Then the ramp. Use an inshave to carve an angled plane from the deepest part of the dish up to the front rim of the seat.

exaggerated bend. Dried wood—whether kiln- or air-dried—has the ability to hold a bend nearly instantly. But if you use green wood, leave the leg in the form longer.

If you are using white oak or have trouble with checking, consider wrapping the steamed section of the leg in clear wrap before inserting it in the form. This slows the loss of moisture and heat and helps prevent splitting. When the leg comes out of the form, wrap the foot in paper to slow the moisture exchange.

On to the seat

With all the legs turned and bent, it's time to drill and then ream the leg mortises in the seat blank. Lay out the center points of the mortises on the top of the seat, then draw sight lines by connecting the center points. The angles for all the leg mortises are the same— 9.5° . I drill them with a $\frac{5}{8}$ -in. drill bit using a two-mirror setup to guide me. Once the holes are drilled through the seat, transfer the sight lines to the underside of the seat so you can start reaming. Using a square and a bevel gauge to guide the tool, ream at the same 9.5° angle until the legs seat about halfway into the holes.

Next, to adjust for any variation in the leg bends, I finish reaming while using the leg as a reference. I set a large shop-made bevel gauge to 11.5° and use it to be sure the centerpoint on the tip of the leg aligns with the centerline of the mortise. If it doesn't, I tweak the reaming until it does.

With the legs fitted I move on to carving the seat. This can be done with gouges,



Edgework. Flexible thin plastic makes perfect template material for laying out the shaping at the edge of the seat (far left). To shape the edge, Galbert uses a drawknife to create a series of chamfers, first broad, then narrower.

Spokeshave blends the facets. After shaping the edge with drawknifed chamfers, blend them to a fair curve with a spokeshave.



Stretcher joinery

DRILL FOR THE STRETCHERS



Elastic guideline. Find the center point for the stretcher mortise by sighting between the two lines of a rubber band strung around the legs.



Extension for accuracy. An extension rod supported at the near leg makes it easy to drill accurate mortises. Before drilling, rotate the leg just enough to drill squarely into it.



Dowels determine distance. After drilling the mortises for the side stretchers, insert dowels and use the rubber band method to mark for the back stretcher and footrest mortises.



More mortises. With one dowel removed so he can rotate the leg, Galbert drills a centered hole. In place of the dowel, he clamps a board across the back to maintain the correct leg orientation.



From round to square. A V-block helps strike a square line at the top of the footrest mortise. Galbert colors the inside of the drilled hole with a marker to guide him as he chops the hole square. A shopmade cradle holds the leg level and wedges provide support beneath the chiseling.

spokeshaves, and scrapers, but traditional chairmaker's tools will speed the process and add to the fun. Two holes drilled $\frac{5}{8}$ in. deep locate the deepest part of the carving. With an inshave, I carve a bowl shape toward the rear of the seat, working almost to the bottom of the depth holes. Next I use the inshave to carve a plane angling up from the bottom of the bowl to the front of the seat. For both the dish and the plane, I follow up the inshave with a travisher. Then, using a drawknife, I relieve the front edge of the seat where the sitter's thighs pass over it. I refine this area with a spokeshave. The carving on the underside of the seat is all done with the drawknife and finished with the spokeshave. I leave a small flat at the front and back of the seat top to make clamping in a vise easier. Those flats are easily shaped after assembly.

Stretcher time

To simplify drilling the stretcher mortises, I attach a 16-in. length of $\frac{1}{2}$ -in.-dia. round steel stock to my drill bit with a motor-shaft coupling. I drill with the legs socketed into the seat, and there's no need for measuring angles. Start by orienting the legs in the seat and marking the center points of the side stretchers on each leg. To support the rod while drilling the mortise in a back leg, clamp a board to the front legs $\frac{1}{4}$ in. below the center point of the V-groove. This centers the $\frac{1}{2}$ -in. extension rod on the groove. Before you drill, rotate the leg just enough so the bit is pointing to the center of the leg. Then drill 1 in. deep.

After drilling for the side stretchers, I cut dowels the length of the stretchers and put them in the newly drilled mortises. This ensures accuracy as I mark for the front

TURN THE STRETCHERS AND SHAPE THE FOOTREST



Stretcher tenons.
A Sorby sizing tool simplifies turning the tenons on the stretchers. Galbert makes a cut to full depth at the very end, but creates the rest of the tenon with a series of gradually deeper sideways slicing cuts.



Mill and shape the footrest.
Galbert mills the footrest blank to a thickness that just fits the height of the mortise. After bandsawing the blank to shape, he fine-tunes the overall shape—and the tenon's fit—with a drawknife.



After fitting, make it flat on top. Because the legs are angled, the footrest tilts upward slightly. To make its top surface parallel to the floor, set a pencil to strike a line at the height of the top back edge.

SOURCES OF SUPPLY

REAMER

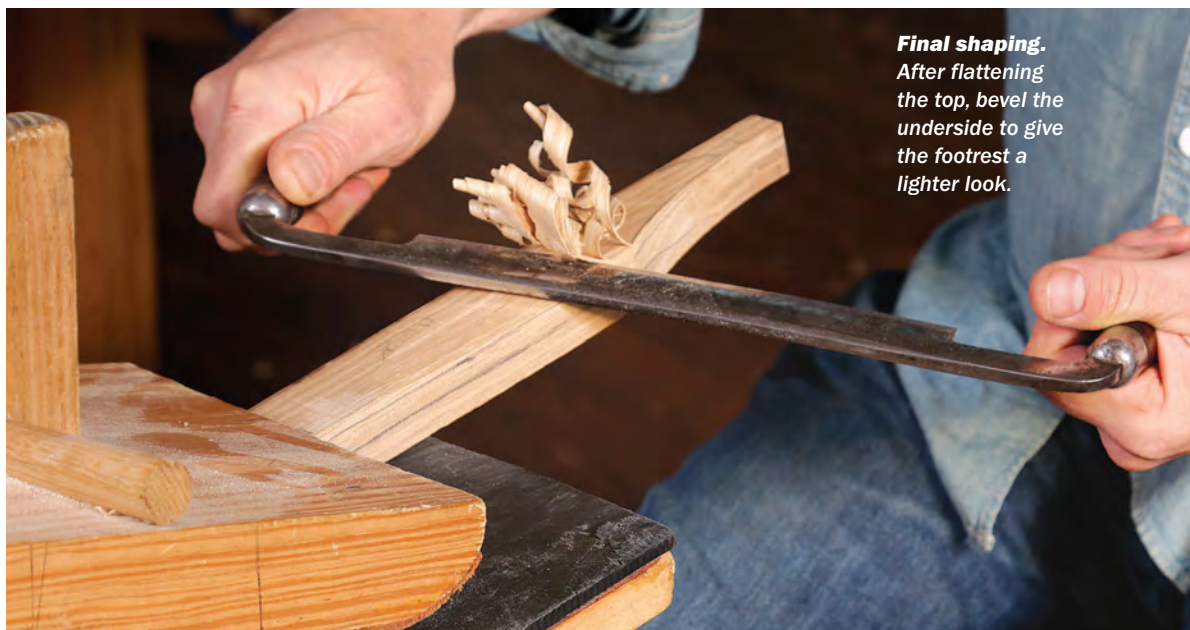
Made by Tim Manney
@tim.manney on Instagram
or via email at tmanney@gmail.com

HARD FELT

$\frac{1}{2}$ -in. off-white hard felt
durofelt.com

SHAFT COUPLING

amazon.com
grainger.com



Final shaping.
After flattening the top, bevel the underside to give the footrest a lighter look.

Assemble the stool



Front and rear first. Using Old Brown Glue, which has a leisurely open time, Galbert begins assembly by gluing in the rear stretcher and the footrest.



Front to back. Connect the front and back assemblies by gluing in the side stretchers.

and rear stretcher mortises and repeat the drilling procedure. Then I square up the footrest mortises with a chisel.

To make the footrest, mill a board so its thickness matches the height of the square mortise. Cut the footrest to rough shape at the bandsaw, then use a drawknife to fit its tenons to the mortises. The rake of the legs will cause the footrest to angle upward slightly. I level its top to the floor with a drawknife and spokeshave. Then I taper the underside to lighten the look of it.

Stool assembly

I assemble the stool with liquid hide glue (from Old Brown Glue), which allows the very tight joints to seat without seizing. I start by gluing the footrest between the front legs and the back stretcher between the back legs. Then I join those two assemblies with the side stretchers. Once the



Dry tenons. Fit the legs up through the seat without glue, and make marks for tenon wedges perpendicular to the seat's grain direction.



Kerfs for wedges. After removing the legs from the seat, follow your layout lines to cut kerfs for the tenon wedges.



Glue and bang, then drive a wedge. To knock the legs home at final assembly, Galbert elevates the inverted stool on spacers. Then he flips the stool and glues and drives the wedges.

TRIM THE FEET



Dial in a slight cant. The front legs are shorter than the rear ones, angling the seat forward 1°. Galbert uses his iPhone to measure the angle and puts coins under the feet to adjust it. Then he marks each foot and saws at the pencil lines.

legs are all connected, I insert their tenons—unglued—into the seat and mark for wedges. After cutting slots for the wedges, I glue and wedge the legs in place.

Finally, I level the legs, trim the through-tenons, and finish off the top of the seat with spokeshaves. After a careful scraping, I apply milk-paint and an oil finish. □

Peter Galbert is a chairmaker and teacher in Rollinsford, N.H. Full-size plans for his stool are available at petergalbert.com.



Fine
Woodworking
2019 LIVE

Watch Peter Galbert make this stool at Fine Woodworking Live 2019

FINISH THE SEAT



Flush to the seat. When the glue has cured, cut the through-tenons flush. Where the saw can't cut flush, follow up with a shallow gouge.



Finishing touch. With a spokeshave, Galbert cuts a defining chamfer around the back edge of the stool.

Don't Fight the Fibers



Online **Extra**

For a lesson on reading grain from Fine Woodworking's Mike Pekovich, go to [FineWoodworking.com/275](https://www.finewoodworking.com/275).

Better ways to read grain and make the most of your lumber

BY JASON ROBERTS

Like most woodworkers, I've learned about grain direction the hard way. I still remember the sound a beautiful piece of spiderwebbed Brazilian rosewood made when I sent it through a planer with dull knives, nor will I forget seeing it emerge with terrible tearout. I was making a jewelry box for my girlfriend, and I nearly wasted that pricey piece of wood. In the end I had to make the sides much thinner than I wanted.

I've now been cutting, drying, and selling high-end lumber for furniture and instruments for more than a decade, and I've been making furniture for much longer than that. Along the way I've learned a number of reliable ways to read grain and avoid tearout, whether I'm surfacing the wood using power tools or by hand. I'll help you make the most of your materials and avoid mistakes reading grain.

In this article, I'll refer collectively to the various longitudinal cells in wood—the ones that grow vertically in the tree—as fiber. Learn how to read the fiber and you'll head off tearout before it happens. Even when you can't prevent it completely, you'll know how to minimize it, making it faster and easier to produce the flat, flawless surfaces that characterize high-end work.

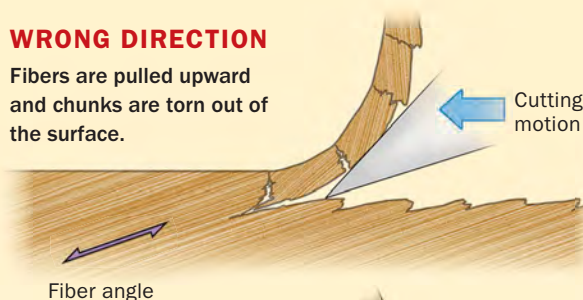


Work in the right direction

Whether you're surfacing boards by hand or machine, the orientation of the wood fibers makes all the difference.

WRONG DIRECTION

Fibers are pulled upward and chunks are torn out of the surface.



RIGHT DIRECTION

Fibers are pushed down and cut cleanly.



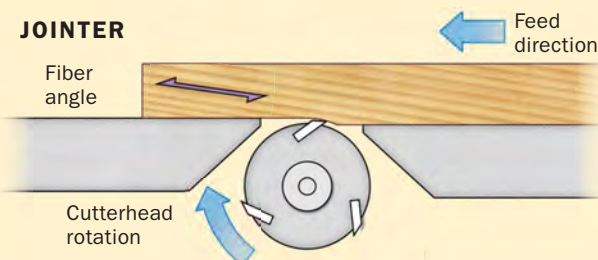
DIFFERENT TOOLS, DIFFERENT DIRECTIONS

Planing with the wood fibers means different things on different tools.

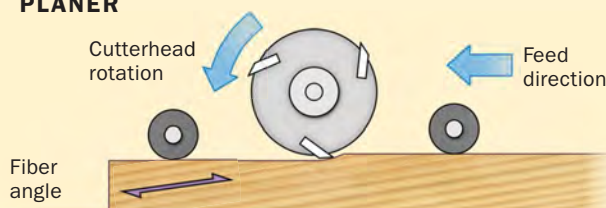
HANDPLANE



JOINTER



PLANER



Mark the angle, not the direction

Roberts marks the fiber angle on the edge of the stock with a short dash. An arrow indicating which way to push won't always work, since the right direction depends on which face you are planing and which tool you're using.

It's the fibers that matter

Although growth rings create grain patterns, it's the orientation of the wood fibers—the various cells that grow vertically in a tree—that matters when it comes to cutting. Hardwoods have three types of vertical, or longitudinal, cells: vessels, fiber cells, and tracheids. Softwoods have just one type, tracheids. A closer look at the cellular structure of hardwood reveals a number of reliable indicators of fiber direction. (In softwoods, with no vessels and only microscopic rays, rings are the only guide to fiber direction.)

Rings, the circular patterns of a tree's seasonal growth, create prominent lines on the surfaces of a board that can offer a reliable roadmap to fiber direction. But they are sometimes misleading.

Rays are ribbons of cells that grow horizontally in the tree, radiating out from the center toward the bark, visible in some woods but not others. Because they are sandwiched between the longitudinal cells, rays seen on the face of a board are an excellent indicator of fiber direction.

Vessels (pores) grow vertically in the tree, and they can often be seen emerging from the sides of boards. In large-pored woods, they are another dependable indicator of fiber direction.

Fiber cells, along with tracheids, are the primary structural cells in a tree. However, they are very small in diameter and hard to see on the surface of a board, so you'll need to look elsewhere to determine fiber direction in a board.

Good ways to read fiber direction

Roberts takes different approaches with different woods, depending on which indicators are most visible.

Rings

Growth rings are visible on the edges and faces of many woods, and usually are a good indicator of fiber direction.

READ THE FACE TO PLANE THE EDGE



Adjacent surface tells the tale. Roberts read the ring lines on the face of this ash board to figure out which way to joint the edge, achieving a glassy surface as a result.

How tearout happens

Trees taper as they grow, and tree trunks aren't always straight. So when boards are cut out of a log, the fibers often run at an angle to the surface. Wood always wants to split along the fibers. When you plane in the wrong direction, tiny splits dive forward and down ahead of the blade and little chunks of wood lift up and break off, leaving the jagged divots we call tearout.

Joint, plane, or handplane the board in the right direction, and the fibers will lie down nicely and cut cleanly. Whether the board is riftsawn, quartersawn, or flatsawn, reading the fiber direction and approaching it correctly is the key.

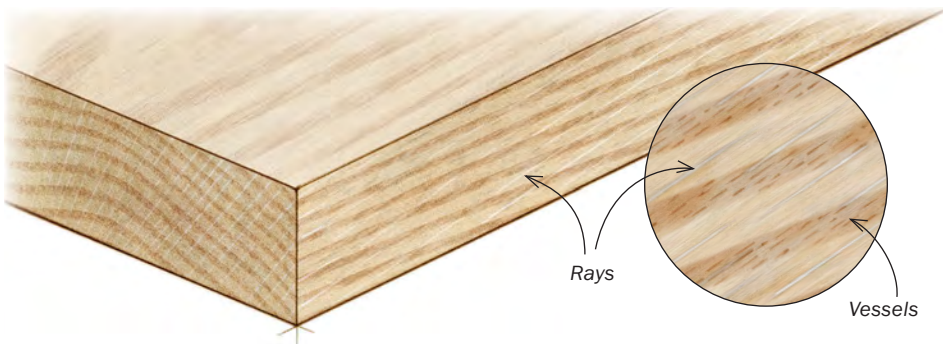


READ THE EDGE TO PLANE THE FACE

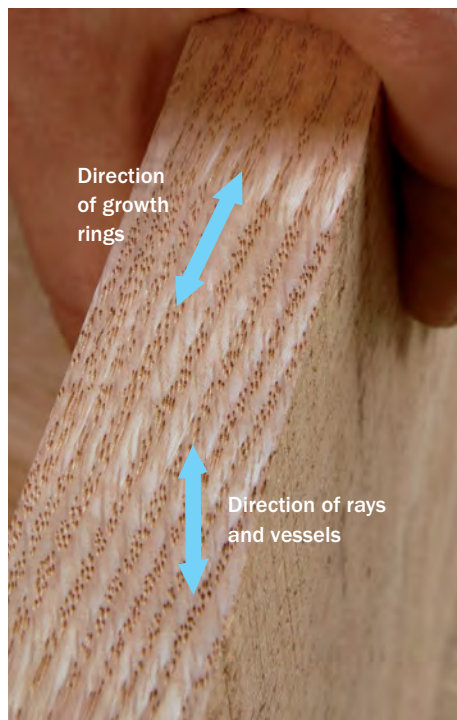
Adjacent surface tells the tale. Roberts read the ring lines on the edge of this ash board to figure out which way to plane the face.

Rays and vessels

When visible, rays and vessels are the most reliable indicators of fiber direction.



Sometimes the rings don't tell the story. Using the rings as a guide when jointing this oak board resulted in tearout. A close look at the rays (see photo at right) would have been a better bet.



The rays are always right (if you can see them). In woods with visible rays, like red oak, white oak, and sycamore, their brown lines are a foolproof indicator of fiber direction. Note how the oval-shaped pores (vessels) agree with the rays here, while the growth rings do not.



Visible vessels are excellent too. If you can't see rays, look for vessels (pores). In some woods, like the butternut shown here, vessels appear as long, dark dashes. Other woods with readable pores include birch, walnut, and mahogany.

Milling difficult woods

No matter how great a grain-reader you are, you can't always avoid tearout. Here's how to prevent or minimize it on the toughest woods.



RAYs

Rays are a weak point in some woods—such as quartersawn oak—and are prone to tearout no matter which direction you plane or cut.



CURL

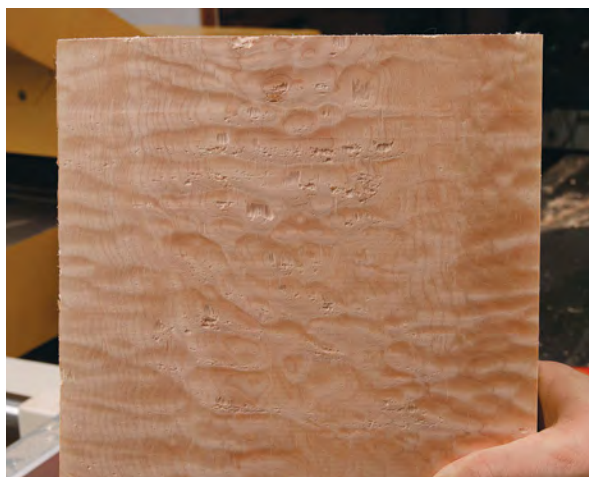
Woods like tiger maple get their luster from the tight undulations of the grain, which can change direction every $\frac{1}{4}$ in. or less.



INTERLOCKED

It's common for some tropical hardwoods to have interlocked grain where adjacent stripes of wood have fibers running in opposite directions.

SKew WHEN JOINTING



No good way to go. Figured woods have constantly changing grain, which can result in really nasty tearout.



Use sharp blades and skew the board. Roberts installed sharp knives on his jointer, skewed the slab of quilted maple as far as possible to create a shearing cut (top), and got amazing results this time.

Of course, wood is an organic material, and not all boards can be planed cleanly in one direction. Trees crook and twist, branches and knots intervene, and grain sometimes changes direction along the length of a board. Some tearout is inevitable.

In fact, some boards are hard to plane cleanly in any direction. Figured woods are especially tricky, with curly figure, burls, and bird's-eyes. Exotic woods with interlocking grain are also tough. And in some woods the rays are prone to tearout no matter which direction you plane or cut. There are boards with straight grain, mostly parallel to the surface, that won't tear out no matter what you do. Air-dried wood is also forgiving, even when it's figured.

There are ways to prevent tearout in even the trickiest woods, and I'll cover a few of those. But first, let's focus on the vast majority of boards you'll encounter.

A step-by-step approach to reading grain

Where to read the grain direction depends on which part of the board you're working on. When planing the face of a board, look at an adjacent edge. Before planing or jointing an edge, look at an adjacent face.

Most woodworkers start with the rings—Growth rings are prominent in many species, and usually are a reliable indicator of fiber direction. But because of the way they emerge on certain boards, these rings are sometimes misleading. To determine the fiber direction from growth rings, it helps to look at the lines on three adjacent surfaces: an edge, a face, and the end grain. In softwoods, which have no visible rays or vessels, the rings are the only guide to fiber direction. But with some hardwoods, there are alternatives.

Rays can be a better option—Ray cells radiate out from the center, or pith, of a tree to the bark, carrying nutrients horizontally and storing starches and sugars. Because ray cells are stacked in bands that grow between the vertical cells, they are a guaranteed indicator of fiber direction. They are visible in sycamore, red oak, and white oak, among other woods that display ray fleck when quartersawn. Unfortunately, not all woods have visible rays. The ray cells in walnut, mahogany, ash, and all softwoods, for example, are too tiny to see.

No rays? Look for vessels—If you are working hardwood and it doesn't have visible rays, it might have visible vessels (pores), another indicator of fiber direction.

Along the edges and faces of open-pored hardwoods like butternut, birch, walnut, mahogany, and the oaks, vessels emerge as oval-shaped holes or long, thin dashes with a distinct orientation. Follow their lead:

TRICKS FOR PLANING



Try wetting the surface. This works well on the planer, where the wet surface faces up, as opposed to the jointer, where it would ride the cast-iron tables—a recipe for rust.



Consider a helical head. Spiral cutterheads, with segmented carbide blades, are available for an increasing number of new jointers and planers, and can be retrofitted to many old ones. These cutterheads give amazing results on the toughest woods.



Hand tools for difficult surfaces

You can get handplanes sharper than jointer and planer knives, and scrapers are tearout-free in any direction.

PLANING AT A HIGH ANGLE

High blade angles.

Woods such as tiger maple cut best with the blade at about 55° (below left), while cocobolo (below right) should be worked with the blade cutting at 60° to 65°.



Their angle is the other telltale sign of fiber direction.

If all else fails, there's always trial and error—If you can't determine the best planing direction with a close look, make your best guess, and take a light pass with your planer, jointer, or handplane. You'll have a 50-50 chance of getting the direction right. Even if you guessed wrong, if the blades are sharp and the pass is light, the tearout will be shallow and you'll have plenty of thickness left to try again.

When you figure out the best direction for planing any board, mark it on one edge for subsequent passes.

Techniques for tricky woods

Some tearout is inevitable. If you experience it in both directions, choose the one that works best. Or try one of these approaches.

Tips for machine work—Whether you're using a planer or jointer, one of the simplest ways to avoid tearout is to install sharp knives. If you can afford one, converting to a helical cutterhead in your jointer or planer will greatly reduce tearout in all woods. These cutterheads are especially amazing on figured woods. If you don't have a helical head, one way to achieve a shear cut on a straight-knife jointer or planer is to skew the board as much as the machine will let you.

Another trick for woods with wild figure is to soften the fibers with a wet cloth before feeding the board through the planer. This often reduces tearout. I avoid this on the jointer, where the wet surface could rust the cast-iron tables.

Handplane has its advantages—A handplane has a few advantages over planers and jointers. One is that you can adapt quickly as you work, planing different parts of the board in different directions. This is helpful any time the fibers switch directions, such as around knots. As always, make sure your handplane blades

TRY A SCRAPER

Scrapers work well in any direction. A card scraper is a great tool for targeting tricky areas (right), but it can leave an obvious hollow if you work one spot too much. A scraper plane is a better option for tabletops (far right), helping you remove an even amount of material from the entire surface.



SANDING IS THE GREAT EQUALIZER

Although it's not always the fastest way to smooth wood, sandpaper is a relatively foolproof method for producing flawless surfaces on the toughest woods.

Smooth tabletops start with careful glue-ups. By keeping the boards level to start with, Roberts makes it much easier to sand them flat. He applies pressure with parallel-jaw clamps, uses a rubber mallet to tap joints level, and then clamps the ends of the panel to level the joints there, too.

are super sharp. On tricky woods, try closing up the mouth tight and taking very thin shavings. Using a higher blade angle should reduce tearout as well.

Sanding or scraping always works—If you continue to have trouble with tearout, try sanding or scraping. You'll get zero tearout on the wildest woods. You'll need to know how to turn a sharp burr on a scraper, and both methods can leave hollows in the surface with improper technique. This often happens when people focus on a small area of deep tearout.

The key to even scraping or sanding is to work the entire surface in a uniform way. That's why a scraper plane works better than a card scraper at keeping the surface flat and avoiding hollows. If you have to go deeper in one spot, "feather out" the small hollow to create a larger, less noticeable, depression.

Sandpaper requires no setup, has a short learning curve, and will surface the wildest wood with no tearout. This is why so many pros own a drum sander or wide-belt sander. With random-orbit sanders, I use harder pads to help avoid digging hollows on large surfaces like tabletops. These firm pads are available for many sanders. They stay flatter in use, especially when a board is harder in some areas than others.

Wood is expensive and mistakes can be hard to fix. Learn to read fiber direction, and you'll be paid back many times over. □

Jason Roberts is a furniture maker and wood dealer in Olympia, Wash.



Try a firmer pad. Firm sanding pads are available for many sanders. They stay flatter in use, a big plus on large surfaces and those with figure or defects.



Sand in a uniform pattern. To avoid creating hollows and leaving behind scratches from previous grits, work the panel in a uniform pattern with each new disk. Be sure to attach a vacuum to the sander, keep it level, and don't add any pressure beyond the weight of your hand and the sander itself.

The ABCs of Letter

A few key techniques handle every letter in the alphabet

BY CLARK KELLOGG



I love carving letters. There is something about the crispness of a well-cut letter that just feels like magic to me. Eight years ago, I was fortunate to be able to study with English woodcarver Chris Pye and I still carve letters using the technique he taught me. There are many other approaches to letter carving, but I like this method because you can learn the basics in about a day—the rest is just a matter of practice.

I'll explain the set of core techniques that, once mastered, can be used to create any letter in the alphabet. This type of carving works well with various styles of lettering (such as italic or Gothic/blackletter), but traditional Roman letters are the best place to start. Although typographical issues such as spacing and layout are essential elements of a successful carving, this article will focus on just the technique of carving the letters themselves.

All the letters are cut with double-beveled chisels and gouges. (I have had good luck with both Pfeil/"Swiss Made" tools and those made by Lie-Nielsen/Auriou.) Somewhat counterintuitively, a V-gouge is almost never used for this type of lettering.

There are three basic shapes you need to learn for letter carving: straights, curves, and intersections. All letters in the Roman alphabet comprise some combination of those three elements, and carving a letter is usually just a matter of arranging and connecting them. Straights are cut with (you guessed it) straight chisels, curves are cut with gouges, and intersections are cut with a combination of standard and fishtail gouges.

All letters are cut with the tool roughly 30° off vertical. Each side, or wall, of the letter is cut with a separate action and they should meet in the center of the trench, which is called the root.



Carving

Most basic lettering is carved along the length of a board, and this is good way to start.

If you look carefully at a set of capital Roman letters, you will notice that each letter is made from a combination of thick and thin strokes. Generally, the width of a thick stroke is $\frac{1}{6}$ the total height of the letter. (So, a 24mm-tall *I* would be 4mm wide.) Most uprights are made of thick strokes. Thin strokes usually have a width $\frac{1}{8}$ the height of the letter, and are mostly used for horizontal strokes.

Wood selection

Generally, the harder the wood, the more difficult it is to carve; however, you tend to get a crisper result. Conversely, soft woods such as poplar and cedar are fairly easy to carve, but can be difficult to keep looking sharp. I would avoid pine, as the alternating hard and soft growth rings make it nearly impossible to get consistent cuts. Mahogany is generally considered the gold standard, combining ease of carving with the ability to take fine detail, but using it can present some sustainability issues. I have had good luck with walnut, white oak, pear, cherry, and Osage orange. Feel free to experiment with other woods as well.

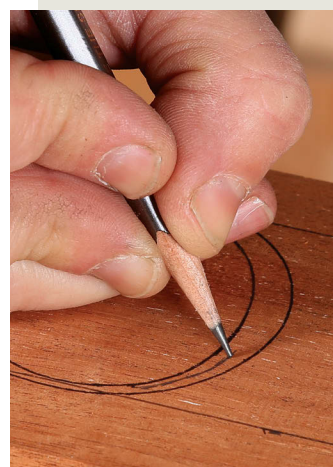
Basic upright stroke

The basic upright is the most important stroke to learn, because it serves as the foundation for almost all of the different cuts you will make afterward. It is essentially an *I* minus the serifs at the top and bottom. Begin with a vertical cut. Place a double-bevel chisel vertically along the centerline of the trench, and make a heavy cut using a mallet. Don't be shy about it; the idea is to sever the fibers on either side of the trench.

Next, cut the walls of the stroke. Place the chisel on the right-hand line. Tilt the chisel 30° to your right, gripping the chisel in



Getting started



FROM PAPER TO WOOD

Kellogg uses Adobe Illustrator, but almost any word-processing program will suffice to lay out the carving. Trajan is a good font to start with. Tape the printout to the workpiece with a sheet of blue transfer paper (saralpaper.com) underneath. Then trace the outlines of the letters with a sharp pencil (above). For large, curved letters, Kellogg sketches in a centerline (left) to guide his stop cuts. On straight sections he'll usually just eyeball it.

A SMALL KIT OF CARVING TOOLS

Traditionally, flat carving chisels are designated #1, with a second number referring to their width in millimeters. So, a 1/25 refers to a flat, double-beveled chisel 25mm wide. Gouges are also labeled with two numbers, with the first designating the degree of curvature, from #2, which is nearly flat, to #9, which is either a half-circle or a U-shape. Most curves can be cut with an assortment of 3s, 4s, and 5s, while 2s, 6s, and 7s are helpful to have on hand in a pinch. It may be useful to have a 150mm ruler handy, as nearly all carving tools are designated in millimeters. And at least to begin with, it is nice to carve letters that correspond to the size of your tools. For example, if you only have a 1/20 chisel, plan on making all your verticals 20mm long.

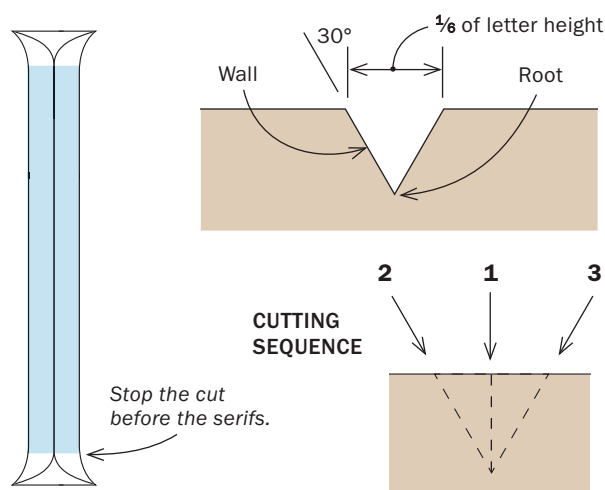
Double-bevel chisel

Gouge

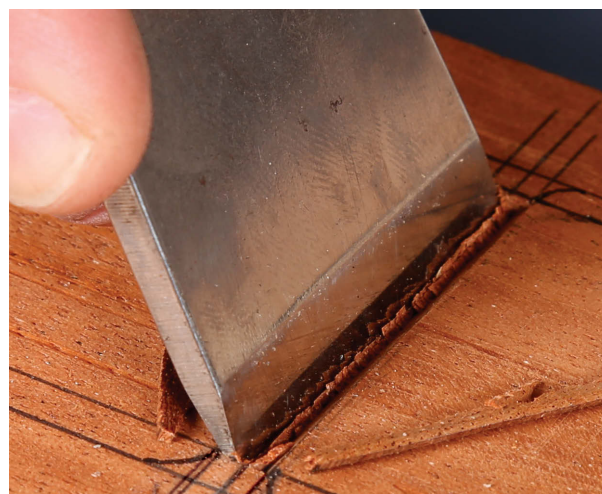
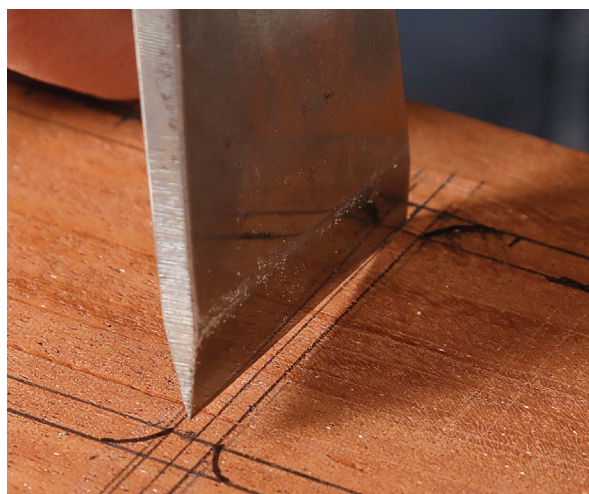
Fishtail chisel and gouge

Vertical strokes

One of the most common elements in letter carving, the vertical stroke is simple to cut and a good place to start practicing.



Start with the centerline. Place the chisel on the centerline and make a heavy vertical cut (right). Then follow with a pair of angled cuts (far right) to complete the trench. Maintain a consistent angle when chopping so that all strokes of the same width will be the same depth.



TIP

SWITCH HANDS FOR OPPOSITE WALLS



It might seem awkward at first, but switching hands to cut opposite sides of the trench will help you cut more consistent angles. With a little practice, it will become a habit.

your left hand, and the mallet in your right. (You don't want to work with your arms crossed.) An easy way to find a roughly 30° angle is to tilt the chisel to 45° (or, halfway between upright and lying down), then tilt the chisel up about halfway between 45° and upright. The edge of the chisel should now be aiming toward the root. With one or two quick mallet strikes, chop down into the trench. It's tricky at first, but try to maintain the 30° angle all the way through the cut.

Next, mirror the cut you just made by switching hands (the chisel should now be in your right hand, and the mallet in your left), and placing the chisel on the left-hand line. The idea is for the two sides of the trench to meet neatly in the center, at the root of the trench. A small, triangular chip should pop out if you have done things just right. Switching hands to carve either side of the trench can take a little getting used to, but learning the skill is well worth the practice. Where many people seem to run into trouble is maintaining the 30° angle on either side of the trench: Either the chisel is held too low (too flat) to the surface, producing a

shallow trench, or it is held too upright, and the trench becomes too deep. Don't worry if the ends of the trench look broken-off for now—the serifs we add later will take care of that.

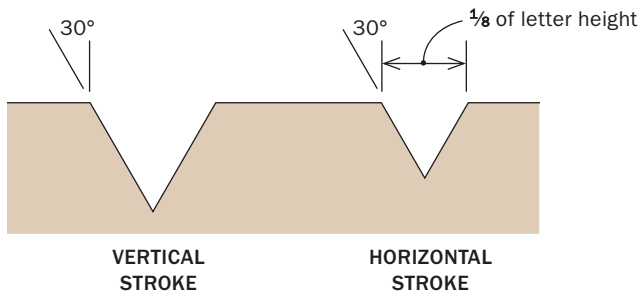
Angled strokes, such as the uprights of an *A*, are cut in essentially the same manner as vertical strokes, with a few minor differences. The first, of course, is that the layout lines are angled relative to your base lines. The second is that we'll make angled strokes a little bit shorter, so as not to cut into any intersections.

Horizontal strokes

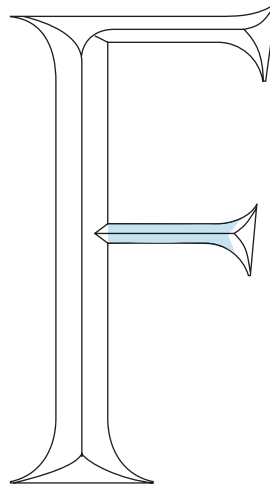
The geometry of the horizontal stroke is essentially the same as a vertical stroke; however, because horizontals generally run with the grain, instead of across it, the technique for cutting them is different. The important thing is to create stop cuts at both ends before making the horizontal stroke. On letters such as *A* or *H*, carving the vertical strokes first will create natural stops for the horizontal stroke. On letters like *E* and *F*, where the center stroke ends with a serif, you'll make a pair of stop cuts on the serif end.

Horizontal strokes

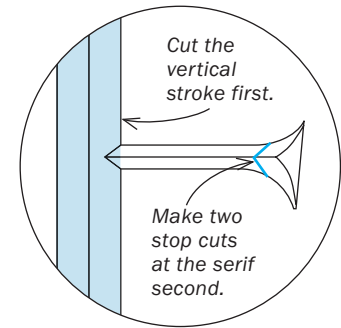
These cuts are typically narrower than vertical strokes, so the trench will be shallower.



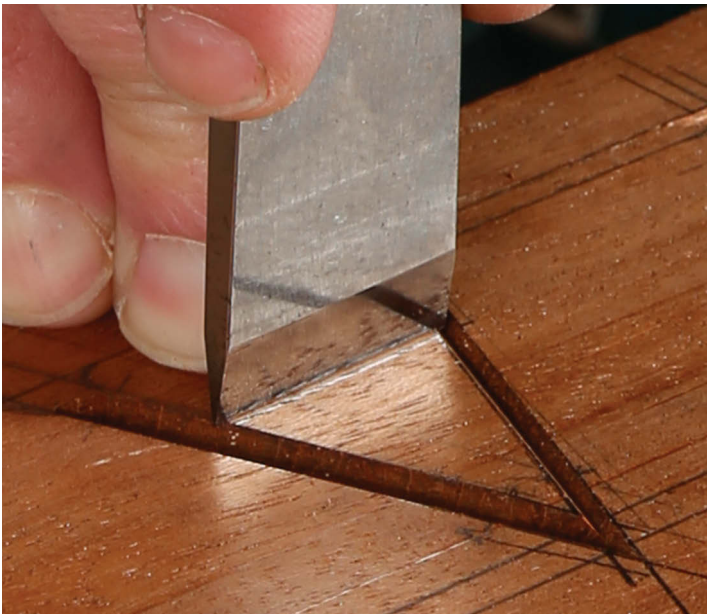
Maintain the same chisel angle for thin strokes as thick strokes. The trench will be roughly half as deep as the thicker stroke.



ESTABLISHING THE ENDS OF A HORIZONTAL STROKE



It's important to sever the grain at each end before making a horizontal cut. Where it meets a vertical, start with that cut first. Where it meets a serif, make a pair of cuts.



Vertical strokes before horizontals. Cuts parallel to the grain require stop cuts at the ends to prevent the grain from splitting. On letters like A, where the horizontal cut falls between two verticals, carving the verticals first creates natural stops for the horizontal stroke.



A pair of cuts at a serif. When a horizontal stroke ends at a serif such as the middle bar of an F, make a pair of cuts in a V-shape just before the serif to sever the end grain. Then carve the trench. Make the vertical and angled chops (below) and the chips should pop out cleanly.

These cuts will prevent the fibers from splitting along the board. Next you can cut the trench, starting with a vertical cut, then making the two 30° angle cuts. This can usually be done without a mallet, since there is less resistance in cutting with the grain. With some “stringy” woods, such as poplar or white oak, you may find that the fibers tend to “roll” down the cut instead of paring off cleanly. If that is the case, try re-honing your chisel, and use a slicing motion to work down and across the fibers as you move toward the bottom of the trench.

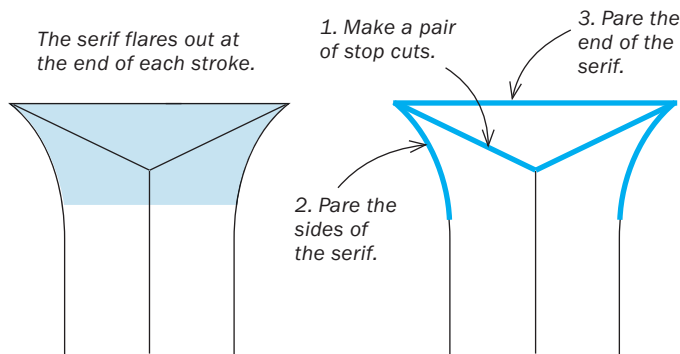
Serifs

In Roman lettering, serifs terminate nearly all strokes that don't end in an intersection (C, J, and R are the exceptions.) I like cutting them because they give a finished look to straight-cut trenches, and can tie a carving together visually. To make a serif, begin by using a fishtail chisel to make two stop cuts that angle from the



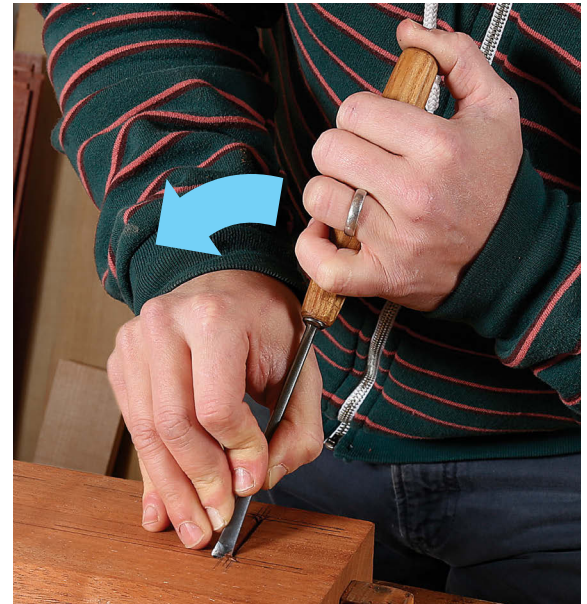
Serifs

The serif caps the stroke and gives the font its distinctive character. You'll need to make a series of cuts to create it.



Make a pair of stop cuts. Start by planting the corner of the fishtail chisel at the centerline of the trench, then pressing forward at a 45° angle until the cut reaches the corner of the serif.

Pare the sides of the serif. The flare is created with a #5 fishtail gouge. Plant the corner in the root at the base of the serif, then swing and rotate the handle of the gouge upward, until the edge of the tool just traces the serif. The goal is a smooth transition from the straight stroke to the curved serif.



center line to the points of the serif. Then use a #5 fishtail gouge to cut the flaring side walls. The idea is for the letter to transition smoothly from a straight stroke to a curved serif. Next, cut the end of the serif using the #3 fishtail gouge, starting at the top of one corner and slicing down diagonally toward the other. If all has gone well, a little triangular chip should pop out, and the three faces of the serif should join in a point in the middle.

Tying everything together

Intersections are a major component of almost any letter. And while they aren't as fussy as curves can be, the order of operations to cut them can be a little bit tricky. Generally, there are two types of intersections: those in the middle of a segment (such as the crossbar of an A), and those at the end (such as the apex of an A).

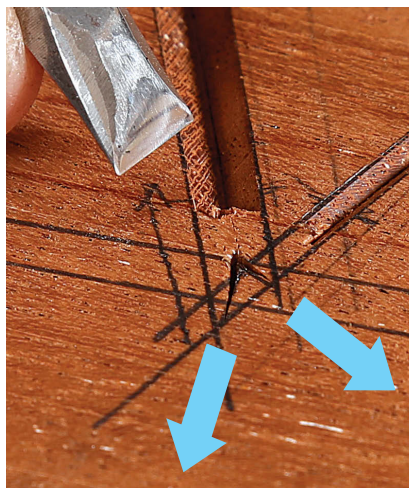
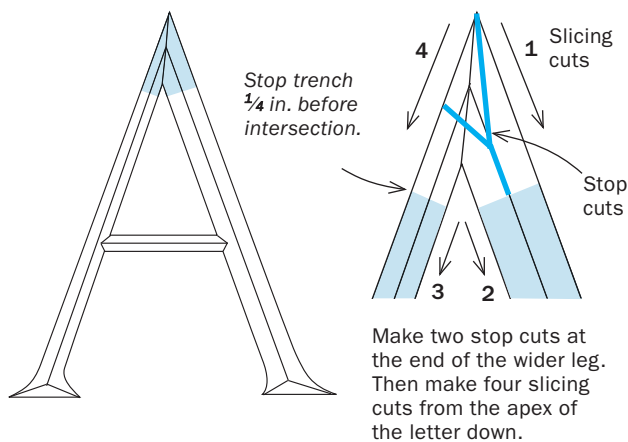
Intersections in the middle of a stroke happen automatically, since all you do is cut into one side of the main stroke's trench. Keep in mind, however, that if the



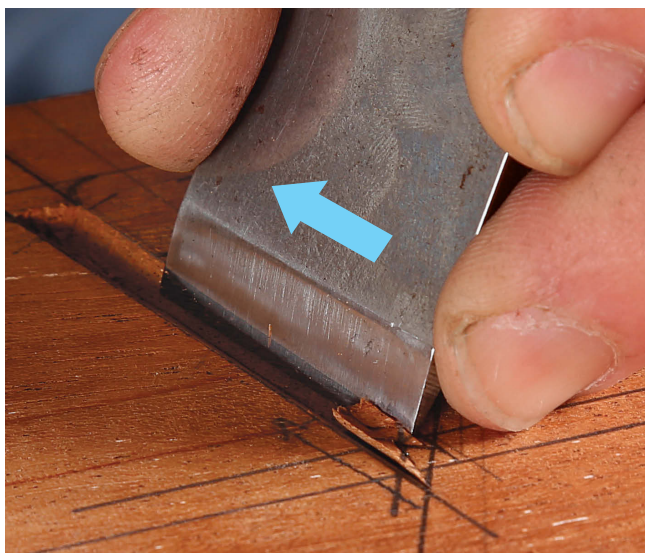
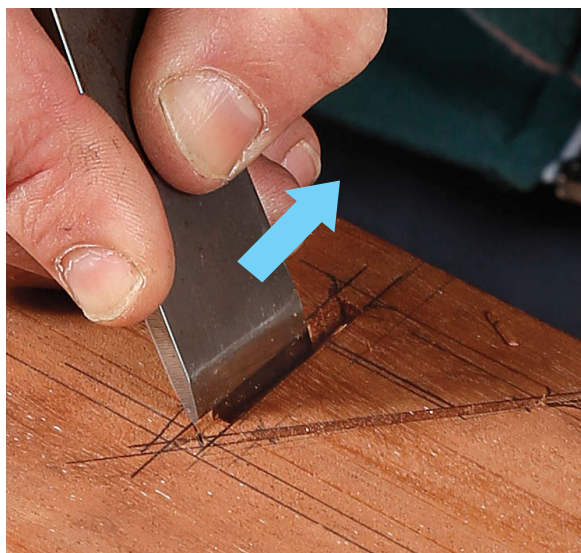
Finish with the end of the serif. Using a #3 fishtail gouge, start at one corner of the serif, angle it, and push down. You should end with the gouge's leading corner at the root of the serif, and its edge along the opposite corner of the serif. The gouge gives the serif its slightly incurved end wall.

Intersections

For everything to look good where strokes meet, it's important to work cleanly and carefully to create the proper geometry.



Use a fishtail chisel to make a pair of stop cuts. The stop cuts begin at the top center of the thicker trench, with one pointing up to the apex of the junction, and the other roughly perpendicular to the thinner stroke (left). Continue the center line of the stroke to the stop cuts (right).



Continue the walls. Make a series of slicing cuts with a chisel, starting at the top of the apex and working down. To make these cuts, grip the chisel near the cutting edge and pull toward you.

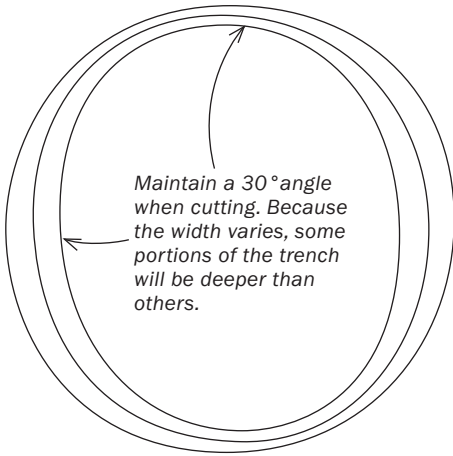
intersecting stroke is thinner (as with most crossbars), it will also be shallower; its trench should “exit” about halfway up the wall of the thicker stroke.

Junctions at the end of two or more strokes are a little more complicated, and you must be careful to maintain the correct geometry inside the trenches. As always, it is critical to keep the angle of the trench walls consistent. To join the trenches, cut them as you would normally, but ending about $\frac{1}{4}$ in. away from the junction. Then use a fishtail chisel to make a pair of stop cuts (as you did with the serifs). Next, make a series of slicing cuts with a chisel, starting at the top of the apex and working across the junction. (It should be four cuts total, one for each wall of the two trenches coming together.) You may have to make several passes. Work slowly, and avoid putting too much pressure on the grain. Finally, use a fishtail chisel to remove the chip left at the bottom of the intersection.

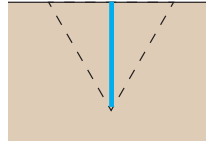


Clear out the waste. Finally, use a fishtail chisel to chop and remove the small chip left at the top of the larger trench.

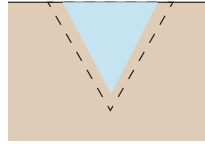
Curves



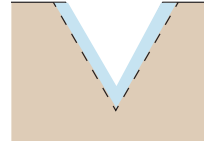
You'll need gouges of different sweeps to handle the changing curve on a letter such as an O. The final cuts are made without a mallet, so it helps to remove most of the waste before slicing to the lines.



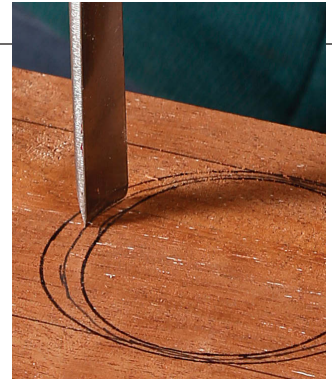
1. Start with a vertical cut at the center line.



2. Make relief cuts staying safely inside the line.



3. Use a slicing cut to finish the inner and outer walls.



Make a vertical cut along the centerline. Work your way along the line with a gouge, fitting the shape of the gouge to the curve as you go.



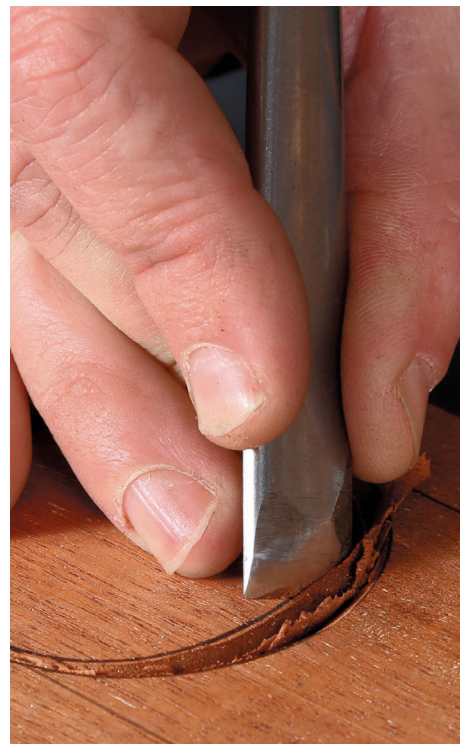
Make a series of relief cuts. Using a #4-12mm gouge, work along the outer rim of the O, pushing in toward the centerline (left). These cuts don't have to be super precise, just be sure to stay inside the outer line. Repeat the process along the inside rim, this time using a #3-12mm gouge (right).



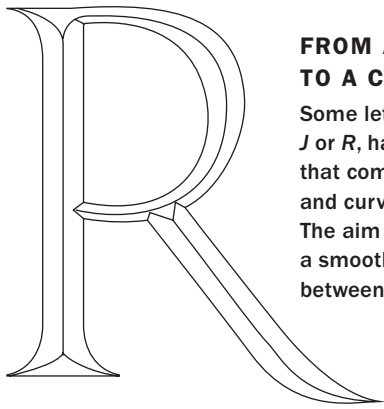
Curved strokes

The majority of the letters in the Roman alphabet have at least one curved element, so there is no getting around learning how to cut them. It takes a little while to master, but the results are well worth it—your first well-cut O will be as exciting as cutting a nice set of dovetails for the first time. The thing to remember with curves is that the geometry of the trench is the exact same as it is for straight trenches—two sides running down at an angle and meeting neatly in the middle.

Curved strokes are cut by matching the right-shaped gouge to the curve at hand. Generally, the walls are not cut with a mallet; rather, after the trench is roughed out the walls are “sliced” by skating the gouge along the curve. For these cuts, the gouge is held near the cutting edge like a pencil, and pushed along and into the wood, with the “heel” (the corner of the cutting edge) cutting into the fibers. The handle is usually held in the less-dominant hand and serves as a brake for the gouge, to keep it from slipping and cutting beyond the confines of the letter and



Pare to the line. With a sharp #4-16mm gouge, make a slicing cut all the way around the outside rim of the letter (above). Use a pencil grip and twist the gouge as needed to keep it on track. Keep the gouge tilted back toward you and remember to maintain the 30° angle. You may need to switch hands or body positions to work all the way around the letter. Finally, make a slicing pass on the inside trench wall, switching between a #3-12mm and a #4-12mm to adjust for the curve (left).



FROM A STRAIGHT TO A CURVE

Some letters, such as *J* or *R*, have strokes that combine straight and curved sections. The aim is to create a smooth transition between the two.



Begin with the straight section. As you would with any other straight section, begin with a vertical cut at the centerline and follow with angled cuts. Be sure to stop the trench short of the curved section.



Continue with the curve. Use a gouge with a sweep that matches the curve to make a vertical cut along the centerline (far left). Then use a fishtail gouge to slice the curved walls (left).

out into the great unknown. The gouge will naturally want to follow its own curve; and although you can usually steer a gouge to make a tighter turn, it is nearly impossible to steer it to make a wider turn. Most curved strokes will require a flatter gouge to cut the inside wall and a curvier gouge to cut the outside wall at any given point. Therefore, it is useful to have a range of gouges on hand; #3-16mm, #4-12mm, #4-16mm, and #6-12mm are good ones to start with.

With a gouge held vertically, cut along the centerline, just as you did for the straight strokes, using a mallet. Then rough out the walls with relief cuts along the outer and inner rim of the *O*, pushing the gouge in by hand toward the root. At this point you should have a rough *O*. Don't worry if the trench is a bit funky, or if there are still little chips stuck to the root.



Next make a paring or slicing cut all the way around the outside rim of the letter, tracing the outside line of the *O*, using a pencil grip and twisting the gouge as needed to keep it on track. Keep the gouge tilted back toward you so one corner of the cutting edge is pointed down toward the root, and the other is clear up above the work surface. Remember to maintain the 30° angle off vertical just as you did before. You may need to switch hands or body positions to work all the way around the letter.

With the outside trench wall complete, make a slicing pass on the inside wall. Ideally, you should be left with two curving trench walls that, as before, meet at the root in the middle of the stroke. Just remember that the depth of the cut will vary according to the width of the trench. □

Clark Kellogg is a professional furniture maker in Houston, Texas.

Modern Dining Table

Subtle lines
and details
create a table
for any home

**BY PHILIP
MORLEY**

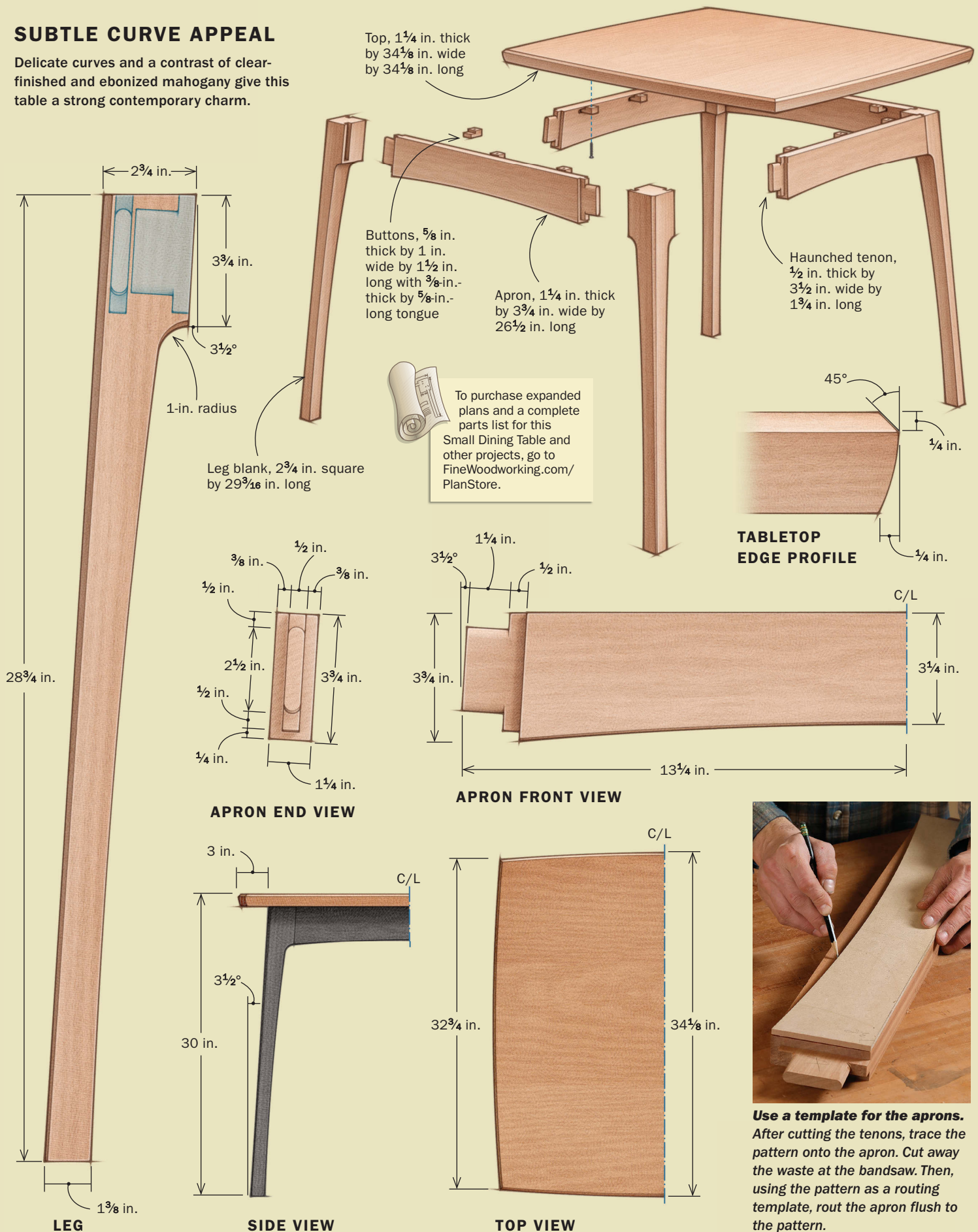
Designed to seat four, this table would fit nicely in a small dining room or kitchen. Because its design is uncomplicated, favoring clean lines and gentle curves over ornamentation, it will complement just about any style of decor. The mahogany top, with its curved sides and crisp edge profile, is clearly contemporary, and the ebonized base also has a modern appeal.

The splayed legs are attached to the aprons with mortise-and-tenon joints, but their defining feature is the way their tapered sides curve as they rise to meet the arc on the aprons' bottom edge. The junction looks like a gun-stock joint, but I make it differently, preferring to cut



SUBTLE CURVE APPEAL

Delicate curves and a contrast of clear-finished and ebonized mahogany give this table a strong contemporary charm.





LEGS HAVE A CURVED TAPER

Angled slightly outward, the legs make the table appear fleet of foot, a lightness further enhanced by the curve that tapers the leg's thickness from top to bottom.



Rough out the leg. Use a template to transfer the leg shape to the outside faces of the blank (far left). At the bandsaw, cut along the layout line on one face (above). Then tape the offcut to the blank and cut away the waste on the other face (left), following the layout line.

the tight curve into just the leg rather than splitting it between the leg and apron. I'll show you how I do it, and how I create the tapered chamfer on the leg's outside edge.

I'll demonstrate how I shape the tabletop's curved sides and edge profile with three off-the-shelf router bits. The techniques are not difficult, and when you're done with the table you'll have a graceful and welcoming place for meals with friends and family.

Curved joint is easier than it looks

Part of this table's presence comes from its gently angled legs. The transition from leg to apron begins a curve that carries along the apron and back to the opposite leg. On the leg's outside corner, there



Online Extra

To watch a video of shaping the curved, tapered legs on this table, go to FineWoodworking.com/275.

Two-sided template. Nestled in the template, the leg is held secure for routing. Morley's template leaves the area where the leg joins the apron about $\frac{1}{32}$ in. proud. He refines the transition after the legs and aprons have been glued together.

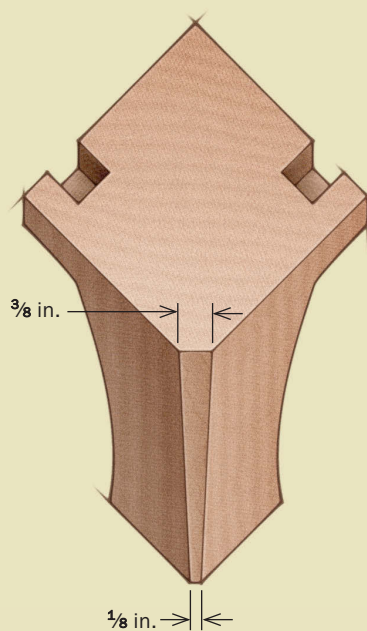


Planer jig creates tapered chamfers. The supports at the ends of the jig hold the leg at a slight end-to-end tilt to create a chamfer that is wider at the top of the leg than it is at the bottom. Take several light passes in the planer until the chamfer is the correct width.

is a chamfer that narrows as it travels down the leg.

The legs and aprons begin as rectilinear blanks, and I cut the mortise-and-tenon joinery in them while they are still square. Keep in mind that the legs slope outward. After the joinery has been cut, I shape the bottom edge of the aprons with a template. Trace the curve on the apron, rough it out, and then rout flush to the template.

I use a template and two jigs to shape the legs. After tracing the template onto the two outside faces of the leg blank, I rough it out at the bandsaw. Next, I put the leg into a jig



LEG DETAIL TOP VIEW



Eye-catching detail. The outside faces of the leg are straight, but the tapered chamfer gives the illusion of a curve.

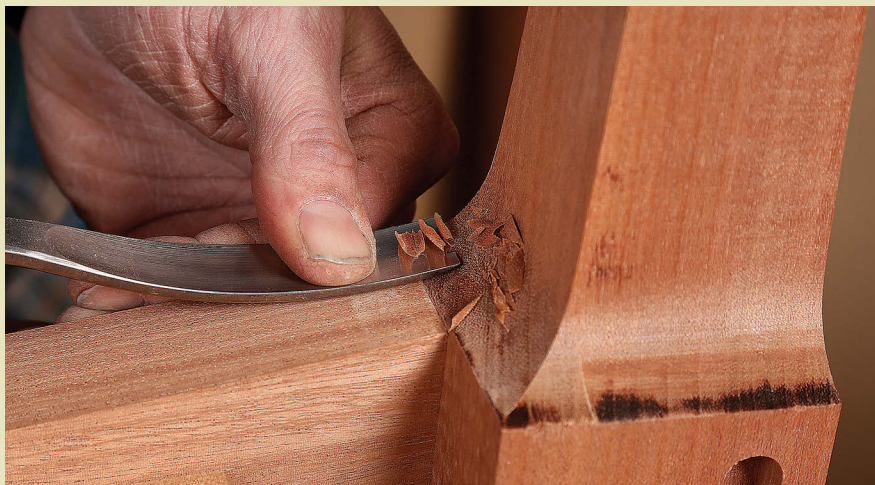
REFINE THE JOINT AFTER ASSEMBLY

To ensure a smooth transition from leg to apron, leave the leg side of the joint a bit heavy when routing. After gluing the leg to the apron, use gouges and sanding to create a seamless curve.



Glue the legs to the aprons. Tapered cauls (above) create flat purchase, spread the pressure, and prevent the clamps from marring the legs.

Rough out the transition. Morley uses a curved gouge to quickly remove material from the joint.



Refine with a sanding drum. Use a series of drums, working from 80 grit up to 120 grit. Switch to hand-sanding and work up to 320 grit.



that has two sides that match the template's shape, and rout both faces flush. Note that the curve at the top of the leg, where it meets the apron, is left heavy at this point. I'll complete the shaping by hand after I have glued the leg to the apron.

Before gluing up the base, you need to chamfer the outside corner of the leg. I do this in the planer with a jig that holds the leg at just the right angle to cut a chamfer that tapers in width. Take several light passes until the chamfer is the correct width at the top and bottom.

Now glue up the base. Start with one apron and two legs. After the glue has dried, finish shaping the curve on the leg that flows into the curved apron. I begin with a carving gouge, getting the curve as close as I can to its final line. I then chuck sanding drums into my cordless drill and further refine the curve. Finally, I use sandpaper on shaped sanding blocks to get the curve to its final shape and smooth the surface. Repeat this process as you glue up the rest of the base. Next up: the top.

SUBTLE CURVE FRAMES THE TOP

Morley template routs the sides to a curve. The elegant edge profile is a chamfer combined with an arc.

Custom profile from two router bits

After gluing the top together, cut it to shape. Begin by tracing the curved template on all four sides. Cut a bit proud of the line with a jigsaw, and then clamp the template to the top, aligning it with the line you traced. Starting with the end-grain edges, rout the tabletop flush to the template.

Now cut the edge profile in two steps. First, use a fingernail bit with a center bearing (magnate.net, no. 5867) to rout the bottom of the profile, starting with the end grain edges. Switch to a chamfer bit and rout the top of the profile.

This is a modern table, and I thought it fitting to ebonize the base. (Michael Robbins demonstrates his ebonizing technique in the *Finish Line* on pp. 78–84). I attached the top with shopmade buttons. At this point, the table is ready for years of meals and memories. □

Philip Morley is a professional furniture maker in Wimberley, Texas.

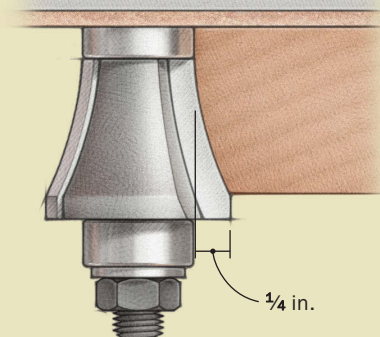
www.finewoodworking.com



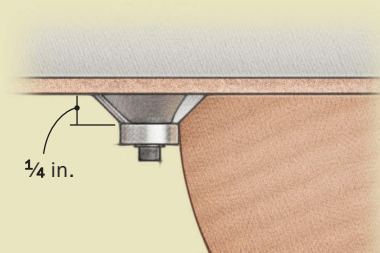
Add a curve to the top. Lay out the curve with a template (left). After cutting most of the waste free with a jigsaw, rout flush to the template (above).



Round the bottom edge. To cut the profile, Morley uses the bottom half of a 2-in. fingernail bit that has a center bearing.



Chamfer the top. The chamfer bit's bearing rides along the curved profile you just cut.



A man with grey hair, wearing a dark blue zip-up jacket, is standing in a workshop. He is holding a large, curved wooden door panel with both hands. The panel has a light-colored wood veneer. In the background, there are wooden cabinets, a window, and various workshop tools and materials on a workbench. The title "Curved, Veneered Doors" is overlaid in large white serif font on the left side of the image.

Curved, Veneered Doors

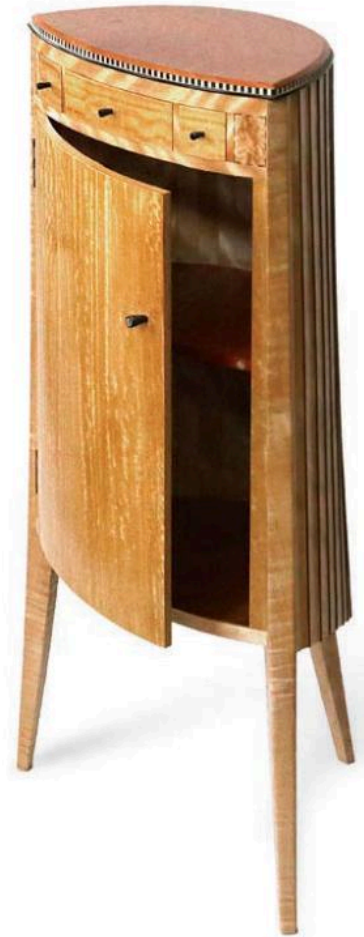
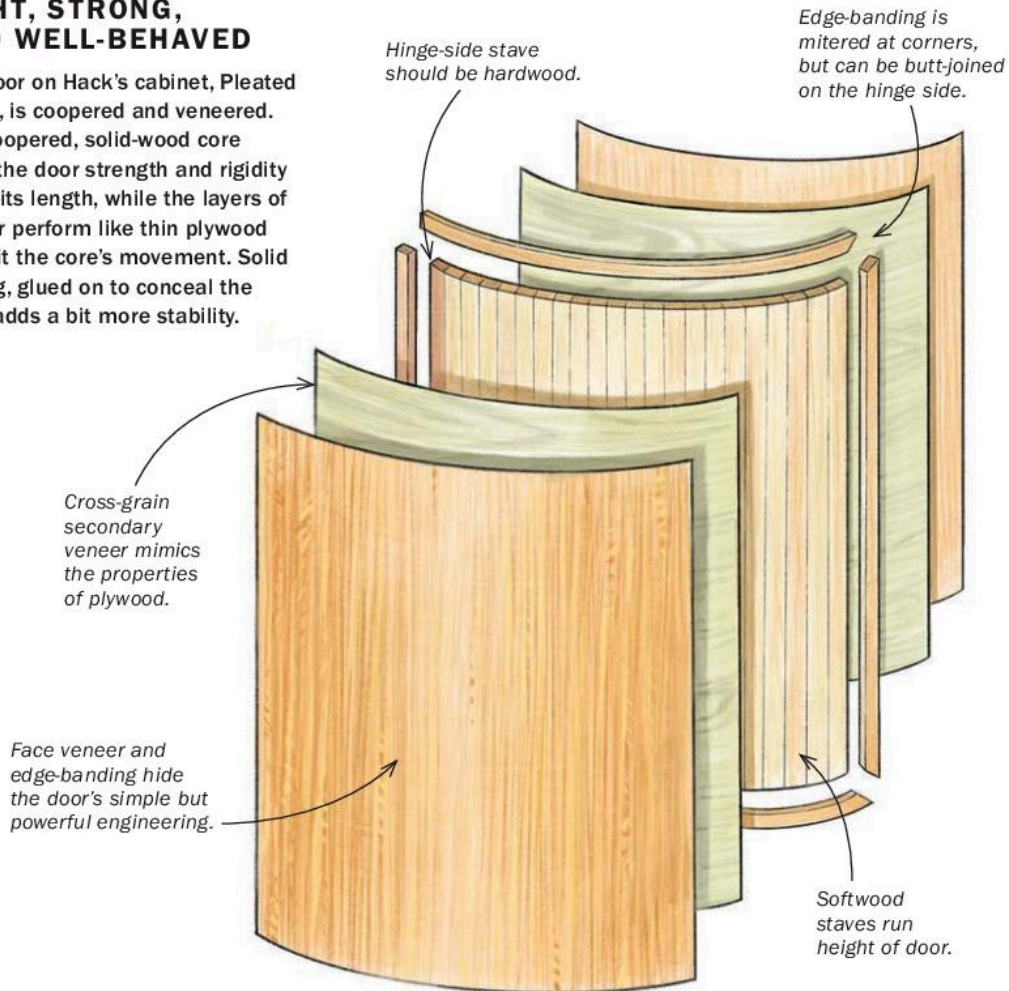
No-hassle coopering
is the core of this
low-tech method

BY GARRETT HACK

A curved door, even one with a slight radius, adds a lot of pizzazz to a piece. I use a traditional technique that gives me consistent results: a coopered core of solid wood with two layers of veneer on each face, their grain at right angles to each other. The result is a curved door that's light, strong, stable, and appealing without the need for a vacuum bag. And thanks to veneer, any look is possible. I've yet to hit the limits of this method. I've made doors as large as 40 in. high and 20 in. wide, as well as ones far smaller, and from ½ in. to 1 in. thick. The technique isn't just for doors, either. I've used it for the curved panels of frame-and-panel doors, for the curved sides of a case piece, and for interesting dividers within. Though it's more work than a flat door, it's a small price to pay for some pizzazz.

LIGHT, STRONG, AND WELL-BEHAVED

The door on Hack's cabinet, Pleated (right), is coopered and veneered. The coopered, solid-wood core gives the door strength and rigidity along its length, while the layers of veneer perform like thin plywood to limit the core's movement. Solid edging, glued on to conceal the core, adds a bit more stability.



TEMPLATE

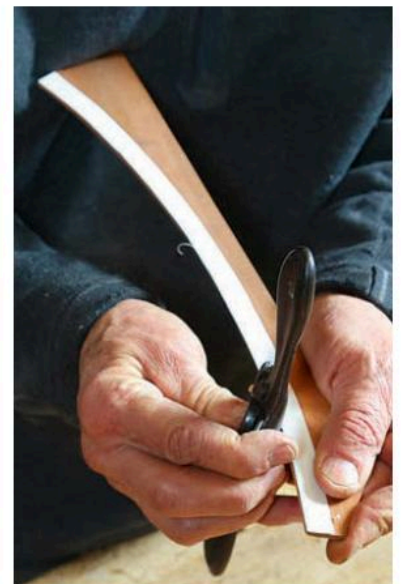
Get the shape of the door from a full-size drawing or, better yet, a pattern cut directly from the door opening.



Outside curve comes first. Trace the exterior shape of the opening onto a piece of paper. Use a thin piece of scrap to back up the pencil and keep the paper flat. Cut out this arc with scissors.



Inside curve next. After cutting out the paper, tape it in the opening and use a compass set to the thickness of the door to scribe the line. This gives you the radius of your bending form.



Make a hardwood template. After cutting out the paper template, glue it to a piece of hardwood and saw close to the line for the inner curve. Refine the curve with hand tools.

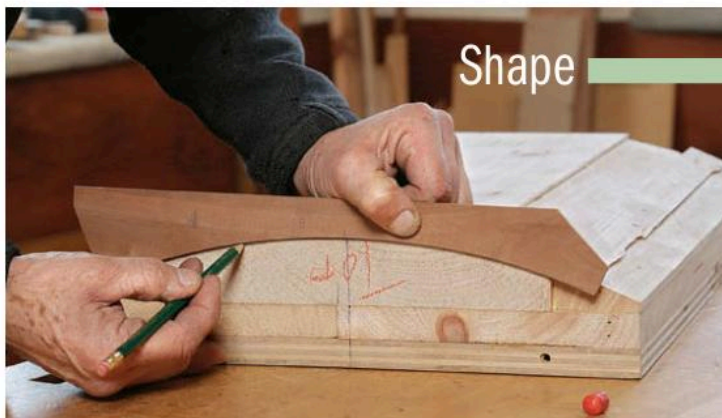
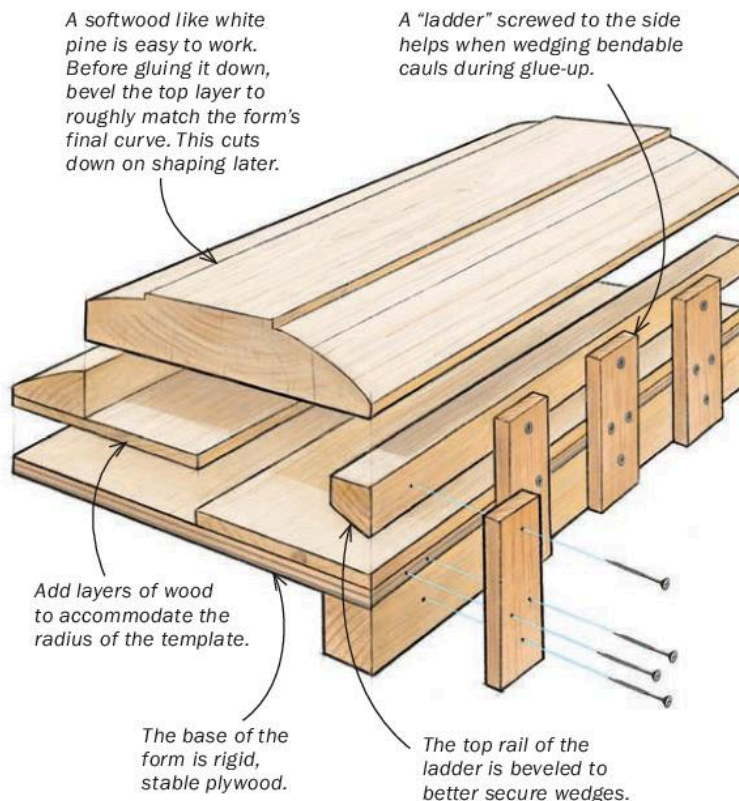
FORM

The form is the foundation of all your glue-ups, so make it accurate. Shape it to match the inside curve of the finished door exactly, since there is no springback to compensate for.



Assemble

Glue up the rough form. Hack clamps where he can, but elsewhere simply nails down the beveled parts to keep them in place while the glue dries.



Shape

Trace the door's curve to the rough form. The hardwood template gives Hack a sturdy reference to scribe against.



Begin shaping the form. Start with coarse cuts to bring the form nearly to shape, but don't hit your layout lines just yet.



Template and light reveal high spots early on. Regularly hold the template to the form to see where you still need to plane down. Mark these high spots. Be sure to keep the template centered.



Cross-grain cuts knock down ridges. A nimble block plane used cross-grain lets you plane down localized areas easily. Keep the template on hand and check your progress often.



Fine-tune

Crayon and template mark high spots later. As his form nears its final shape, Hack rubs the bottom of his template with a dark crayon and drags it along the form, again keeping the template centered. The dark lines transferred to the form show where he needs to plane down. These lines should become longer as you refine the form.



Crayon and straightedge mark flatness along length. Rubbing crayon on a straightedge and sliding it back and forth lets you know when the form's flat—a crucial step to ensuring a successful glue-up.



Winding sticks check for twist. To make the winding sticks, joint one edge of a pair of boards and cut the other edge to match the curve of the form. Sight across them to make sure the form is not twisted.

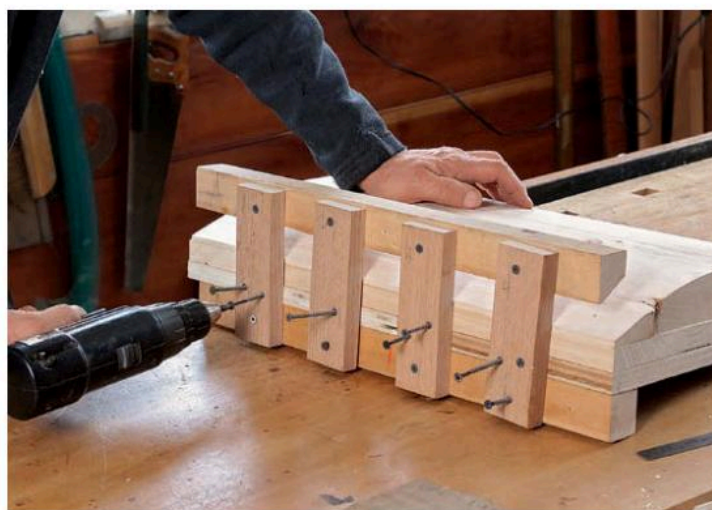
Build the form

The door is built over a curved form that establishes its shape both when coopering the core and laying on the veneer. I make the form out of white pine because it's easy to work. I build it up in layers with the grain running the length of the door, and I make the form at least a couple of inches wider and longer than the finished door.

The pine boards vary in width and thickness to roughly mimic the final curve of the form to expedite shaping. After tracing the curve on an end of the form, shape it with a drawknife and planes. Regularly check that the form is flat along its length and uniform in its curve. When it's done, wax it very well or cover it with packing tape so glue won't stick to it.

Assemble the core

The door's stability starts with a coopered core of stable wood, such as basswood, red or white cedar, mahogany, or white pine.



Clamping ladder needs to be rock solid. To help secure bendable cauls, Hack attaches a ladder of sorts to the side of the form. He uses plenty of screws, as it will be under lots of stress.

CORE

The coopered joints don't need to be dead-on. The glue will bridge some gaps, and the veneer will help provide structural integrity.



Bevel



Make the staves. Hack tips the handplane (left) to form angled edges on each stave. These joints don't need to be perfect, so he finds the mating angles by trial and error, correcting each stave as he moves along. An extralong strip against the ladder will help distribute clamping pressure later.



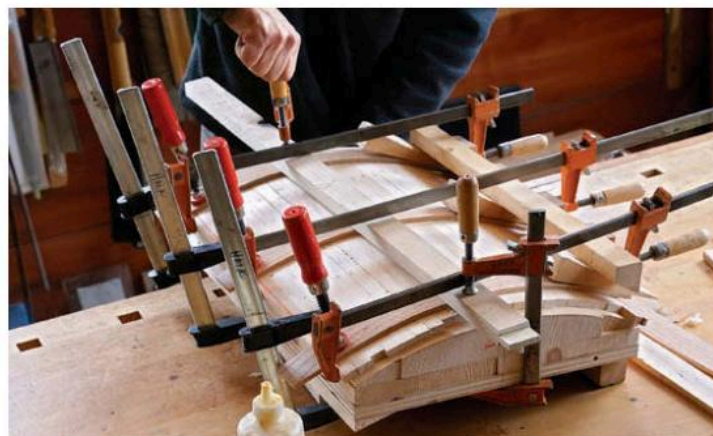
Glue up



Bendable cauls distribute pressure. To get pressure across the face of the core, Hack first wedges $\frac{3}{4}$ -in.-thick, flexible oak cauls under the ladder. He then clamps down their loose ends. A wedge-shaped clamping block under the form prevents the clamps from slipping. An extra, unglued stave, marked with red, helps with the next step.



Clamp across the door. Apply just enough pressure to keep the joints closed without buckling them. For gentler curves, like the one here, a clamp works just fine. For tighter radii, wedges may be the way to go.



Long, centered caul keeps the middle from lifting. Hack calls this his strongback, and it's used to prevent the clamping pressure across the core from pinching the staves out of shape.



Fair the core's surfaces. To ensure a good mating surface for the cross-grain veneer, smooth both faces of the core. A plane works well for the convex face. For the concave face, Hack likes sandpaper backed with a thick piece of leather.



Secure the cross-grain veneer to the form. Tape down the veneer so it stays put when you glue it to the core. Keep the tape on the perimeter of the oversize sheet so it doesn't interfere with the joint.

Apply glue to core. An even, generous layer of glue across the core helps create a solid joint without voids. Don't spread glue on the veneer, as moisture from the glue could ripple the stock.

The stave on the hinge side is an exception. Since it will hold screws, I make it out of cherry or another hardwood.

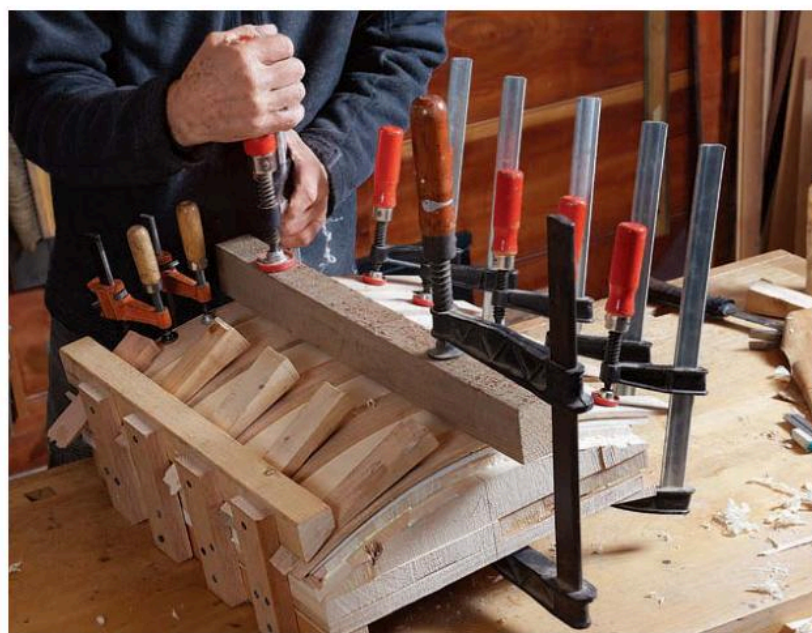
Be mindful of the staves' grain. Quartersawn and straight grain are best, but some riftsawn is OK. Just be sure to orient the pieces so that their face grain is straight. I make them 1 in. or so longer than the finished door.

The thickness of the staves should be the final thickness of the door minus the thickness of the four veneer layers. Buy or make these veneers before starting the core.

The curve of the door dictates the width of the staves. For a slight curve they could be 1 in. wide, whereas for a tighter bend they may need to be closer to $\frac{1}{2}$ in. wide. That's what I used for the door shown here. I don't fret about some randomness in their width since I fit them as I go. Keep in mind that the narrower the staves the more fair their curve will be before smoothing.

The stave joints don't need to be perfect. Glue will help fill gaps, and the two layers of veneer on each face will also hold the assembly together. I simply plane each bevel by eye, checking the fit of adjacent staves on the form. What is critical, however, is that the staves' edges are parallel along their length.

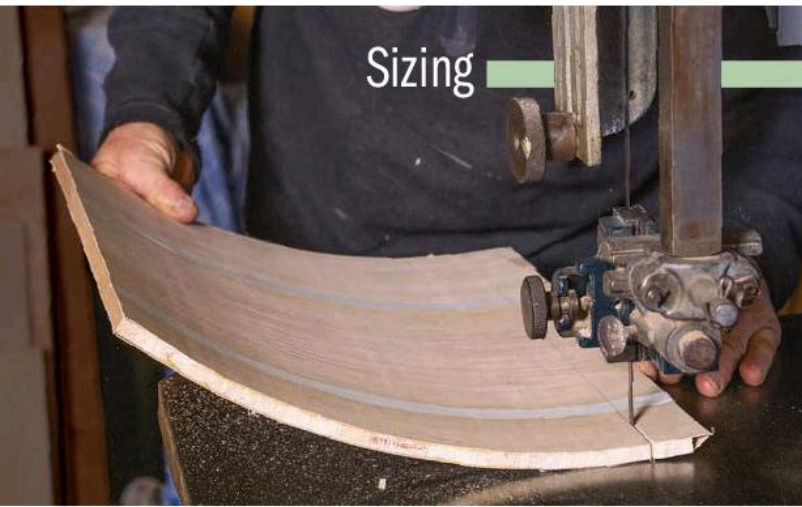
Gluing up the staves involves strategic clamping, flexible cauls, and plenty of glue. Also, if the door is very wide or very curved,



Wedges, cauls, and clamps. When clamping the cross-grain veneer, Hack uses three sheets of thin bendable plywood under the oak strips to distribute pressure. He also clamps the strips this time before wedging them so they don't shift the coopered core.

DOOR

With the cross-grain veneer in place, trim the door to size, then add edge-banding.



Trim the core roughly to shape. Hack uses a bandsaw and cuts close to his line. When sizing the core, be careful not to saw off the hardwood hinge-side stave.

I recommend gluing it up in two stages, as I did for this one.

When the glue is set, fair the core's outside face with a block plane and its inside face with coarse sandpaper. Neither face needs to be perfect; the veneer will bridge any small variations.

Add the first veneer layer

The grain of the first layer of veneer runs perpendicular to the door's length. This layer can be made from whatever secondary wood is most convenient. For both this and the face veneer, avoid thin stock, such as most commercial veneer. My experience is that the moisture from the glue often ripples these. I prefer veneer closer to $\frac{3}{16}$ in. thick, which has no such problem. Thick veneer also gives me a little extra to plane when fitting the partially completed door later on. All four sheets should be at least 1 in. longer and wider than the core so you can easily tape them to the form.

When applying the cross-grain veneer, tape it down so it doesn't move when you apply clamping pressure. I also layer on a few cauls of bending plywood. Aside from these, the clamping arrangement is the same as when you glued up the staves, except there's no need to clamp across the door.

As for which glue to use, Titebond Original is a simple, dependable, and non-toxic option that works well for quickly gluing the veneers. For a larger door where I need more open time to position things and get clamps on, Titebond III is good. I've also had good



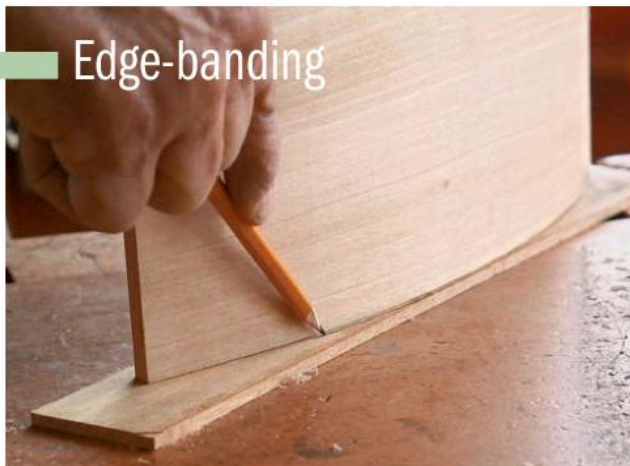
Bevel the edges of the side staves. Set a bevel gauge to the angle of the opening and plane the sides of the door to match. The hinge side should mate perfectly, but Hack slightly undercuts the other side so the door closes more easily.



Door size should account for edge-banding. When setting the door gaps, use two pieces of edge-banding as shims. Trim the door until the spacing is what you want. At this point, tight is better than loose.

Edge-banding

The edge-banding wraps around the door, giving it the look of solid wood, especially if the edging is the same species as the face veneer. Applying it before the face veneer makes the edge-banding stronger and helps it look natural.



Make the edge-banding. Use the door itself when tracing the curved pieces. Cut them out overwide at the bandsaw. Rip the straight pieces, also overwide, for the side edges.



Miters with paring block. Hack miters the edge-banding for the door's two outside corners. On the hinge side, where the joint won't be seen, he uses a simple butt joint.



Use tape and clamps for curved ends. Hack relies on green tape because it's very elastic. To protect the edge-banding, he uses the hardwood template as a caul.



Tape only for the sides. To ensure there's enough pressure, make sure the tape's pulled taut across the joint. Flush up the edge-banding before adding the final layer of veneer.

results with polyurethane glue, which I like because it imparts no moisture and won't ripple thin veneer; but it is a mess to clean up and the foaming pressure can blow glue right through the veneer.

After gluing on the cross-grain veneers, I cut the door to size and check how it fits in its opening. Fine-tune its shape by planing away a little here or adding some thin veneer there.

Add the edge-banding

The edge-banding, which wraps around the whole door, adds strength and enhances the illusion that the door is made of solid wood. You'll need curved pieces for the top and bottom of the door, and straight pieces for the sides. Cut them overwide. This extra material lets you flush up the stock later even if it slips during the glue-up. With these edge-banding pieces planed to a consistent thickness, use them as you dial in the desired gaps around the door.

When the gaps look good, glue on the edge-banding. The pieces can be mitered at all the corners, though on the hinge side they could be butted instead, since those joints are unlikely to be seen. Having them butted is helpful if you need to fit the door

DOOR

Glue on the face veneers following the same sequence you used for the cross-grain veneer.



Face veneer

Follow the same clamping steps. After gluing and clamping the face veneer, make sure there's even squeeze-out along the seams. Adjust your clamping as necessary.



After the glue-up, use a spacer when trimming the veneer. Shimming out the knife lets you clean up the joint with a plane later.



End grain may need to be cut flush without spacer. Veneer with wily grain may chip as it's cut to rough length. If this happens, forgo the spacer and take light cuts with the knife.



Finish up the edge-banding. Use a finely set plane to bring the face veneer flush with the edge-banding. Then, plane a chamfer the depth of the veneer. With a good color and grain match on the edging and face veneer, the joint disappears.

a little more, because these pieces can be planed some without much worry. You're rather limited planing mitered pieces, because changing their thickness can make the joints uneven.

Before the face veneers can go on, plane the edge-banding flush with the door. Work with the grain to avoid tearout, which would appear as gaps under the face veneer.

Now apply the face veneers

The face veneers go on using the same steps as you used for the cross-grain veneers, only their grain runs vertically. After both faces are on and the glue has set, trim and plane off the excess and add a slight chamfer to hide the joint. □

Garrett Hack makes furniture in Thetford Center, Vt.





LIVE EDGE HARDWOOD LUMBER

Live Edge Hardwoods

Uniquely Beautiful... Endless Possibilities

Interested in a new and distinctive look?

Live Edge Hardwoods offer a natural beauty that is breathtaking. Furniture made from our Live Edge Hardwoods are like pieces of art that you will treasure, and hand down for generations.

SPECIFICATIONS:

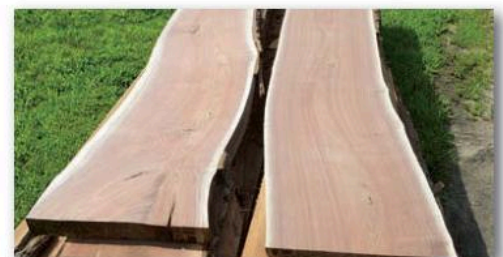
Thickness - 8/4

Width - 9" + Length - 8'-12'

Please call for more info,
price and availability.

407 Route 125, Brentwood, NH
603-679-1230

HighlandHardwoods.com



Inspiration for our readers, from our readers

LESLIE WEBB

Georgetown, Texas

When Webb set out to design this rocking chair, her goal was to incorporate the shape of the rockers throughout the piece. “I also wanted to distill the chair to essential parts only,” she says. The rattan caning is a nod to traditional bentwood rockers.

WHITE OAK, 39D X 22½W X 38H



ASPEN GOLANN

Allston, Mass.

The design of this cabinet-on-stand was inspired by traditional 17th-century Connecticut sunflower chests. “I adapted the piece by making the carved panel a door and elevating the piece on a stand,” Golann says. “The split turnings, moldings, and carvings are taken directly from traditional chests of the era.” This piece was featured in the gallery of student work at Fine Woodworking Live 2018.

WHITE OAK, WALNUT, AND MAPLE, 16D X 19W X 32H

Photo: Lance Patterson



NICK BARBOZA

Hampden, Maine

Barboza's Salemo Sideboard's case floats within the exterior framework made up of the top, legs, and stretchers. The legs are bent laminations that taper from about 4 in. wide at the bottom to 2 in. wide at the top. “I'd done bent laminations,” he says, “but I'd never done a tapered bent lamination before and it yielded a great result.”

CHERRY AND EBONY, 20D X 56W X 34H





CHRISTOPHE CLAEYS

La Ciotat, France

The “shark gills” on the frame-and-panel doors of this cabinet are steam-twisted oak. The frame is chestnut, and the drawers are birch plywood. Claeys achieved the dark pigment using water-based tint and varnish.

CHESTNUT, OAK, BIRCH PLYWOOD

APPROX. 23½D X 63W X 15¾H

Photo: Dario Caruso



JOHN KENNEDY

Orlando, Fla.

The contour carving on Kennedy’s Ripple Box represents the concentric circles that emanate out when a pebble is dropped into still water. Each ring is 10% bigger than the one that precedes it. “My challenge,” Kennedy says, “was to do this on a square box and keep the effect.”

BLACK WALNUT AND CURLY MAPLE

12½SQ X 18H



ROBERT LAPLACA

Charlotte, N.C.

LaPlaca came across the original of this John Townsend block-and-shell chest in *The Master Craftsmen of Newport, the Townsends and the Goddards* by Michael Moses and Israel Sack (MMI Americana Press, 1984). “For lovers of Newport furniture like me, this book is a must-have.” LaPlaca used photos in the book to model the chest in SketchUp.

MAHOGANY, 20D X 32½W X 34½H

LI CHEN

Kunming, Yunnan Province, China

After graduating from Rochester Institute of Technology and working with John Sheridan in San Francisco for a year, Li Chen moved back home to China and set up shop. The stool was designed for his parents. Its shape was inspired by Chinese and Japanese gate towers. "I tried to make the seat look like it was suspended in midair and not connected directly to the legs."

RED OAK, APPROX. 10 $\frac{2}{3}$ D X 16 $\frac{1}{2}$ W X 15 $\frac{3}{4}$ H

Photo: Lao San



JOHN CHAMPION

Atlanta, Ga.

Champion admired the look of Steve Latta's demilune table ("Federal Card Table," FWW #180) and wanted to build something with similar decorative features, a curved front, and dimensions that fit his needs. He decided to incorporate Prince of Wales feather paterae into the ovals at the top of the legs. "I spent a lot of time testing design ideas, construction, and finishing techniques to end up with the final result."

AFRICAN MAHOGANY, HOLLY, AND DYED POPLAR
16D X 54W X 30H



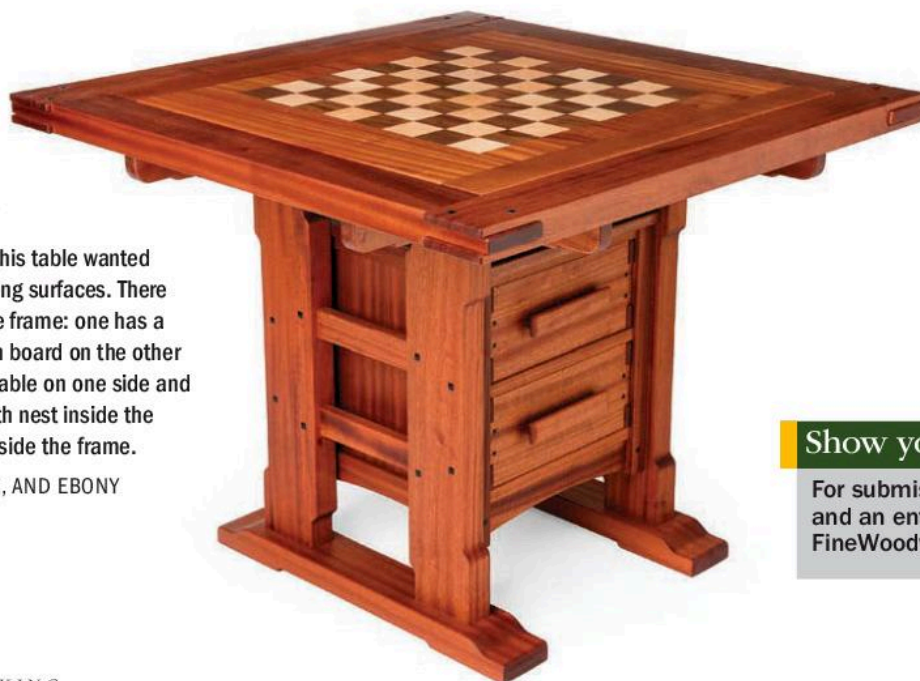
WILL MILLER

West Long Branch, N.J.

The clients who commissioned this table wanted a game table with multiple playing surfaces. There are two inserts that fit inside the frame: one has a chessboard with a backgammon board on the other side, the other has a poker felt table on one side and a sapele panel on the other. Both nest inside the table, resting on leather pads inside the frame.

SAPELE, BLACK WALNUT, MAPLE, AND EBONY
38SQ. X 30H

Photo: Liz and Bob McKay



Show your best work

For submission instructions and an entry form, go to FineWoodworking.com/rg.

HEARNE HARDWOODS INC.



200 WHITESIDE DRIVE
OXFORD, PA 19363

1.888.814.0007 / 1.610.932.7400



FLITCH CUT TABLE TOP SLABS,
EXOTIC & DOMESTIC LUMBER,
FIGURED WOODS, BURLS,
BOOKMATCHED MATERIAL,
GUITAR SETS &
INSTRUMENT GRADE WOODS,
CUSTOM MADE HARDWOOD FLOORING

OVER 140 SPECIES &
1 MILLION FEET OF
HARDWOODS IN STOCK



WWW.HEARNEHARDWOODS.COM

www.finewoodworking.com



insidepassage.ca
1.877.943.9663

"If I were starting my life today as a craftsman, and needed to learn what matters the most; my choice would be Inside Passage School."
— James Krenov

Yard Cleanup is easy with a
DR® CHIPPER SHREDDER!

Chip big branches up to 5" in diameter.
Shred yard and garden waste up to 1.5" thick.

Powerful engines spin massive fly-wheels and shredding hammers to reduce everything FAST.

Check out the full DR® lineup including towable models!

FREE SHIPPING
6 MONTH TRIAL

Some Limitations Apply

Go Online or Call for FREE Info Kit!

DRchipper.com
TOLL FREE **888-213-0916**



19D52X © 2019



BE A BETTER CRAFTSMAN WITH GREX® 23 GAUGE HEADLESS PINNERS



ALSO AVAILABLE

GCP650 First Cordless 2" 23 Gauge Headless Pinner

Be a better craftsman with proven precision built GREX tools. It's the same award-winning robust build quality that users have trusted in GREX tools for 25 years. And GREX continues to lead the industry's innovation of 23 Gauge Headless Pinners. Don't be fooled by look-alikes. The difference really is in the details.



FIND YOUR DEALER

www.grextools.com



888-447-3926



866-633-7788

CRAFT FORMS 2018

These pieces caught our attention from among the many shown at Craft Forms 2018, a juried exhibition at the Wayne Art Center in Pennsylvania. This was the 24th year of the exhibition, which also featured works in ceramic, fiber, metal, glass, mixed media, and 3-D printing.

MARK DEL GUIDICE

Concord, Mass.

Del Guidice calls this wall cabinet “Either Way,” and says “it was inspired when I saw an architectural rendering of proposed buildings that reminded me of two people standing together but facing in different directions.” He used splined miter joints in the cabinet cases. The tops are veneered bent laminations and the incised carved panels are colored with milk paint.

MAHOGANY, PECAN, SWISS PEARWOOD, AND WHITE OAK
7D X 16W X 25H

Photo: Stewart Clements



DANNY KAMERATH

Llano, Texas

Like many of Kamerath's bowls, this spalted hackberry vessel is carved and sculpted from a block of wood, not turned on a lathe. It took about 60 hours to do the work, including the wipe-on poly finish.

SPALTED HACKBERRY, 6½D X 7W X 8H



B.R. DELANEY

Wurtsboro, N.Y.

Named Fulcrum, this ash and brass coffee table came to life through an approach Delaney learned from furniture designer Brandon Gore—design by disconnecting. He says, “I try not to be influenced directly by any one craftsperson or image, but by delving deep into my own thoughts and memories.”

ASH, 22D X 62W X 18H



Groff & Groff Lumber, Inc.
Exceptionally Fine Hard Woods

A specialty lumber company with a large supply of kiln-dried & exotic hardwoods.

A large variety of LIVE EDGE SLABS and Matching Flitches, Walnut, Cherry, Curly Cherry, Maple, Oaks, Butternut, Purpleheart, Tiger Maple, Birds Eye Maple, Sycamore, Ash, Paulownia, Sassafras, Quarter Sawn Red and White Oak, Burls, Turning Blocks, & More!
 Custom sawing available.

858 Scotland Road, Quarryville, PA 17566
 1-800-342-0001 • 1-717-284-0001 • sales@groffslumber.com
 www.groffslumber.com

The Woodworker's Choice

Lignomat Moisture Meters

Pin and Pinless Meters

With every meter from Lignomat you buy Accuracy, Reliability, Quality, a 2-year Warranty and Expert Customer Service.

For Moisture Problems **www.wood-moisture.com**
 For Moisture Meters **www.lignomat.com**
 800-227-2105

Organize
 your
 Workshop

Product # FWW10011050
 Order online at
TauntonStore.com

43 Years
 of projects, tips & techniques
 to make you a better woodworker

Enjoy 272 fully searchable issues of
Fine Woodworking magazine on one USB or DVD.

Only at **Tauntonstore.com**

© 2019 The Taunton Press

52 BOXES IN 52 WEEKS

IMPROVE YOUR DESIGN SKILLS ONE BOX AT A TIME

MATT KENNEY

Professional woodworker and former special projects editor of *Fine Woodworking*, Matt Kenney set himself the intriguing challenge of designing and building one box a week for a complete year. Along the way he created a wonderful collection of beautiful wooden boxes, refining his unique design aesthetic and developing smart techniques for making elegant boxes that woodworkers of all levels will be eager to build.

PICK UP YOUR COPY TODAY.
 Available at TauntonStore.com
 or wherever books are sold.

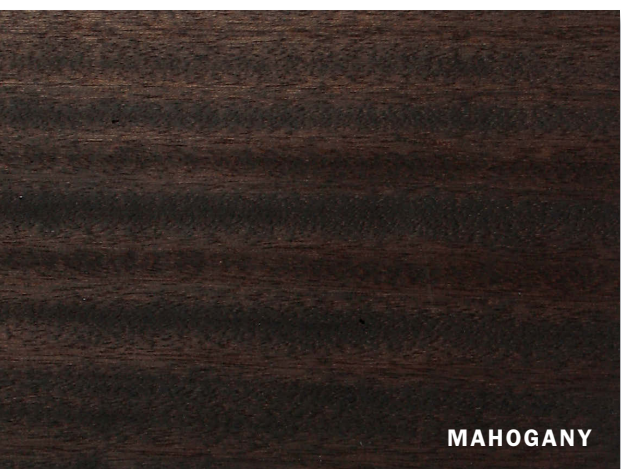
Taunton

Ebonizing

A DARK FINISHING OPTION THAT LETS THE WOOD'S CHARACTER PEEK THROUGH

BY MICHAEL ROBBINS

WALNUT



MAHOGANY



WHITE OAK

Ebonizing wood is a wonderful way to create a dark, graphic look that emphasizes the form of a piece. The steel wool and vinegar recipe I use gives depth and darkness to heavy-tannin woods like walnut and oak, while still allowing for aspects of the grain to shine through. Since this is a reactive finish, it penetrates deeper into the wood than a stain or dye that sits on top, creating a natural, durable black tone. On low-tannin woods, it produces lovely grays, blues, and purples. The ingredients cost very little and can be bought at any hardware and grocery store. You can easily experiment and develop a recipe that's right for you.

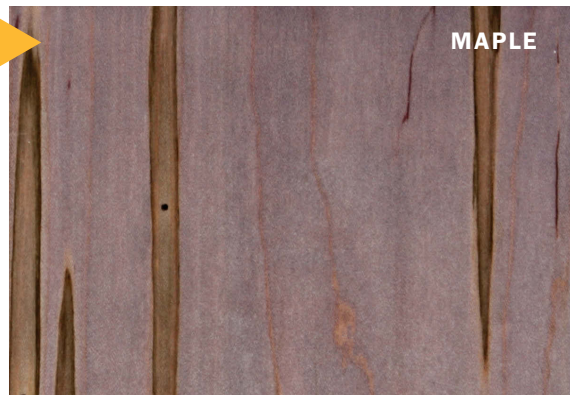
Make the solution

The recipe calls for a 12-pad package of No. 1 steel wool, a gallon of white vinegar, lacquer thinner, and a few clean containers. The goal is to make the purest solution possible, so I remove the excess oil that's present in the steel wool by rinsing it in lacquer thinner. I use a three-container method, rinsing

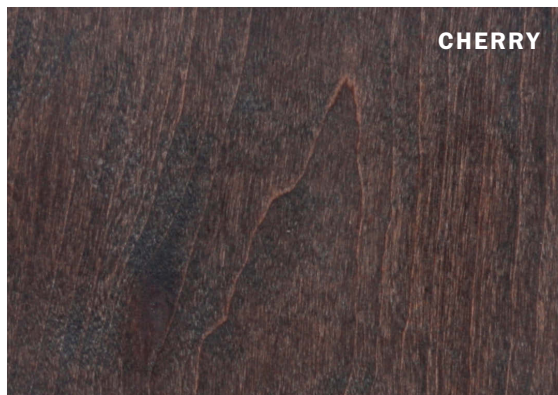
Tannins are the trigger

Using a steel wool and vinegar solution for ebonizing introduces iron oxide to the natural tannins in wood. The effect is similar to what happens when you leave a hammer out in the rain and later find a blue stain on the wood underneath. In the controlled environment of the wood shop, you can make a clean and concentrated solution that will produce consistent and repeatable results.

Works on low-tannin woods, too. Woods such as maple and cherry don't have a high tannin content, so they won't get as dark. But the process yields beautiful grays, blues, and purples.



MAPLE



CHERRY

EST 1928

WOODCRAFT®

QUALITY WOODWORKING TOOLS • SUPPLIES • ADVICE®

Own A Piece Of Wood History And Turn It Into Your Next Project

From charred edges to uncommon shapes and one-of-a-kind grain patterns, these show-stopping Pequiá slabs are uniquely beautiful. Brought back to the U.S. from Brazil, the 1,000+ year old tree is a story in itself.

► Get your Pequiá slabs before they are all gone! Visit your local Woodcraft store or shop online at woodcraft.com and search Pequiá.



Visit <http://bit.ly/pequiatree> to find out more!

For A Free Catalog Or To Find Your Local Woodcraft Store, Visit woodcraft.com
Or Call 800-225-1153. Follow Us: [f](#) [t](#) [p](#) [i](#) 19WW06R

AMERICA'S ORIGINAL Walk-Behind Brush Mower!



Starting at just **\$1499⁹⁹**



*Assembled in the USA using domestic and foreign parts.

The DR® FIELD & BRUSH MOWER is Now Better than Ever!

FASTER. Up to 20 HP and 34"-wide cut for faster mowing!

EASIER. Power steering gives you fingertip control.

NEW CHOICES: including PTO and tow-behind models for tractors and ATVs.

FREE SHIPPING 6 MONTH TRIAL

SOME LIMITATIONS APPLY

Go Online or Call for **FREE DVD & Info Kit!**

DRfieldbrush.com

TOLL FREE **888-213-0916**



19D53X © 2019

GearKlamp **NEW**



Works "BIG" in a small space.

The new and unique BESSEY GearKlamp works "BIG" in small spaces to provide a fast clamping solution for tight spots up against another object or, when reaching across something to clamp. The patented gear mechanism separates the spindle from the rail-mounted handle for greater clearance and, the quick release shift button makes for fast set-ups. BESSEY. Simply better.

besseytools.com facebook.com/BesseyToolsNorthAmerica instagram.com/BesseyTools_na

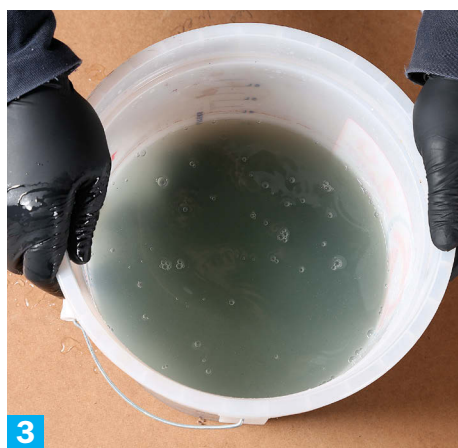
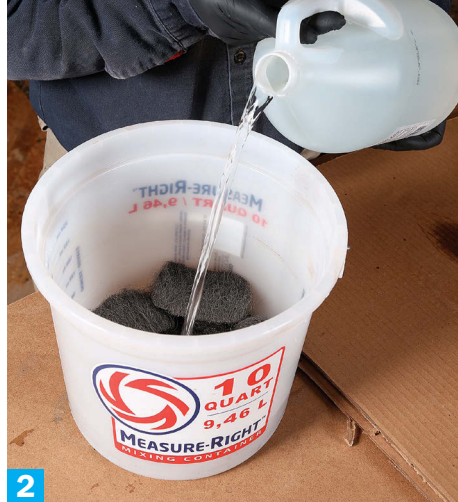
Make the ebonizing solution



the steel wool in consecutive containers, each with a few ounces of lacquer thinner in it. The first container is the dirtiest, and by the time it reaches the third, the steel wool should be relatively clean. Once I've cleaned a full bag of steel wool, I store the used lacquer thinner from the two cleaner containers for future use. I discard the dirtiest batch of thinner.

Set aside the pads on a clean surface for about 20 minutes to allow the thinner to evaporate. Clean a bucket (the cleaner the better) to make the solution in. I have a specific bucket that I use only for this process. Place the clean steel wool pads in the bottom and carefully pour the gallon of white vinegar over them, making sure the pads are completely submerged. The solution should begin to bubble, a sign the vinegar is reacting with the steel wool and beginning to break it down. I stir the solution every couple of hours, making sure that the steel wool is still submerged in the vinegar. I allow the solution to brew for 24 to 36 hours, stirring occasionally when possible.

Once the time is up, I strain the vinegar solution into a clean container through a few layers of fresh white rags. If my cleaning process was thorough, the strained solution should be perfectly clear or close to it. The leftover steel wool



Steel wool gets a bath, then a soaking. Robbins starts by cleaning the steel wool pads. He uses three separate containers of lacquer thinner for the cleanest results (1). When the steel wool pads are dry, he puts them in a clean bucket and gently pours white vinegar over them (2). Ideally all the pads should be completely submerged. You will see bubbles as the vinegar begins to break down the steel (3). While the steel wool marinates for 24 to 36 hours, Robbins stirs occasionally. Then he strains the solution through a few layers of white rags. (4)



**WOOD
WORKING**

BEGINS HERE.

Are you a passionate woodworking enthusiast? Do you own or operate a small shop?

Immerse yourself at this year's largest woodworking machinery show in the U.S. Get an up-close look at the latest power tools, machines, large-scale door-making machines to table saws, hand tools and accessories.

GET YOUR PASS TODAY

Enter Promo Code: **FWM** and **SAVE**



www.awfsfair.org

July 17-20, 2019

Las Vegas Convention Center

Las Vegas, Nevada

Apply the solution



Soap up the solution. Switching to smaller containers, he adds a drop or two of dish soap to 8 oz. of solution. The soap allows the mixture to penetrate deeper into the wood.



Brush and scrub. After wetting down the workpiece with water to raise the grain, apply the ebonizing solution with a foam brush. You don't have to wait for the water to dry before applying the solution. Work the solution into the pores with a scrub brush.



can be discarded at this point. The solution is ready for use immediately after straining.

Brush on the solution

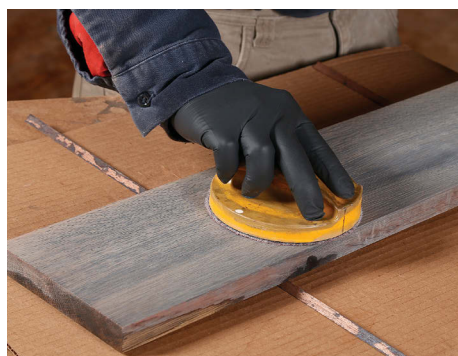
Once the piece has been sanded up through the grits to 220, I raise the grain with water, wetting the wood's surface evenly. To keep the ebonizing solution as pure as possible, I pour what I need into a smaller container before applying it. To help the solution penetrate deeper into the wood cells, I add one or two drops of dish soap to 8 oz. of solution. This helps break the surface tension of the liquid and produces a blacker, more consistent result, especially in open-grain woods like oak.

While the wood is still wet from the water, apply the ebonizing solution liberally and work it into the pores with a stiff brush, brushing in the direction of the grain. Work in sections using overlapping brush strokes. The wood should begin turning dark almost immediately. One coat should do the job. After the first coat has dried, you may find a second coat necessary to even out missed spots, but it won't darken the color much.

After I'm satisfied with the evenness and depth of color, I allow the wood to dry before sanding back any raised grain with 400-grit paper. On unfinished wood, this process will produce a deep navy blue color. Depending on what is desired, almost any type of finish can be applied now. I generally use a penetrating oil finish. It turns the wood from navy blue to rich black, for a classic ebonized finish.

Options for a blacker black

One option for producing an even darker result is pre-treating the wood with strong black tea, which is rich in tannins. This can be brewed and applied to the raw workpiece before the ebonizing solution. The heavy concentration of tannins, combined with the wood's natural tannins, produces a blacker black. Another approach I use is to apply an ebony tung oil after



Apply a topcoat. Once the surface is dry, lightly sand it with 400-grit paper. Almost any topcoat can be applied to an ebonized surface. Robbins uses Osmo Polyx-Oil.



Max Strength = Maximum Control

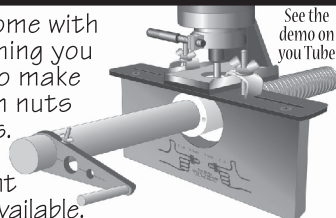


Get Control with the Strongest,
Stiffest Fret Saws on Earth
Available in Titanium or Aluminum

www.knewconcepts.com

The Beall Wood Threader 3.0

Kits come with everything you need to make wooden nuts & bolts. Six different sizes available.



THE BEALL TOOL CO.

541 Swans Road N.E. Newark Ohio
1-800-331-4718 www.bealltool.com Dpt. FW

Fine Woodworking PRESENTS

TAUNTON workshops

Build your skills. Follow your passion.

SHARPEN YOUR SKILLS

Take in-depth online video classes from expert Fine Woodworking instructors in the comfort of your home

TauntonWorkshops.com/FW

THE BEST HARDWOOD LUMBER

Walnut • Cherry • Exotics & More

100%
Satisfaction
Guarantee
EVERY ORDER



FRIENDLY
Service

EASY
Ordering

www.101Woods.com

VISA PayPal 800-423-2450

BEST DOVETAILS

It's the truth.

Order your Keller Dovetail System now!
(800) 995-2456

Made in the USA since 1976 • DVD/Video \$8.95 + \$2 p/h

www.bestdovetails.com

Fine Woodworking

Shop Our Online Store

FineWoodworking.com/ShopNow

Your destination for trusted woodworking resources

CLASSIFIED

The Classified rate is \$9.50 per word, 15 word min. Orders must be accompanied by payment, ads are non-commissionable. The WOOD & TOOL EXCHANGE is for private use by individuals only; the rate is \$15/line, min. 3 lines. Send to: Fine Woodworking Classified Ad Dept., PO Box 5506, Newtown, CT 06470-5506. FAX 203-426-3434, Ph. (866) 505-4687. Deadline for the July/Aug., 2019 issue is April 12, 2019.

Hand Tools

E.C. EMMERICH'S full line of cabinetmaker's hand tools and parts. www.ecemmerich.com 800-724-7758.

DIEFENBACHER TOOLS – Fine imported and domestic hand tools for woodworkers. www.diefenbacher.com (720) 502-6687 or ron@diefenbacher.com

USED AND ANTIQUE HAND TOOLS wholesale, retail, authentic parts also (415) 924-8403, pniederber@aol.com always buying.

Instruction

STUDIO OF MICHAEL MCDUNN is offering woodworking classes for beginners to advanced woodworkers. See our website for more information at www.mcdunnstudio.com or call (864) 242-0311.

Create Moldings With Your Table Saw

With Corob Molding Knives & Shaper Cutters

Over 45 Shapes Available

Molding Knife Heads fit standard table saws with 5/8" arbor. Knives are also compatible with Delta heads, and other old style heads.



1-800-745-9895
corobcutters.com
MADE IN USA

VACUUM Pressing

Veneering ~ Laminating

Vacuum Pumps
Air-Powered & Electric

Vacuum Bags
Poly & Vinyl

Frame Presses

Veneering Accessories

800 547-5484 - www.qualityvak.com



**THE FURNITURE INSTITUTE
of MASSACHUSETTS**

Study with Fine Woodworking author Philip C. Lowe • Classes range from 1 day to 1 week to 2 and 3 year mastery programs.

• See new class schedule on:

(978) 922-0615 www.furnituremakingclasses.com

Instruction continued

PENLAND SCHOOL OF CRAFTS, in the spectacular North Carolina mountains, offers one-, two-, and eight-week workshops in woodworking and other media. (828) 765-2359. www.penland.org

Wood

RARE WOODS. Ebony, boxwood, rosewood, satinwood, ivory wood, tulipwood + 120 others. (207) 364-1073. www.rarewoodsusa.com

EISENBRAND EXOTIC Hardwoods. Over 100 species. Highest quality. Volume discounts. Brochure. 800-258-2587. eisenbrandhardwoods.com

NORTH/CENTRAL VIRGINIA: Complete line of premium, kiln-dried hardwoods. Culpeper/Warrenton area. (540) 825-1006. cpjohnsonlumber.com

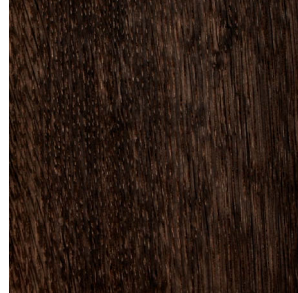
Get your darks darker

The steel wool ebonizing method relies on the tannic acid in the wood to react with the iron solution. But tannic acid content varies by species, and even woods with high tannic acid can have variation. Here are a couple ways to manipulate the process for more consistent or darker results.

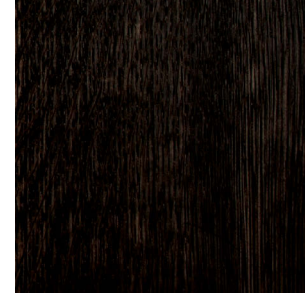


WHITE OAK

EBONIZING SOLUTION



TEA WASH BEFORE



OIL STAIN AFTER



Make it tea time. A concentrated solution of black tea brushed onto the raw wood and left to dry adds tannins to the wood. Applying the ebonizing solution on top of the tea yields darker and more even results.

the ebonizing solution but before the final topcoat. This product, made by Sutherland and Welles, has an aniline dye base mixed with tung oil and helps to even out any unwanted light areas or high contrast. While it does make the wood slightly warmer in tone, it produces a beautiful finish and is a great option.

Works on tannin-light woods, too

I often use a steel wool and vinegar process on maple and other tannin-light woods, but I call it oxidizing instead of ebonizing. Oxidizing uses a lighter solution, which you can get by diluting the ebonizing solution with water or vinegar, or making a different solution with about half the amount of steel wool as the original. All you want is a slight reaction.

The most difficult part of oxidizing is choosing the finish that will go on top of it. Anything oil-based will amber the wood, turning the beautiful cool colors muddy and green. You want a finish that doesn't change the color of the wood, so you can keep those blues and grays. I'd suggest a water-based spray finish for this.

Michael Robbins builds furniture in Philmont, N.Y.



Online Extra

To watch a members-only video of Robbins's oxidizing technique, go to FineWoodworking.com/275.

Or follow with a dark oil. An ebony tung oil applied after the ebonizing solution but before the topcoat adds depth and darkness, and evens out any contrasting areas. Robbins uses Sutherland and Welles Old World Concentrated Stain with Polymerized Tung Oil in ebony.

ULTRA QUIET

Oil-Free | 4.0 Hp 60 gallon



www.CaliforniaAirTools.com



INDEX TO ADVERTISERS

ADVERTISER	WEB ADDRESS	PAGE	ADVERTISER	WEB ADDRESS	PAGE
AWFS Fair	www.awfs.org	p. 27	Hearne Hardwoods	www.hearnehardwoods.com	p. 75
The Beall Tool Co.	www.bealltool.com	p. 83	Highland Hardwoods	highlandhardwoods.com	p. 71
Berdoll Sawmill	www.berdollsawmill.com	p. 19	Highland Woodworking	highlandwoodworking.com	p. 21
Berkshire Products	berkshireproducts.com	p. 17	Infinity Cutting Tools	www.infinitytools.com	p. 19
Bessey Clamps	besseytools.com	p. 79	Inside Passage School	insidepassage.ca	p. 75
California Air Tools	www.californiaairtools.com	p. 85	Keller Dovetail Jigs	www.bestdovetails.com	p. 83
Center for Furniture Craftsmanship	www.woodschoool.org	p. 19	Knew Concepts	www.knewconcepts.com	p. 83
Connecticut Valley School of Woodworking	www.schoolofwoodworking.com	p. 11	Laguna Tool	lagunalathe.com	p. 5
Corob Cutters	corobcutters.com	p. 83	Lignomat	www.lignomat.com	p. 77
Dowelmax	dowelmax.com	p. 17	Oneida Air Systems	oneida-air.com	p. 15
DR Power	www.drpower.com	p. 11	Oneida Air Systems	oneida-air.com	p. 17
DR Power	www.burncage.com	p. 19	Quality Vak	www.qualityvak.com	p. 83
DR Power	www.drchipper.com	p. 75	Rikon Tools	rikontools.com	p. 13
DR Power	www.drfieldbrush.com	p. 79	SawStop	sawstop.com/upgrade	p. 9
Envi by Eheath	www.eheat.com	p. 21	3M Pro Grade Precision	3m.com/sanding	p. 7
Fine Woodworking Live	finewoodworkinglive.com/register	p. 25	Vacuum Laminating Technology	vacuum-press.com	p. 11
Forrest Blades	www.forrestblades.com	p. 15	Varathane		p. 87
Furniture Institute of Massachusetts	www.furnituremakingclasses.com	p. 83	Wagner Meters	wagnermeters.com	p. 11
Grexx Tools	www.grexxtools.com	p. 75	Woodcraft	woodcraft.com	p. 79
Grizzly Industrial	grizzly.com	p. 2	Woodpeckers	woodpeck.com	p. 15
Groff & Groff Lumber, Inc.	www.groffslumber.com	p. 77	Woodpeckers	woodpeck.com	p. 21
			Woodpeckers	woodpeck.com	p. 25
			Woodworkers Source	www.101woods.com	p. 83

Tools from my father

BY JON WAYNE BROWN

By the time I took my first suitcase of tools back home to Toronto from my parents' house in Newfoundland, Dad hadn't been in his workshop in any meaningful way for three years. It wasn't the basement shop where I cut my teeth, but a cramped, downsized version in the downsized home they had bought as empty nesters. The house was a fixer upper, which suited Dad to a T. He had finished the renovations just as the crippling pain took hold.

A disused workshop is a sad sight. During those three unproductive years, his shop had become an ad-hoc storage room covered in dust rather than sawdust. Since we had never worked shoulder-to-shoulder there, it didn't feel like his shop to me.

Sorting through his tools while he languished in his chair upstairs, I kept a practical distance to my decisions. Was it worth taking up valuable suitcase real estate with the biscuit joiner? (Yes.) His Mastercraft bench chisels? (They'll do for now.) His router? (Guess I don't need two.)

I allowed myself just a couple of compact sentimental selections: a small plane with a curved blade set in a wooden handle that fits nicely in the palm for easing edges, and a Stanley nail set at least 30 years old, though the exact model



I allowed myself just a couple of compact sentimental selections: a small plane, and a Stanley nail set. I chose them because when I hold them, I can immediately picture his hands.

can still be found at any box store for under \$10. I chose them because when I hold them, I can immediately picture his hands.

Back in Toronto I sharpened the bench chisels and put them to work on my first furniture commission, an outdoor dining set in quartersawn white oak. The joinery—drawbored mortise-and-tenons, bridle joints, and even a couple of dovetails—was beyond anything my father had taught me. On the phone I told him how well his old chisels had performed after a good sharpening and explained the techniques I was learning.

Our teacher-student relationship was being turned on its head. If Dad was able, he would have pattered off to the workshop after our long-distance chats to try things for himself. On trips home I could have shown him firsthand; we could have made something together like old times.

A month or so after he died, Mom and I were talking by phone. I was a few months from moving to the West Coast with my wife, adding a few thousand more miles between us. Mom was on a mission to ship Dad's tools to me, and our move was complicating things. But that day I could hear relief in her voice. You'd be amazed how cheaply you can ship a ton of tools 5,000 miles with a little patience and the determination of a retiree.

A couple of months later I was back in Dad's small workshop, dismantling his Craftsman radial-arm saw for shipping. Practicality was out the window by now. This was the first machine Dad taught me to use, and it was coming with me.

That was almost two years ago. Dad's machinery waits in storage for a permanent home, but his smaller tools have found use in my shared, city shop here in Vancouver. I have a son of my own now. He'll never know his grandfather, but at least I'll teach him on the same tools my father used to teach me.

Jon Wayne Brown is a photographer and furniture maker in Vancouver, B.C., Canada.



IN 1958, VARATHANE® SET OUT TO INSPIRE WOODWORKERS EVERYWHERE.

Since 1958, Varathane has been used by fine woodworkers and master DIYers like you. Every stain is formulated with a passionate respect for the wood, allowing you to create enduring pieces for generations to come.

We've earned the trust of woodworkers who want durable, time-saving, easy-to-use stains and coatings they can count on. And when it comes to innovation, we remain a category leader.

Trusted for over 60 years, Varathane stains and finishes are renowned for their stunning beauty and exceptional performance.

DON'T JUST FINISH IT. VARATHANE IT.

Varathane
— SINCE 1958 —



Available at





Sitting in the Krenovs' Kitchen

James Krenov never made a chair. “I leave that to people better suited to it,” he said. One person he trusted to make a chair was his friend Vidar Malmsten, the son of Krenov’s Swedish mentor, Carl Malmsten. In the 1960s, Vidar built prototypes for several chairs while sharing Krenov’s small basement workshop in the suburbs of Stockholm, and one of Vidar’s designs provided Jim and his wife, Britta, with a set of kitchen chairs. In those years Britta worked as a teacher to support the family and enable Jim to pursue his passion. “She had an unwavering belief in me right from the start,” Krenov said, “even when I couldn’t carry my end of the plank.” Fifty years later, when Mattie Hinkley, a student at the Krenov School in Fort Bragg, Calif., wanted to build a ladderback, one of her teachers mentioned the Krenov kitchen chairs. Jim had died in 2009, but Britta, beloved at the school and far beyond, still lived nearby. She invited Hinkley to visit and measure the chairs. Hinkley found Britta to be “casual, sweet, and warm, just a pleasure to chat with,” and their meeting inspired her as she worked on these reproductions in white oak and Danish cord. Partway through, she got the news that Britta had died. To mark the memory of her visit and Britta’s generous spirit, she named them Britta’s Chairs.

—Jonathan Binzen