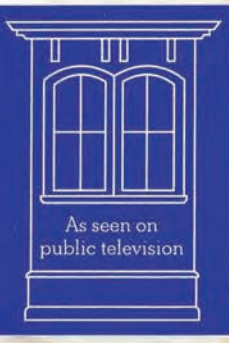
NOVEMBER/DECEMBER 1995

This Old House

UPDATE ON THE
New TV Project
Salem, Mass.

Bathrooms
Windows



Screws
Evergreens
Tools
Wallpaper
Marble

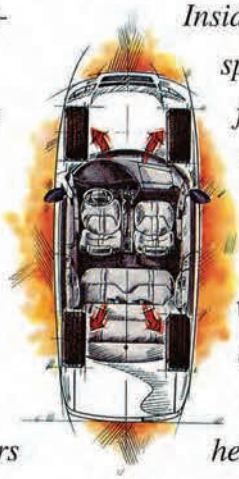
USA $3.50 CANADA $4.50

Steve Thomas and Norm Abram save the old windows at the Salem House.

The shape of a vehicle's body has everything to do with inner space, and how it moves through the outside atmosphere.

So the people who designed Dodge Stratus crumpled up the book of conventional wisdom, and came up with this extraordinary example of air management, space maximization and automotive architecture.

The lines are round, soft, wedge-like. Its wheels-to-the-corners stance helps give Stratus remarkable handling and stability. The lowered cowl provides superb visibility and aerodynamics. And the dual pedestal-mounted side mirrors channel airflow so deftly, they even manage to reroute the rain for better side window visibility.



Inside is the inherent spaciousness of cab-forward design, along with decidedly driver-oriented ergonomics. The way the doors are curved front-to-back and top-to-bottom helps provide even more shoulder and hip room and add side-impact protection.

It makes exce use of air and

*Another nice benefit: beneath the subtle rear spoiler sits the largest trunk in the class.**

*The Dodge Stratus. From one end to the other, it's a breath of fresh air. And space. For more information, call 1-800-4-A-DODGE. Or see your friendly Dodge dealer. And be sure to ask about our Customer One Care™ 3-year or 36,000-mile bumper-to-bumper warranty and 3/36 Roadside Assistance.***

ptional space.

Stratus starts at ***$14,995***† *and includes...*

- *16-valve, SOHC, sequential multi-point fuel injected engine, 5-speed manual transmission*
- *Modified double-wishbone suspension*
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- *Dual airbags*
- *Child safety rear door locks*
- *Dual remote mirrors*
- *Speed control*
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- *Intermittent wipers*
- *Dual visor vanity mirrors*
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ES shown ***$16,645***†

†*Includes destination. MSRPs exclude tax & color shown.*
**Ward's lower middle segment.*
***See limited warranty & restrictions at dealer. Excludes normal maintenance & wear items.*
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Stratus

The New Dodge
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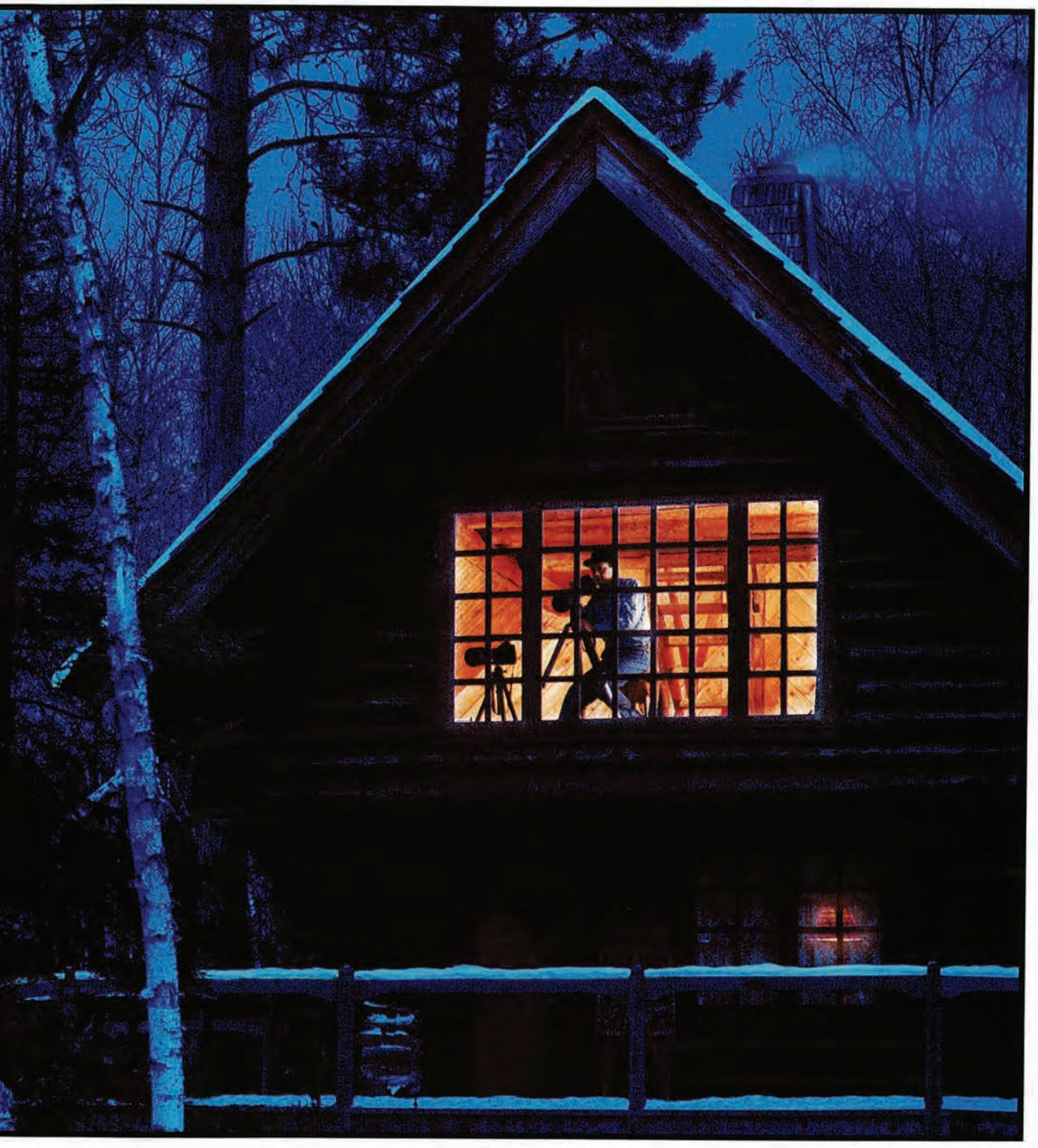

get the exact size, shape and finishing he wanted. In short, it meant he could stay true to his vision. If you, too, are unwilling to compromise the quality and style of your home, mail the coupon for a free Marvin brochure. Or call 1-800-346-5128 (1-800-263-6161 in Canada).

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1049511A

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WINDOWS & DOORS

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contributors

NOVEMBER/DECEMBER

1 DAVID BARRY (photographer, "Chimney Fix-up," "Saving Old Windows" and "What's That Siding Hiding?") has taken photos for *Vanity Fair* and *Texas Monthly*. He enjoyed working for *This Old House* because it gave him the opportunity to plague Norm and Steve with detailed questions about his personal renovation plans. **2 CHRIS SANDERS** (photographer, "How Marble Comes Out of a Mountain" and "Evergreens") works out of New York City but owns a 1915 house on three acres of land in Katonah, New York. A renovation that started out as a bathroom rebuild, centered on the old clawfoot tub, ended up as a new second floor with three bedrooms, two bathrooms and a raised roof. Inspired by our story, he's planning to use evergreens as fencing.

3 LAURA GOLDSTEIN (copy chief) is a former editor at the *Washington Post Magazine*. She has moved back to New York City—where she grew up—just as her book about the alley dwellings of Washington, D.C., is being issued by the Smithsonian Institution Press. *In the Alleys: Kids in the Shadow of the Capitol*, a history of these vanished areas, celebrates the photographs of Godfrey Frankel, whose pictures captured the residents of these post-Civil War neighborhoods just before they were demolished in the 1950s. **4 STEVE PETRANEK** (author, "Getting It Straight"), a senior editor for *Life* magazine, is restoring a 55-year-old Shingle-style Cape Cod in Chappaqua, New York. His least favorite project so far has been the painstaking rebuilding and reglazing of the house's original, custom-fit wooden storm windows. He is now eyeing with dismay the cedar-shake roof, most of which is original. He wrote "Foundations" in our first issue and "Floor Finishes" and "House Inspection" in our most recent issue.

5 DARRIN HADDAD (photographer, "Extras," "Reciprocating Saw," "Wallpaper History" and "Evergreens") spent most weekends renovating his early 1900s Colonial in southern Connecticut until the July birth of his son, Joe. Now he barely has time for painting and putting up crown molding. During the week he works as a still-life photographer in New York City.

This Old House

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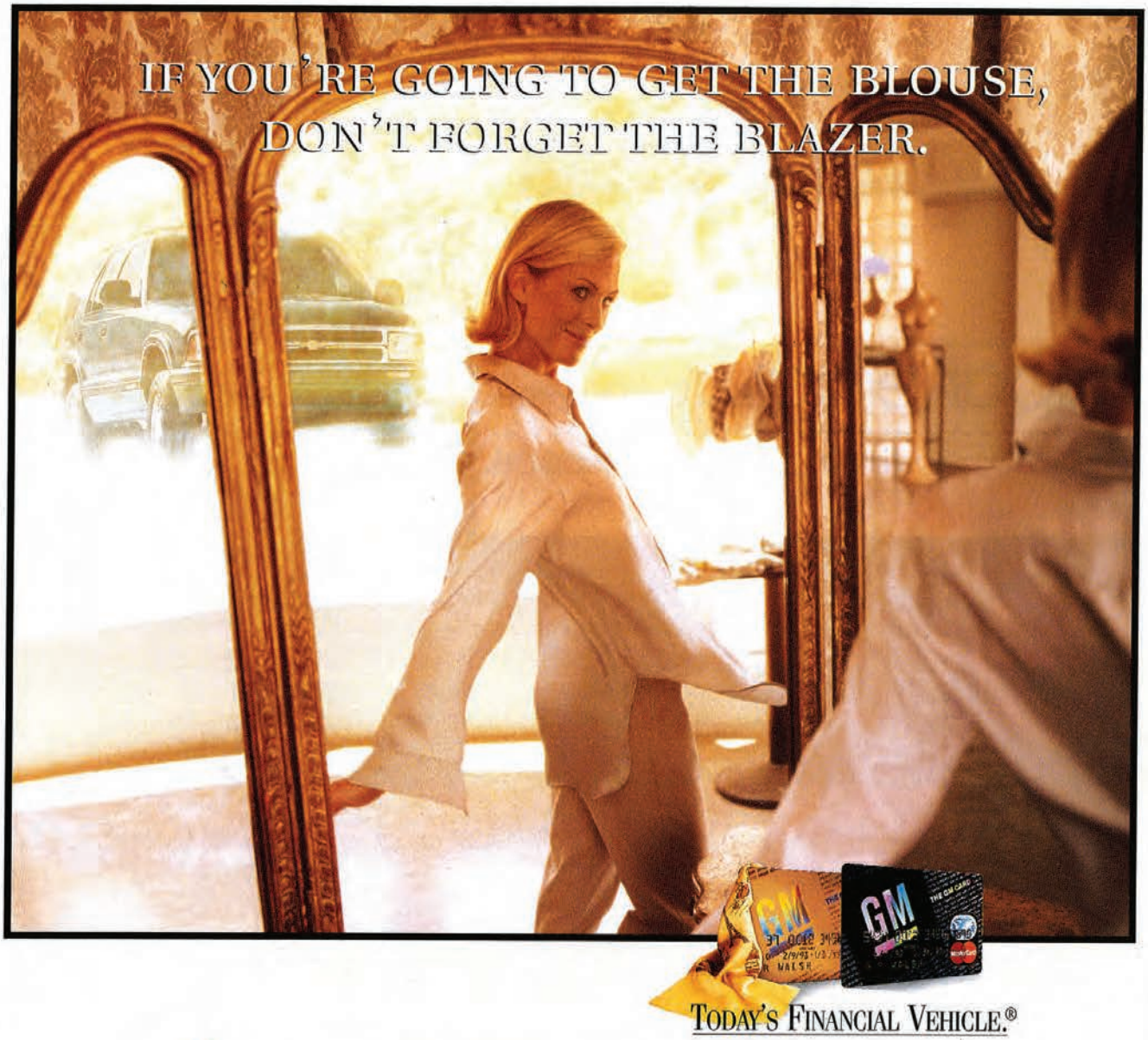
PHOTOGRAPHS, TOP TO BOTTOM, BY ANDREA GENTL, JOE FORNABAIO, JEN EVERETT (2), NANCY HADDAD



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contents

NOVEMBER/DECEMBER 1995

The tub goes here? page 64

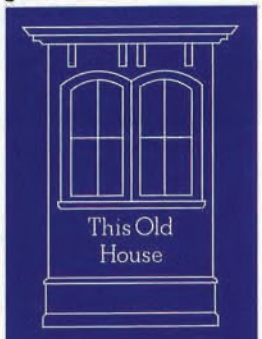
For softwood, page 86

Community work, page 82

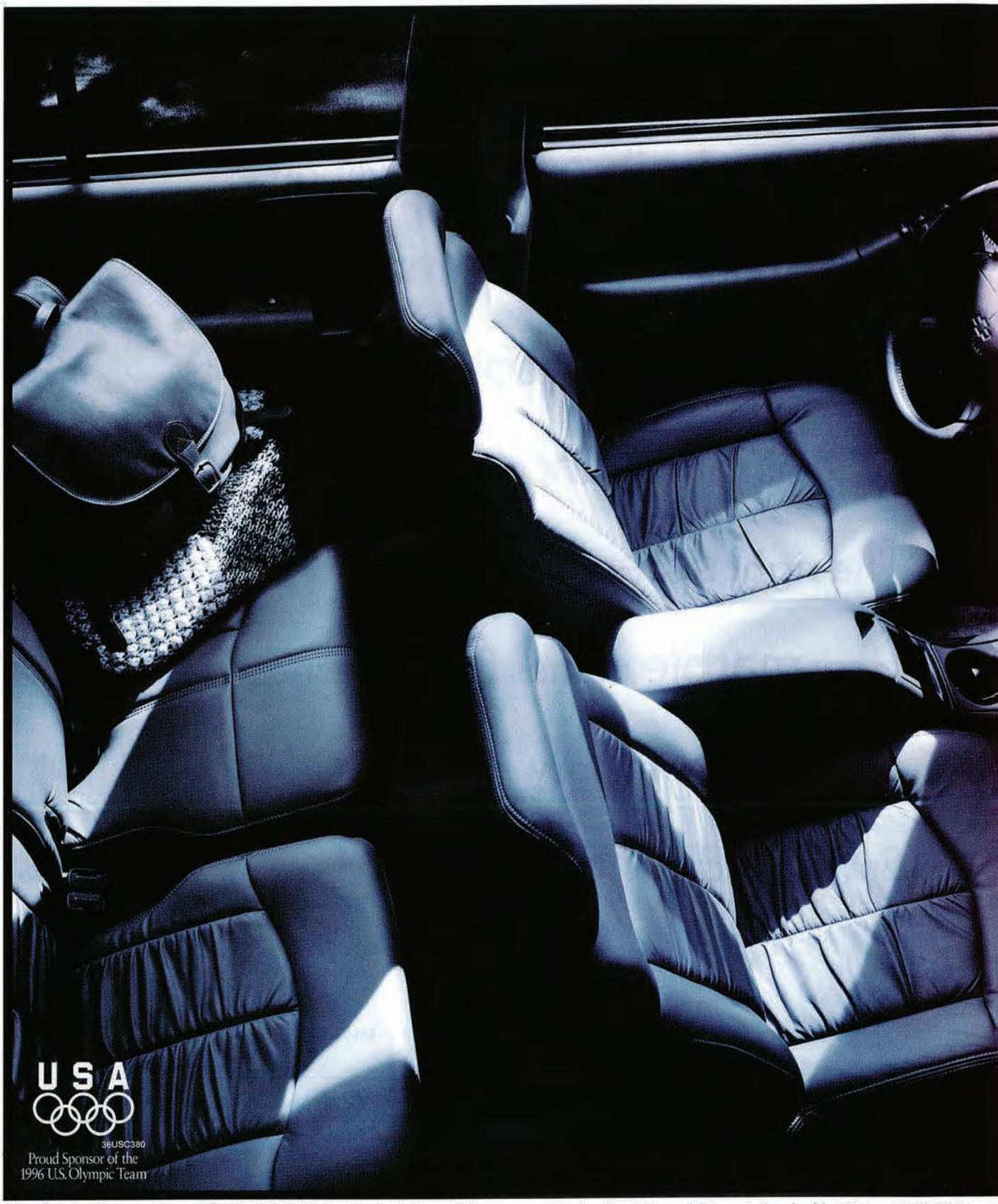
Cover photograph by Micheal McLaughlin

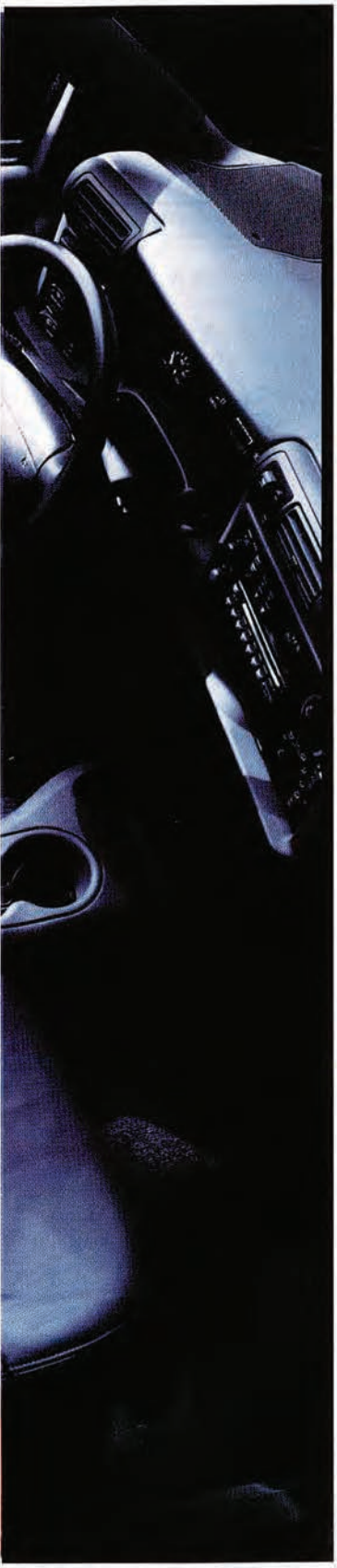
More contents, page 12

"GOOD WORKMEN NEVER QUARREL WITH THEIR TOOLS."
Lord Byron



TOP PHOTOGRAPH BY J MICHAEL MYERS; MIDDLE AND BOTTOM BY DAVID BARRY; SCREW ILLUSTRATION BY CLANCY GIBSON; THANKS TO J. CREW FOR NORM'S SHIRT (COVER)





IT'S THE *quiet* ONES YOU HAVE TO LOOK OUT FOR.

Very quiet and serene, the Chevy Blazer has more features than a movie theater. Stretch out and enjoy the view. The ride of the Blazer is smooth. With all this luxury and class, you'd almost expect Blazer to be the shy, introverted type. Nothing could be further from the truth. Its Vortec 4300 V6 Sequential-Port Fuel-Injected engine rocks the house. Chevy Blazer. Definitely the strong, silent type.

CHEVY BLAZER
LIKE A ROCK

contents

Tom Silva flashes, page 47

Cut, notch and remove, page 28

The torpedo, page 43

Miscellaneous

Rich Trethewey flushes, page 38

Construction can be dangerous. Think about your safety, and that of others, when you embark on the projects shown in this magazine.

PHOTOGRAPHS, TOP TO BOTTOM, BY DAVID BARRY, DARRIN HADDAD, KEVIN WILKES, J MICHAEL MYERS

A lot further. That's because the new single-handle *Delta* Gourmet™ has an extra-long spout that easily reaches every bowl in today's two- and three-bowl sinks. It does it beautifully, too, thanks to a gracefully curved arc and variety of popular finishes. But then, what else would you expect from *Delta*? After all, we've been designing faucets that are stylishly practical for the past 40 years. So if you want a kitchen faucet that's long on style and practicality, call 1-800-345-DELTA for an authorized Delta Studio® Showroom near you. You won't have to look any further than the *Delta Gourmet*.

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Demopolis
WIIQ-TV
Thu. 8:30 pm
Sat. 8:00 pm
Dozier
WDIQ-TV
Thu. 8:30 pm
Sat. 8:00 pm
Florence
WFIQ-TV
Thu. 8:30 pm
Sat. 8:00 pm
Huntsville
WHIQ-TV
Thu. 8:30 pm
Sat. 8:00 pm
Louisville
WGIQ-TV
Thu. 8:30 pm
Sat. 8:00 pm
Mobile
WEIQ-TV
Thu. 8:30 pm
Sat. 8:00 pm
Montgomery
WAIQ-TV
Thu. 8:30 pm
Sat. 8:00 pm
Mount Cheaha
WCIQ-TV
Thu. 8:30 pm
Sat. 8:00 pm

ALASKA
Anchorage
KAKM-TV
Mon. 6:00 pm
Sat. 9:30 am
Bethel
KYUK-TV
Sun. 1:00 pm
Fairbanks
KUAC-TV
Fri. 8:00 pm
Sat. 8:00 am
Juneau
KTOO-TV
Mon. 6:00 pm

ARIZONA
Phoenix
KAET-TV
Thu. 1:00 pm
and 7:30 pm
Sat. 5:00 pm
Tucson
KUAS-TV
Sat. 11:00 am
and 6:30 pm
KUAT-TV
Sat. 11:00 am
and 6:30 pm

ARKANSAS
Arkadelphia
KETG-TV
Sat. noon
Sun. 5:30 pm
Fayetteville
KAFT-TV
Sat. noon
Sun. 5:30 pm
Jonesboro
KTEJ-TV
Sat. noon
Sun. 5:30 pm
Little Rock
KETS-TV
Sat. noon
Sun. 5:30 pm
Mountain View
KEMV-TV
Sat. noon
Sun. 5:30 pm

CALIFORNIA
Cotati
KRCB-TV
Wed. noon
Sun. 7:30 pm
Eureka
KEET-TV
Wed. 7:30 pm
Sat. 10:30 am
Fresno
KVPT-TV
Sat. 9:30 am
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Sat. 4:30 pm
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Sat. 5:30 pm
Redding
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Sacramento
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Thu. 8:00 pm
San Diego
KPBS-TV
Tue. 7:30 pm
Sat. 10:30 pm
Sun. 7:00 pm
San Francisco
KQED-TV
Sat. 5:00 pm
San Jose
KTEH-TV
Wed. 9:00 pm
Sat. 3:00 pm
Sun. 5:30 pm
San Mateo
KCSM-TV
Tue. 7:00 pm
Sat. 9:30 am
Sun. 9:00 am

COLORADO
Boulder
KBDI-TV
Mon. 10:00 pm
Wed. 6:00 pm
Sat. 5:30 pm
Sun. 4:00 pm
Denver
KRMA-TV
Sat. 2:30 pm
Sun. 5:30 pm
Pueblo
KTSC-TV
Thu. 8:00 pm
Sat. 2:30 pm

CONNECTICUT
Fairfield
WEDW-TV
Wed. 1:30 pm
Sat. 8:00 pm
Sun. 10:30 am
Hartford
WEDH-TV
Wed. 1:30 pm
Sat. 8:00 pm
Sun. 10:30 am
New Haven
WEDY-TV
Wed. 1:30 pm
Sat. 8:00 pm
Sun. 10:30 am
Norwich
WEDN-TV
Wed. 1:30 pm
Sat. 8:00 pm
Sun. 10:30 am

DISTRICT OF COLUMBIA
WETA-TV
Sat. 5:30 pm
Sun. noon

FLORIDA
Daytona Beach
WCEU-TV
Tue. 9:00 pm
Fort Myers/Naples
WSFP-TV
Sat. 1:30 pm
Sun. 5:00 pm
Gainesville
WUFT-TV
Sat. 9:30 am
and 1:30 pm
Jacksonville
WJCT-TV
Mon. 8:30 pm
Sat. 2:30 pm
Miami
WLRN-TV
Thu. 7:30 pm
WPBT-TV
Sat. 2:00 pm
Orlando
WMFE-TV
Sat. 9:00 am
and 1:30 pm
Sun. 9:00 am
Pensacola
WSRE-TV
Sat. 12:30 pm
Tampa
WEDU-TV
Sat. 11:30 am
Sun. 7:30 pm
WUSF-TV
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Sun. 8:00 pm
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Waycross
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Sun. 8:00 pm
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Sat. 4:00 pm
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KMEB-TV
Thu. 7:30 pm
Sat. 4:00 pm

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KAID-TV
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Coeur d'Alene
KCDT-TV
Sun. 3:30 pm
Moscow
KUID-TV
Sun. 3:30 pm
Pocatello
KISU-TV
Sun. 4:30 pm
Twin Falls
KIPT-TV
Sun. 4:30 pm

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Sat. 5:00 pm
Jacksonville
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Thu. 10:00 pm
Sun. 1:30 pm
Macomb
WMEC-TV
Thu. 10:00 pm
Sun. 1:30 pm

STEVE THOMAS

November 11, at WVIA-TV in Pittston, PA
1 pm: "Behind the Scenes at *This Old House*"
7 pm: "Renovating the *This Old House* Way"

DAVID BARRY

76.25 years

10 years

Average Life Spans

Help increase the one on the left by replacing the one on the right.

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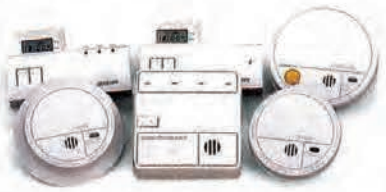

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Thu. 7:00 pm
Sat. 12:30 pm
Peoria
WTVP-TV
Thu. 10:00 pm
Sat. 12:30 pm
Quincy
WQEC-TV
Thu. 10:00 pm
Sun. 1:30 pm

Vincennes
WVUT-TV
Sat. 1:30 pm
Sun. 12:30 pm

IOWA

Davenport
KQCT-TV
Tue. 7:00 pm
Sat. 5:30 pm
Des Moines
KDIN-TV
Fri. 6:30 pm
Sat. 1:30 pm

Lakin
KSWK-TV
Thu. 7:00 pm
Sat. 12:30 pm
Topeka
KTWU-TV
Sat. 9:30 am
Wichita
KPTS-TV
Sat. 11:30 am
Sun. 11:00 am

KENTUCKY

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Sun. 5:00 pm

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Sun. 3:30 pm

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and 6:00 pm
Sun. 4:30 pm
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Sat. 10:00 am
Indianapolis
WFYI-TV
Sat. 10:00 am
Sun. 7:00 pm
Merrillville
WYIN-TV
Wed. 9:00 pm
Sun. 3:30 pm
Muncie
WIPB-TV
Thu. 8:00 pm
Sun. 4:30 pm
South Bend
WNIT-TV
Fri. 10:30 am
Sat. 2:00 pm

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Sat. 12:30 pm

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WKYU-TV
Tue. 1:00 pm
and 6:30 pm
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Sun. 5:00 pm
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Sun. 5:00 pm
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WKPC-TV
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Sat. 1:30 pm
Sun. 3:00 pm
Madisonville
WKMA-TV
Sun. 5:00 pm
Morehead
WKMR-TV
Sun. 5:00 pm

Murray
WKMU-TV
Sun. 5:00 pm
Owensboro
WKOH-TV
Sun. 4:00 pm
Owenton
WKON-TV
Sun. 5:00 pm
Paducah
WKPD-TV
Sun. 5:00 pm
Pikeville
WKPI-TV
Sun. 5:00 pm
Somerset
WKSO-TV
Sun. 5:00 pm

LOUISIANA

Alexandria
KLPA-TV
Sat. 4:00 pm
Sun. 10:00 am
Baton Rouge
WLPB-TV
Sat. 4:00 pm
Sun. 10:00 am
Lafayette
KLPB-TV
Sat. 4:00 pm
Sun. 10:00 am
Lake Charles
KLTL-TV
Sat. 4:00 pm
Sun. 10:00 am
Monroe
KLTM-TV
Sat. 4:00 pm
Sun. 10:00 am
New Orleans
WYES-TV
Sat. 8:30 am
Shreveport
KLTS-TV
Sat. 4:00 pm
Sun. 10:00 am

MAINE

Bangor
WMEB-TV
Sat. 1:30 pm
Calais
WMED-TV
Sat. 1:30 pm
Lewiston
WCBB-TV
Sat. 1:30 pm
Portland
WMEA-TV
Wed. 7:00 pm
Presque Isle
WMEM-TV
Sat. 1:30 pm

MARYLAND

Annapolis
WMPT-TV
Sat. 4:30 pm
Sun. 6:30 pm
Baltimore
WMPB-TV
Sat. 4:30 pm
Sun. 6:30 pm

Frederick
WFPT-TV
Sat. 4:30 pm
Sun. 6:30 pm
Hagerstown
WWPB-TV
Sat. 4:30 pm
Sun. 6:30 pm
Oakland
WGPT-TV
Sat. 4:30 pm
Sun. 6:30 pm
Salisbury
WCPB-TV
Sat 4:30 pm
Sun. 6:30 pm

MASSACHUSETTS

Boston
WGBH-TV
Thu. 8:00 pm
Sat. 5:30 pm
WGBX-TV
Sun. 9:00 am
and 12:30 pm
Springfield
WGBY-TV
Thu. 8:00 pm
Sat. 5:30 pm

MICHIGAN

Alpena
WCML-TV
Sat. 2:30 pm
Bad Axe
WUCX-TV
Tue. 12:30 pm
Sun. 5:00 pm
Cadillac
WCMV-TV
Sat. 2:30 pm
Detroit
WTVS-TV
Thu. 1:30 am
and 8:30 pm
Sat. 10:00 am
East Lansing
WKAR-TV
Thu. 9:00 pm
Sat. 1:30 pm
Sun. 5:00 pm
Flint
WFUM-TV
Thu. 9:00 pm
Sat. 1:30 pm
Grand Rapids
WGVU-TV
Thu. 8:30 pm
Sat. 10:00 am
Kalamazoo
WGVK-TV
Thu. 8:30 pm
Sat. 10:00 am

Manistee
WCMW-TV
Sat. 2:30 pm
Marquette
WNMU-TV
Sat. 1:30 pm
Mount Pleasant
WCMU-TV
Sat. 2:30 pm
University Center
WUCM-TV
Tue. 12:30 pm
Sun. 5:00 pm

MINNESOTA

Appleton
KWCM-TV
Thu. 8:00 pm
Sat. 12:30 pm
Austin
KSMQ-TV
Sat. 12:30 pm
Sun. 7:00 pm
Bemidji
KAWE-TV
Sat. 12:30 pm
Brainerd
KAWB-TV
Sat. 12:30 pm
Duluth
WDSE-TV
Sat. 6:30 pm
Sun. 9:30 am
Saint Paul/
Minneapolis
KTCA-TV
Wed. 7:30 pm
Sat. 6:30 pm

MISSISSIPPI

Biloxi
WMAH-TV
Sat. 7:00 pm
Booneville
WMAE-TV
Sat. 7:00 pm
Bude
WMAU-TV
Sat. 7:00 pm
Greenwood
WMAO-TV
Sat. 7:00 pm
Jackson
WMPN-TV
Sat. 7:00 pm
Meridian
WMAW-TV
Sat. 7:00 pm
Mississippi State
WMAB-TV
Sat. 7:00 pm
Oxford
WMAV-TV
Sat. 7:00 pm

NORM ABRAM

November 11-12, in Fort Washington, PA
Woodworking in America Show
at Fort Washington Expo Center

DAVID BARRY

television listings

where and when to see This Old House

MISSOURI
Joplin
KOZJ-TV
Sat. 12:30 pm
Kansas City
KCPT-TV
Mon. 7:00 pm
Sat. 12:30 pm
Saint Louis
KETC-TV
Wed. 12:30 pm
Sat. 6:30 pm
Sedalia
KMOS-TV
Sat. 12:30 pm
Springfield
KOZK-TV
Sat. 12:30 pm

MONTANA
Bozeman
KUSM-TV
Sat. 11:30 am

NEBRASKA
Alliance
KTNE-TV
Sat. 9:30 am
and 4:30 pm
Bassett
KMNE-TV
Sat. 10:30 am
and 5:30 pm
Hastings
KHNE-TV
Sat. 10:30 pm
and 5:30 pm
Lexington
KLNE-TV
Sat. 10:30 am
and 5:30 pm
Lincoln
KUON-TV
Sat. 10:30 am
and 5:30 pm
Merriman
KRNE-TV
Sat. 10:30 am
and 5:30 pm
Norfolk
KXNE-TV
Sat. 10:30 am
and 5:30 pm
North Platte
KPNE-TV
Sat. 10:30 am
and 5:30 pm
Omaha
KYNE-TV
Sat. 10:30 am
and 5:30 pm

NEVADA
Las Vegas
KLVX-TV
Sat. 2:30 pm
Reno
KNPB-TV
Sat. 10:30 am
and 1:00 pm

NEW HAMPSHIRE
Durham
WENH-TV
Thu. 7:30 pm
Sun. 11:00 am
Keene
WEKW-TV
Thu. 7:30 pm
Sun. 11:00 am
Littleton
WLED-TV
Thu. 7:30 pm
Sun. 11:00 am

NEW JERSEY
Camden
WNJS-TV
Tue. 10:00 pm
Sat. 8:00 pm
Sun. 5:30 pm
Montclair
WNJN-TV
Tue. 10:00 pm
Sat. 8:00 pm
Sun. 5:30 pm
New Brunswick
WNJB-TV
Tue. 10:00 pm
Sat. 8:00 pm
Sun. 5:30 pm
Trenton
WNJT-TV
Tue. 10:00 pm
Sat. 8:00 pm
Sun. 5:30 pm

NEW MEXICO
Albuquerque
KNME-TV
Thu. 7:30 pm
Sun. 10:30 am
Las Cruces
KRWG-TV
Sat. 11:30 pm
Portales
KENW-TV
Sat. 3:30 pm

NEW YORK
Binghamton
WSKG-TV
Sat. 1:30 pm
Buffalo
WNED-TV
Sat. 10:30 am
WNEQ-TV
Sun. 7:00 pm
Long Island
WLIW-TV
Thu. 8:30 pm
Sat. 10:30 am
Sun. 8:00 pm
New York
WNET-TV
Sat. 6:30 pm
Norwood
WNPI-TV
Sat. 10:30 am
Plattsburgh
WCFE-TV
Sun. 11:30 am
Rochester
WXXI-TV
Sat. 10:30 am
Sun. 5:30 pm
Schenectady
WMHT-TV
Tue. 1:30 pm
Sat. 10:30 am
Syracuse
WCNY-TV
Thu. 8:00 pm
Sat. 10:30 am
Watertown
WNPE-TV
Sat. 10:30 am

NORTH CAROLINA
Asheville
WUNF-TV
Sat. 5:30 pm
Sun. 9:00 am
Chapel Hill
WUNC-TV
Sat. 5:30 pm
Sun. 9:00 am
Charlotte
WTVI-TV
Tue. 12:30 pm
Thu. 8:00 pm
Sat. 5:00 pm
Sun. 11:00 am
WUNG-TV
Sat. 5:30 pm
Sun. 9:00 am
Columbia
WUND-TV
Sat. 5:30 pm
Sun. 9:00 am
Greenville
WUNK-TV
Sat. 5:30 pm
Sun. 9:00 am
Jacksonville
WUNM-TV
Sat. 5:30 pm
Sun. 9:00 am
Linville
WUNE-TV
Sat. 5:30 pm
Sun. 9:00 am
Roanoke Rapids
WUNP-TV
Sat. 5:30 pm
Sun. 9:00 am
Wilmington
WUNJ-TV
Sat. 5:30 pm
Sun. 9:00 am
Winston-Salem
WUNL-TV
Sat. 5:30 pm
Sun. 9:00 am

NORTH DAKOTA
Bismarck
KBME-TV
Mon. 10:00 pm
Tue. 10:00 pm
Wed. 10:00 pm
Thu. 7:00 pm
and 10:00 pm
Sat. 6:00 pm
Dickinson
KDSE-TV
Mon. 10:00 pm
Tue. 10:00 pm
Wed. 10:00 pm
Thu. 7:00 pm
and 10:00 pm
Sat. 6:00 pm
Ellendale
KJRE-TV
Mon. 10:00 pm
Tue. 10:00 pm
Wed. 10:00 pm
Thu. 7:00 pm
and 10:00 pm
Sat. 6:00 pm
Fargo
KFME-TV
Mon. 10:00 pm
Tue. 10:00 pm
Wed. 10:00 pm
Thu. 7:00 pm
and 10:00 pm
Sat. 6:00 pm
Grand Forks
KGFE-TV
Mon. 10:00 pm
Tue. 10:00 pm
Wed. 10:00 pm
Thu. 7:00 pm
and 10:00 pm
Sat. 6:00 pm
Minot
KSRE-TV
Mon. 10:00 pm
Tue. 10:00 pm
Wed. 10:00 pm
Thu. 7:00 pm
and 10:00 pm
Sat. 6:00 pm
Williston
KWSE-TV
Mon. 10:00 pm
Tue. 10:00 pm
Wed. 10:00 pm
Thu. 7:00 pm
and 10:00 pm
Sat. 6:00 pm

OHIO
Akron
WEAO-TV
Sat. 10:30 am
and 5:00 pm
Sun. 6:00 pm
Athens
WOUB-TV
Sat. 5:00 pm
Bowling Green
WBGU-TV
Mon. 3:00 pm
Sat. 1:30 pm
Cambridge
WOUC-TV
Sat. 5:00 pm
Cincinnati
WCET-TV
Thu. 8:00 pm
Sat. 9:00 am
Cleveland
WVIZ-TV
Tue. 7:30 pm
Sat. 1:00 pm
Sun. 12:30 pm
Columbus
WOSU-TV
Thu. 8:00 pm
Sat. 4:30 pm
Dayton
WPTD-TV
Thu. 8:00 pm
Sat. 9:30 am
Sun. noon
Portsmouth
WPBO-TV
Thu. 8:00 pm
Sat. 4:30 pm
Toledo
WGTE-TV
Thu. 8:00 pm
Sat. 1:00 pm
Sun. 1:00 pm
Youngstown
WNEO-TV
Sat. 10:30 am
and 5:00 pm
Sun. 6:00 pm

OKLAHOMA
Cheyenne
KWET-TV
Sat. 9:30 am
and 12:30 pm
Sun. 3:00 pm
Eufaula
KOET-TV
Sat. 9:30 am
and 12:30 pm
Sun. 3:00 pm
Oklahoma City
KETA-TV
Sat. 9:30 am
and 12:30 pm
Sun. 3:00 pm
Tulsa
KOED-TV
Sat. 9:30 am
and 12:30 pm
Sun. 3:00 pm

OREGON
Bend
KOAB-TV
Thu. 8:00 pm
Sat. 5:00 pm

J MICHAEL MYERS

television listings

where and when to see This Old House

Corvallis
KOAC-TV
Thu. 8:00 pm
Sat. 5:00 pm
Eugene
KEPB-TV
Thu. 8:00 pm
Sat. 5:00 pm
Klamath Falls
KFTS-TV
Sat. 10:30 pm
La Grande
KTVR-TV
Thu. 8:00 pm
Sat. 5:00 pm
Medford
KSYS-TV
Sat. 10:30 pm
Portland
KOPB-TV
Thu. 8:00 pm
Sat. 5:00 pm

PENNSYLVANIA

Allentown
WLVT-TV
Fri. 7:30 pm
Sat. 6:00 pm
Erie
WQLN-TV
Sat. 6:30 pm
Harrisburg
WITF-TV
Thu. 8:00 pm
Sat. 6:00 pm
Philadelphia
WHYY-TV
Sat. 6:00 pm
Sun. 8:00 pm
Pittsburgh
WQED-TV
Sat. 4:30 pm
and 6:30 pm
WQEX-TV
Wed. 8:30 pm
Pittston
WVIA-TV
Thu. 8:00 pm
Sat. 5:00 pm
and 5:30 pm
University Park
WPSX-TV
Sat. 5:00 pm
Sun. 4:30 pm

RHODE ISLAND

Providence
WSBE-TV
Tue. 8:30 pm
Sun. 6:00 pm

SOUTH CAROLINA

Allendale
WEBA-TV
Sat. 1:30 pm
Beaufort
WJWJ-TV
Sat. 1:30 pm
Charleston
WITV-TV
Sat. 1:30 pm
Columbia
WRLK-TV
Sat. 1:30 pm
Conway
WHMC-TV
Sat. 1:30 pm
Florence
WJPM-TV
Sat. 1:30 pm
Greenville
WNTV-TV
Sat. 1:30 pm
Greenwood
WNEH-TV
Sat. 1:30 pm

Rock Hill
WNSC-TV
Sat. 1:30 pm
Spartanburg
WRET-TV
Sat. 1:30 pm
Sumter
WRJA-TV
Sat. 1:30 pm

SOUTH DAKOTA

Aberdeen
KDSD-TV
Sat. 4:30 pm
Brookings
KESD-TV
Sat. 4:30 pm
Eagle Butte
KPSD-TV
Sat. 3:30 pm
Lowry
KQSD-TV
Sat. 4:30 pm
Martin
KZSD-TV
Sat. 3:30 pm
Pierre
KTSD-TV
Sat. 4:30 pm
Rapid City
KBHE-TV
Sat. 3:30 pm
Sioux Falls
KCSD-TV
Sat. 4:30 pm
Vermillion
KUSD-TV
Sat. 4:30 pm

TENNESSEE

Chattanooga
WTCI-TV
Sat. 1:30 pm
Cookeville
WCTE-TV
Sat. 12:30 pm
Knoxville
WKOP-TV
Sat. 1:30 pm
WSJK-TV
Sat. 1:30 pm
Lexington
WLJT-TV
Thu. 9:30 pm
Sat. 12:30 pm
Memphis
WKNO-TV
Thu. 7:30 pm
Sat. 9:30 am
Nashville
WDCN-TV
Sat. 4:30 pm

TEXAS

Amarillo
KACV-TV
Sat. 12:30 pm
Austin
KLRU-TV
Sat. 5:30 pm
College Station
KAMU-TV
Mon. 5:00 pm
Sat. 12:30 pm
Corpus Christi
KEDT-TV
Sat. 12:30 pm
and 9:00 pm

Dallas/Fort Worth
KERA-TV
Sat. 6:30 pm
El Paso
KCOS-TV
Sat. 4:00 pm
Harlingen
KMBH-TV
Sat. 12:30 pm
Houston
KUHT-TV
Mon. 1:30 pm
Sun. 11:30 am
Killeen
KNCT-TV
Sat. 12:30 pm
Lubbock
KTXT-TV
Sat. 12:30 pm
Odessa
KOCV-TV
Tue. noon
Sun. 12:30 pm
San Antonio
KLRN-TV
Sat. 5:30 pm
Waco
KCTF-TV
Mon. 12:30 pm
Sat. 12:30 pm

UTAH

Provo
KBYU-TV
Sat. 9:30 am
and noon
Salt Lake City
KUED-TV
Sat. 8:00 am
and 5:00 pm

VERMONT

Burlington
WETK-TV
Thu. 8:00 pm
Sat. 11:00 am
Rutland
WVER-TV
Thu. 8:00 pm
Sat. 11:00 am
Saint Johnsbury
WVTB-TV
Thu. 8:00 pm
Sat. 11:00 am
Windsor
WVTA-TV
Thu. 8:00 pm
Sat. 11:00 am

VIRGINIA

Charlottesville
WHTJ-TV
Sat. 8:30 am
Harrisonburg
WVPT-TV
Sat. 1:30 pm
Marion
WMSY-TV
Sat. 1:30 pm
Norfolk
WHRO-TV
Thu. 8:00 pm
Sat. 8:30 am
and 2:00 pm
Norton
WSBN-TV
Sat. 1:30 pm
Richmond
WCVE-TV
Sat. 8:30 am
WCVW-TV
Fri. 8:30 pm
Roanoke
WBRA-TV
Sat. 1:30 pm

WASHINGTON

Centralia
KCKA-TV
Thu. 6:30 pm
Sat. 12:30 pm
Pullman
KWSU-TV
Wed. 7:30 am
Sat. 2:00 pm
Richland
KTNW-TV
Thu. 7:00 pm
Sat. 2:00 pm
Seattle
KCTS-TV
Sun. 5:00 pm
Spokane
KSPS-TV
Sat. 10:30 am
Sun. 5:30 pm
Tacoma
KBTC-TV
Thu. 6:30 pm
Sat. 12:30 pm
Yakima
KYVE-TV
Sun. 5:00 pm

WEST VIRGINIA

Beckley
WSWP-TV
Sat. 1:30 pm
Huntington
WPBY-TV
Sat. 1:30 pm
Morgantown
WNPB-TV
Sat. 7:00 pm

WISCONSIN

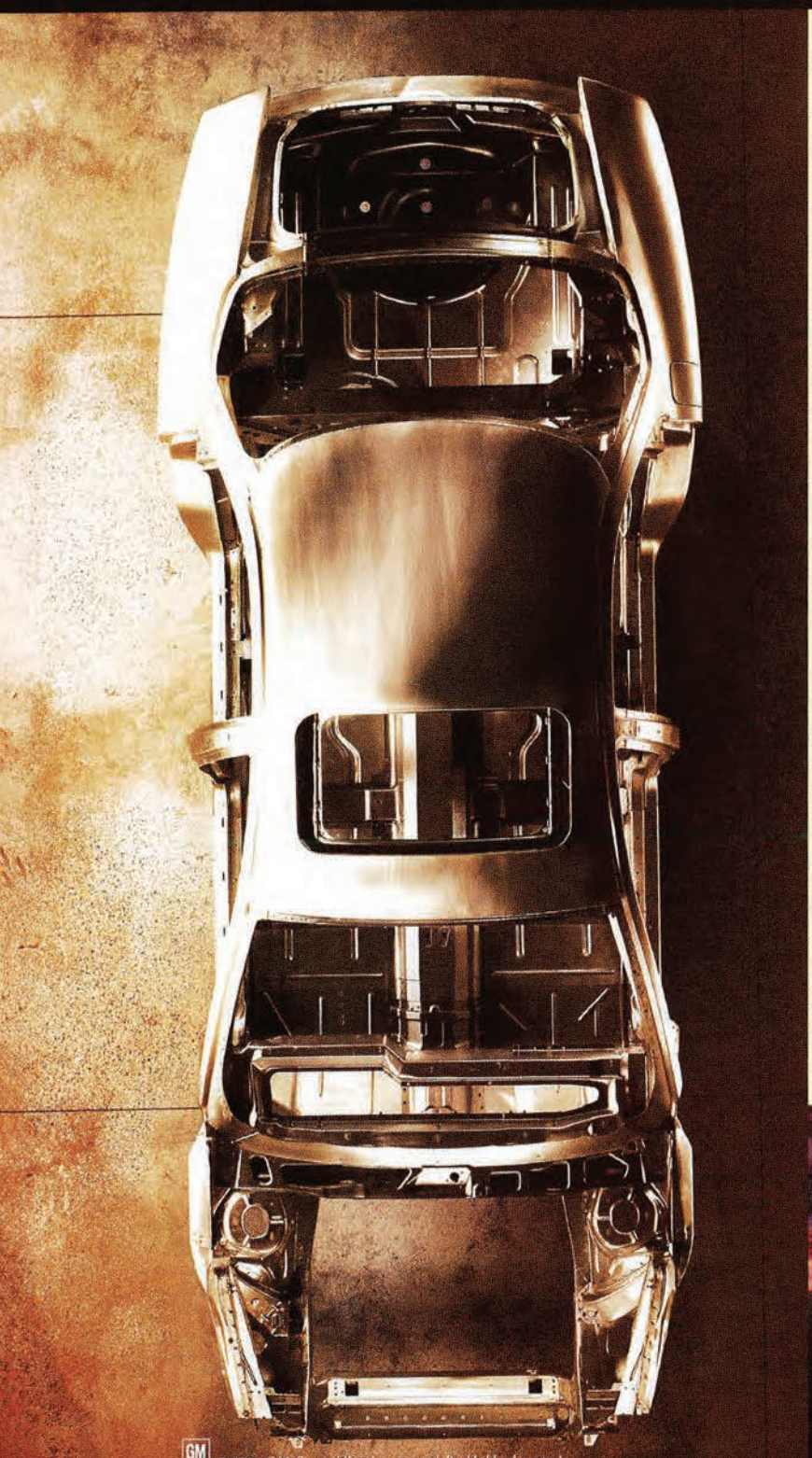
Green Bay
WPNE-TV
Wed. 7:00 pm
Sun. 4:00 pm
La Crosse
WHLA-TV
Wed. 7:00 pm
Sun. 4:00 pm
Madison
WHA-TV
Wed. 7:00 pm
Sun. 4:00 pm
Menomonie
WHWC-TV
Wed. 7:00 pm
Sun. 4:00 pm
Milwaukee
WMVS-TV
Thu. 7:30 pm
Sat. 8:00 am
Park Falls
WLEF-TV
Wed. 7:00 pm
Sun. 4:00 pm
Wausau
WHRM-TV
Wed. 7:00 pm
Sun. 4:00 pm

WYOMING

Riverton
KCWC-TV
Sat. noon
and 5:00 pm

J. MICHAEL MYERS

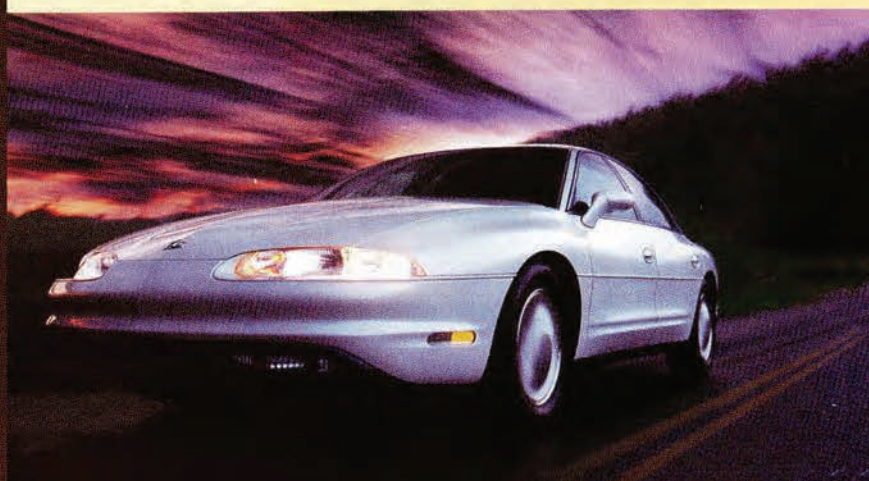
AURORA'S BODY STRUCTURE IS AS STIFF AS THE WORLD CLASS LUXURY IMPORTS. FORTUNATELY, ITS PRICE ISN'T.



When designing the body structure for the Aurora,™ our goal was to create one as rigid as any of the top luxury performance sedans. After all, structural integrity influences everything from ride quality and handling precision to occupant protection and the elimination of squeaks and rattles. It's what gives a driver the ethereal feeling of "I'm-in-charge-I-feel-secure" when motoring down the road. Well, to that end, we more than succeeded. Of course you can still spend tens of thousands more for an import with similar qualities. But the way we see it, that's a hard price to pay. For more information, call 1-800-718-7778. Demand better.

AURORA

Aurora by Oldsmobile.



In the
January February
issue of *This Old House*,
on sale December 26

Trash sheds

Paint stripping

Driveways

Clapboard

Reproduction carpet

Kitchen cabinets

High-tech glass

Hammers

Telephone wiring

Random-orbit sanders

Stove refitting

Home appraisals

and

a preview of

the Spring 1996

television project

For **subscription** information,
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LETTERS

from our readers

Norm Abram has the title **master carpenter**. Can you tell me how this title is earned?

Jana Wolfe
West Des Moines, Virginia

According to our dictionary, the title "master" is given to an artist of great and exemplary skill, or to a worker qualified to teach apprentices. At *This Old House*, the title is bestowed by our executive producer, Russ Morash, who says that Norm meets both definitions.

A while ago, TOH put in a new foundation on an old house. The foundation was factory made and bolted together. Can you tell me the name of the company that made it?
Fred Saavedra
via e-mail

The preformed foundation used at the Acton colonial project came from Superior Walls of America, 800-452-9255.

I love *This Old House* and never miss it. Would you please send me a house plan of the Shingle-style house in Belmont—Dean and Laura Gallant's house?
Mrs. Jeanne Gray
Titusville, Florida

Unfortunately, no plans of the Belmont house exist. We suggest that readers look through reprints of historic house-plan books, many of which are put out by these publishing houses: Dover Publications, 516-294-7000, and Preservation Press/John Wiley, 800-225-5945.

You remodel only two palace-style homes per year. Why don't you squeeze in maybe one condo or tiny house as well?
K.J. Byrd
Mesquite, Texas

If you look at all the shows, *This Old House* has done small homes and two apartments as well. But it is true that most of the houses are big. Here's why: The only way we can do this show for nonprofit television is to stick to two houses a year, doing 18 shows in one close to home and 8 in the other. For 26 good shows in just two locations, we need lots of projects—easiest to find in a larger house. (It's also easier to fit Norm, Steve, the TV crew and the construction crew in a big room than a small one.) However, we think the materials, techniques and tools we show are just as applicable to small homes as to mansions.

Your recent article on wood floor finishes indicates that factory-applied polyurethane does not wear well. What would your advice be to the homeowner who has scratched floors with such a finish?
Stephanie Tsacoumis
via e-mail

Jeff Hosking, our floor expert, advises you to call the flooring manufacturer and find out what finish was applied. If it is indeed polyurethane, you should sand down to bare wood, restain (if necessary) and recoat with three coats of polyurethane—at least.

punch list

definition: a list of items incorrectly done or remaining to be fixed on a construction job

- The two photographs of paint being stripped off siding (Sept/Oct, p. 29) were taken by William Vazquez, not J Michael Myers.
- An air-supplying respirator (Sept/Oct, p. 44) is connected not to an oxygen tank but to a tank of compressed air. Compressed oxygen must never be used in a tank designed for compressed air; minute amounts of oil or other matter in the components could cause an explosion. (Our thanks to alert reader Glen Neuschwender of East Moriches, New York.)
- The key to the "Pigment Trade Routes" map (Sept/Oct, p. 101) should have located the Atlas Mountains in North Africa, not North America. (Also, to clear up any confusion, Trieste was a part of Serbo-Croatia in the late 18th and early 19th centuries—the period discussed in the article—although it is located in modern-day Italy.)
- The fanlight on the 1783 David Dickinson house in Deerfield, Massachusetts (Sept/Oct, p. 102), is black-painted wood, not glass.

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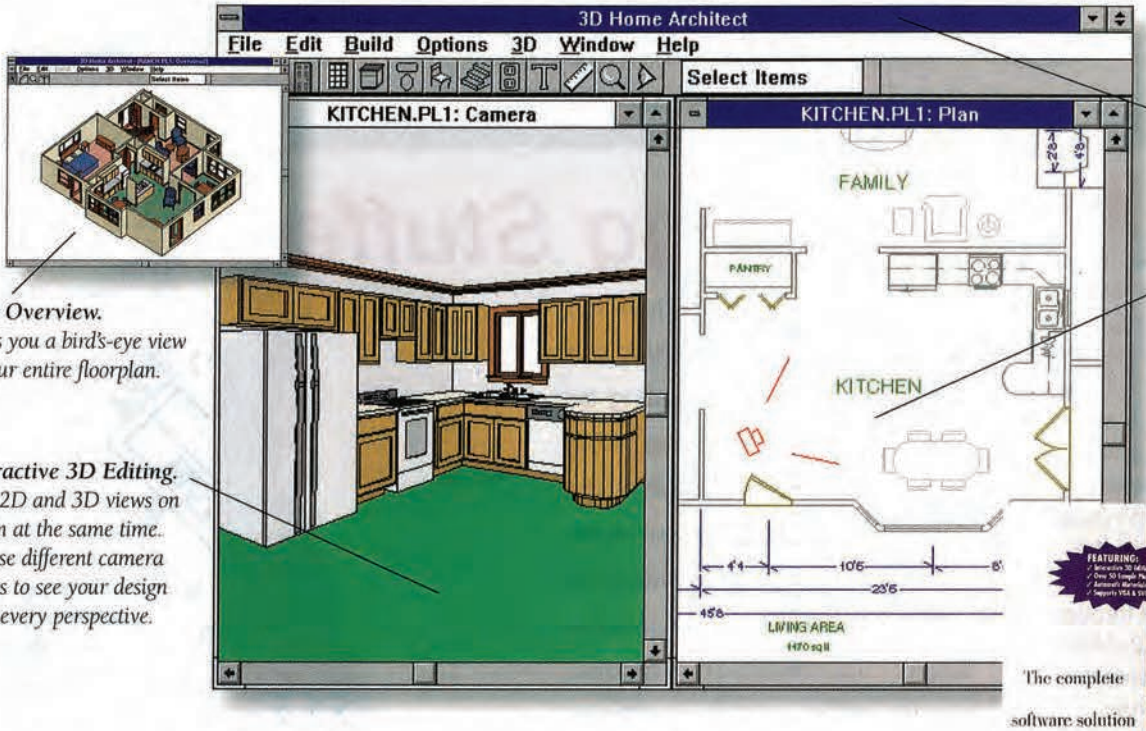

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3D Home Architect will automatically prepare a spreadsheet of all the materials you'll need. Just input their cost and you can easily calculate expenses.

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extras

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This Old House
20 West 43rd Street
New York, NY 10036

or e-mail:
letters @ toh.timeinc.com

dates to remember

■ **"PRESERVING THE SPIRIT** of the West" is the theme of a restoration trade show and conference for homeowners and professionals from December 10 to 12 at the San Francisco Hilton and Towers. Call 508-664-8066.

■ **"WORLD WAR II AND THE AMERICAN DREAM:** How Wartime Building Changed a Nation" at the National Building Museum in Washington, D.C., runs through December. Call 202-272-2448.

■ **THE NATIONAL ASSOCIATION OF HOME BUILDERS'** fifth annual Remodelers' Show is scheduled for November 3 to 5 in Atlanta at the Georgia World Congress Center. Call 800 368-5242x216.

■ **TINSMITHING AND MARQUETRY** are among the courses offered this winter at the John C. Campbell Folk School in Brasstown, North Carolina. Call 800-FOLK-SCH.

This Old **Web site**

Want to know which of Richard Trethewey's relatives was on the first season of *This Old House*? Or how to find the companies that make 45 categories of doors and windows? Visit *This Old House* on the World Wide Web: **http://www.pathfinder.com/TOH** You'll find selected articles from every issue, a page for each of the guys, updates on the current project house and links to other web sites with useful or interesting information. Soon to come: live chat with Norm and Steve.

Photographs by Darrin Haddad

Stocking Stuffers

Swiss Army knives are just the beginning. Here at *This Old House,* we have been testing far meaner-looking stainless steel pocket tools. Show host Steve Thomas favors the Gerber Multi-Plier, a tough, nylon-holstered plier/wire cutter with miniature tools (screwdriver blades, knives, files) and convenience items (can and bottle openers) folded into its handles. "It's tough and versatile," says Steve. "I use it a lot when I'm sailing." Master carpenter Norm Abram generally disapproves of multipurpose tools: "In the shop," he says sternly, "the right tool is always at hand." But he likes the S.O.G. Power Plier for its sturdiness and compound-leverage pliers: "When I helped assemble a neighbor's bird feeder, it made me look good." Heating and plumbing contractor Richard Trethewey tried Leatherman's Super Tool, whose accessories lock in position, but found its handles uncomfortable and urged caution in unfolding the knife blades: "They're really sharp. I cut myself right away." (Richard's caveat applies to all makes.)

S.O.G.
$75
8.5 oz

"**Tools** are half the battle."

Richard Trethewey

Leatherman
$70
8.5 oz

Gerber
$72
7.25 oz

Lead: No-win dept.

After five or so years of news stories about the hazards of lead paint, we have dutifully tested our windowsills and stripped according to the guidelines. Here's a new wrinkle: The EPA, HUD and the Consumer Products Safety Commission have completed studies showing that home test kits are unreliable, giving both false positives and false negatives. What's more, the National Lead Abatement Council (NLAC) and the National Institute of Safety and Health have just ruled that sodium-sulfide-based chemical spot tests (the most popular home kits) should not be used by consumers. Sodium sulfide is a spontaneously combustible poison that leaves a residue defined as hazardous waste. What to do? The EPA/HUD study says send your sample to a lab "equipped with X-ray fluorescence instruments with K-shell capability" for reliable results. Call 800-424-LEAD for more information.

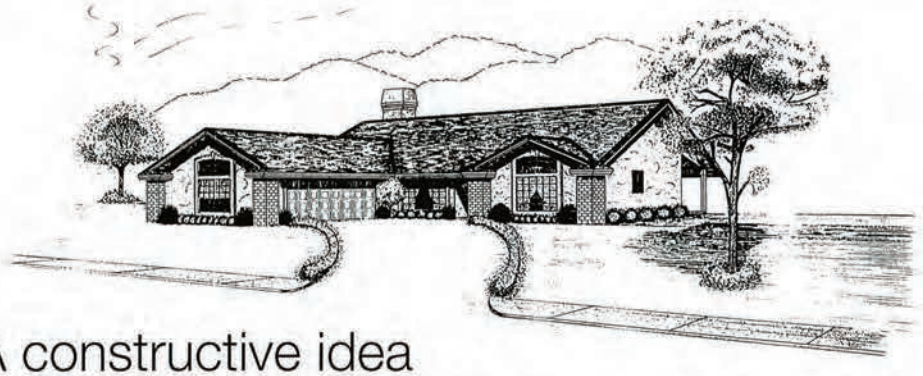
This Old House **Saved**

The $1,000 Queen Anne house in Grand Rapids, Michigan, featured as our first issue's "Save This Old House," has been rescued. Tim Fuller, a contractor from Lansing, purchased the property in August after reading about it in the magazine. Over the next few years, he plans to restore the porch and turn the house into a duplex. Fuller was one of dozens of people interested in saving the house. Barbara Roelofs of the Heritage Hill Foundation in Grand Rapids says calls came from all points, including Seattle, Hawaii, Canada and Puerto Rico.

Cancer warning labels on lumber?

You won't find them stapled to each 2x4, but labels warning that sawdust can cause nasal cancer must soon accompany most wood products likely to be cut or sanded. Manufacturers "don't have to label each piece," said Tom Towers of the Occupational Safety and Health Administration, which is requiring the labels because an international scientific panel found sawdust to be a proven human carcinogen. "That would be ridiculous." Instead, the warning can be posted in the sales area or printed on invoices, he suggested. It needs to be given to each purchaser only once, and only if purchases will be used in a workplace—the only setting OSHA regulates. Nonetheless, Towers said the requirement has prompted a flurry of complaints, mostly from industry representatives who argue that companies here should not have to scramble "because of what a bunch of foreigners" has decided. In fact, the International Agency for Research on Cancer, the arm of the World Health Council that issued the warnings, gets much of its money from U.S. taxpayers through a grant from the National Cancer Institute. And the chairman and vice chairman of the committee are from the United States. Complaints might more appropriately center on the actual danger of sawdust. How great is the risk of developing cancer, really? Not very high, said Dr. Aaron Blair of the National Cancer Institute, vice chairman of the review panel. "The data is very clear that fine wood particles cause nasal cancer," he said. "But nasal cancer is extremely rare." Dr. B.D. Goldstein, who headed the committee, said hobby woodworkers have little to fear but should follow basic safety practices anyway. Fine sawdust, churned up while hand or machine sanding, is more dangerous than the larger particles produced by cutting, Blair noted. Wear a dust mask while sanding, he advised. "That's a pretty simple message."

The agency convened a panel of leading cancer researchers to review health studies all over the world. It found "very high relative risks" for nasal cancer in many European countries, but lower risks in the United States. The highest risks were associated with hardwood dust, but the panel said softwood dust may be equally dangerous — it's just that fewer studies have been done. To see the report for yourself, ordering information is provided in our Directory.



A constructive idea

A group of contractors in Redding, California, came up with a great way to raise funds for the construction of a local interactive nature center. They donated materials and their labor to build a house that will be sold by raffle, all proceeds going to the Turtle Bay Park and Museum. Each $10 ticket buys a chance at a $250,000 home: 2,150 square feet, 3 bedrooms, 2 bathrooms, a heated swimming pool, state-of-the-art energy and security systems and views of the volcanic summits of Mounts Lassen and Shasta. Tickets are on sale through November 10; the drawing is on November 20.

"The **house** shows the **owner.**"

George Herbert

Kit bag

Toolboxes keep getting lighter. First metal instead of wood. Then plastic. Now padded cloth bags with lots of pockets. The nicest we've seen is Portable Products' new GateMouth, patterned after a mason's bag but made to stand open and upright. The GateMouth Jr. is sized for cordless tools and their chargers.

Soot Remover Sponge

After a fire at his office, Mike Bloch of Bloch/New England, a 110-year-old firm in Worcester, Massachusetts, saw the professional cleaners using spongy orange blocks of natural tree rubber to get soot off walls and woodwork. "It wasn't on the consumer market, so we took it there," says Bloch. Called (straightforwardly enough) the Soot and Dirt Remover, it retails at hardware stores for $4.98. We were skeptical but tried it on a grubby *This Old House* wall. It works. "It's like a giant eraser," Bloch says.

Plastic Twine

Though it looks flimsy, plastic wrap is great for bundling awkward loads and for clamping odd-shaped pieces while glue dries. Sold by one company as Flat Twine, it leaves no adhesive residue and doesn't cut into soft surfaces, as twine sometimes does. One lumberyard even used it to keep our load of fence posts from shifting in transit.

Clearwave water softener

Conventional water softeners reduce "hardness" caused by calcium carbonate, but they require monthly maintenance and increase the sodium in your water. Inventor Jim Moloney's Clearwave (about $170; operating costs, about $10 a year) claims to *condition* water. Clamped to a water pipe, Clearwave bombards calcium carbonate with radio waves, pummeling its spiky, irregular molecules into the smooth molecules of aragonite, which won't stick inside pipes and foul teakettles. Immediate result: detergent and shampoo work much better, so you use less. Long-term calcium deposits eventually disappear. Yes, we know it sounds like a plot device from *Star Trek*, but England's Queen Mother and Dublin's Guinness brewery both vouch for it.

Pocket Power

Another tradition lost: Noxon nailsets eliminate hammers and bruised fingers. They look ordinary, but Noxon's midsection is a powerful spring that drives the point home. Set it on a nail, pull the spring a good three inches and release. Especially handy in close quarters and when toenailing, where there's little room to swing a hammer. In addition to nailsets **(1)**, Noxon also makes spring-powered brad setters **(2)**, ID stamps **(3)**, punches and small chisels. They sell for about $8 to $11.

Landscape Lighting

In conventional lighting, electricity runs through cables to bulbs. In fiber-optic lighting, a single bulb sends the light itself to the fixtures through little plastic strands. That makes it the perfect technology for wet conditions: no current in the fixture, so no risk of shock. The Fiberstars company, manufacturers of commercial and residential fiber-optic lighting (their lights will illuminate the 125-foot-high ceiling of New York's Grand Central Terminal after the current renovation) has developed a line of pool and landscape fixtures. They're expensive: $1,500 gets you a light source, 10 fixtures and 180 feet of fiber-optic tubing. The fixtures are best as spots or pinpoints; they won't throw light over a vast area. The quality of light, though, is good—and there's the option of a continuously rotating color wheel, just the thing for a pool party.

Paint Saving Lids

The routine is familiar: You dig through the bowels of the basement hunting for the can of paint. You pry up the lid with a screwdriver, and bits of rust and dried paint fall onto congealed skin as thick as a rhino's. If there's good paint underneath that crust, you'll make a drippy mess as you fish the fragments out. Might as well buy a new can. While you're at it, buy some paint-saving products too. The Pourit plastic spout (above) keeps rims clean and drips to a minimum. When you're done, push the Storeit plastic disc (top) on top of what's left to prevent a skin from forming.

Glue News

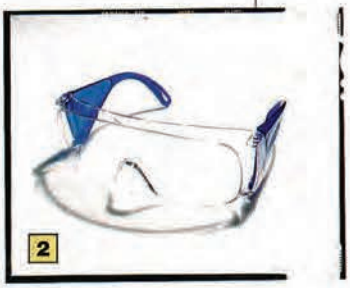
Everyone agrees that epoxy makes a strong waterproof bond, but it's tricky to use (its two components must be thoroughly mixed in the correct proportions), tough to sand and can trigger dermatitis. Yellow woodworking glue is safe and simple to use (there's no mixing), but its strength is so-so and you don't want it to get wet. Now there's a third alternative: so-called polyurethane glues (they're not true urethanes but isocyanates). These one-part, Belgian-made adhesives, marketed as Excel and Gorilla Glue, have nearly the strength of epoxy, are waterproof and can be used right from the bottle. Norm likes them: "They're much easier to use than epoxy."

Polyurethane glues cure by reacting with moisture in the air; they reach full strength in 24 hours. Glue that squeezes out from joints foams up dramatically but is easily scraped or sanded and stained; there's no discernible glue line under the finish on the edge-glued mahogany pictured here. Precautions: Joints have to be tight; gaps larger than half a millimeter have impaired strength. The glue contains MDI, which can irritate the respiratory tract before it cures; good ventilation is recommended. (Asthmatics are isocyanate hypersensitive.) Also, wear gloves. Once this glue dries on your skin, you have to wait until it wears off. Polyurethane glues are expensive, on par with epoxy, but a little goes a long way, and there's less waste once you know how much glue a joint needs.

Flexible Torch

We use a propane torch for many projects, including crème brûlée (Martha Stewart taught us that trick). But the fuel tank is heavy and awkward in tight spots. Bernzomatic's ST900 mini-torch has a four-foot flexible feed so you can set the tank on the workbench. The blister-pack kit includes a stand and tips for soldering and cutting.

Protective Eyewear



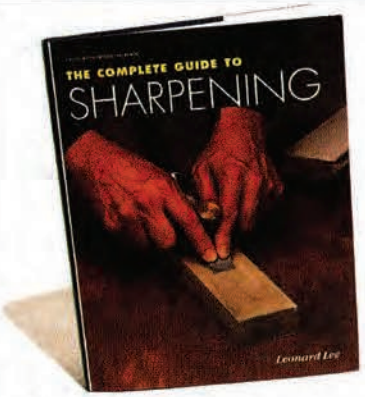
Standard safety goggles are sweaty and, let's face it, a bit geeky-looking. So people don't wear them as often as they should, and the result is 90,000 work-related eye injuries a year in the United States. Hence the new generation of safety glasses. Rarely found at your local hardware store, these glasses come from lab supply catalogs—whichever you pick, make sure they are marked "Z87" (meaning they comply with OSHA impact standards). Options shown here include wraparounds (1), designs with brow bar and molded side shields (2, 3), aviator types (4), and designs that fit over your prescription glasses (5, 6) And take note: These styles are for impact hazard only; for splash or dust protection, the geek goggles are your only option.

BIRD FEEDER PHOTOGRAPH BY KEVIN WILKES

Feed 'em, Zap 'em

One man's pests are another's pets, or so it seems from two new products. First there's a plastic owl that moves like a wind sock at the slightest breeze and actually screeches every 18 minutes (in daylight only) to chase away birds. Never mind that the screech is that of a hawk, not an owl; most birds get the point.

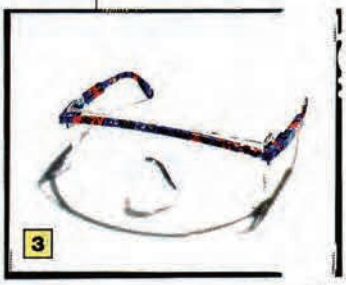
For those of us who want to attract birds but find squirrels stealing all their food, J'z Electronic Bird Feeder solves the problem. Loaded with two batteries, it generates a mild shock if a squirrel tries to bridge the metal hanger, cap or bird supports. Birds don't get shocked, and the manufacturer promises that the squirrels suffer no long-term harm.

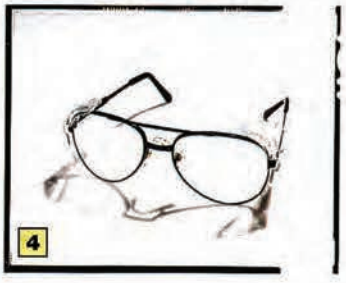


Cutting Edge

The best defense against sloppy woodworking is a sharp tool. Yet many woodworkers put up with dull ones because the sharpening process can be mysterious—and very frustrating when it doesn't turn out right. Toolmaker Leonard Lee's new book, *The Complete Guide to Sharpening* (246 pp., The Taunton Press, $34.95) demystifies the task. Clearly a labor of love that took years to research, the book tells why, not just how, exploring everything from the various metals that go into tools to the crystalline structure of sharpening stones.

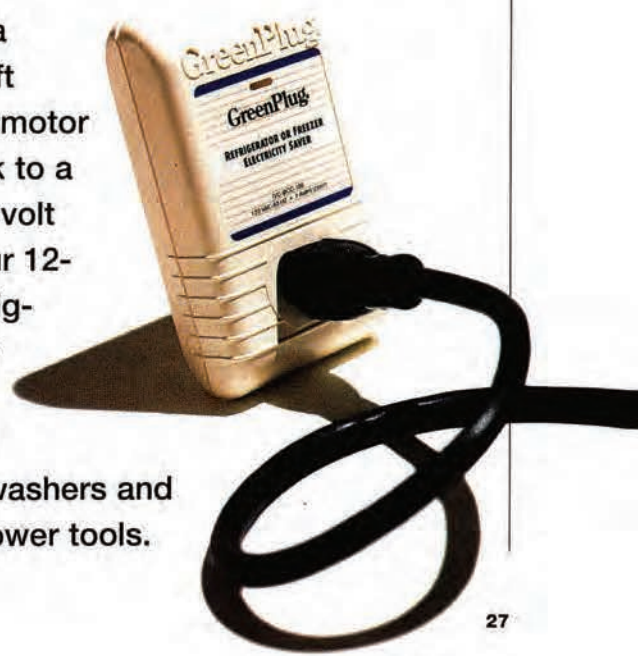
A new house is finished every **1.8 seconds** in the United States.





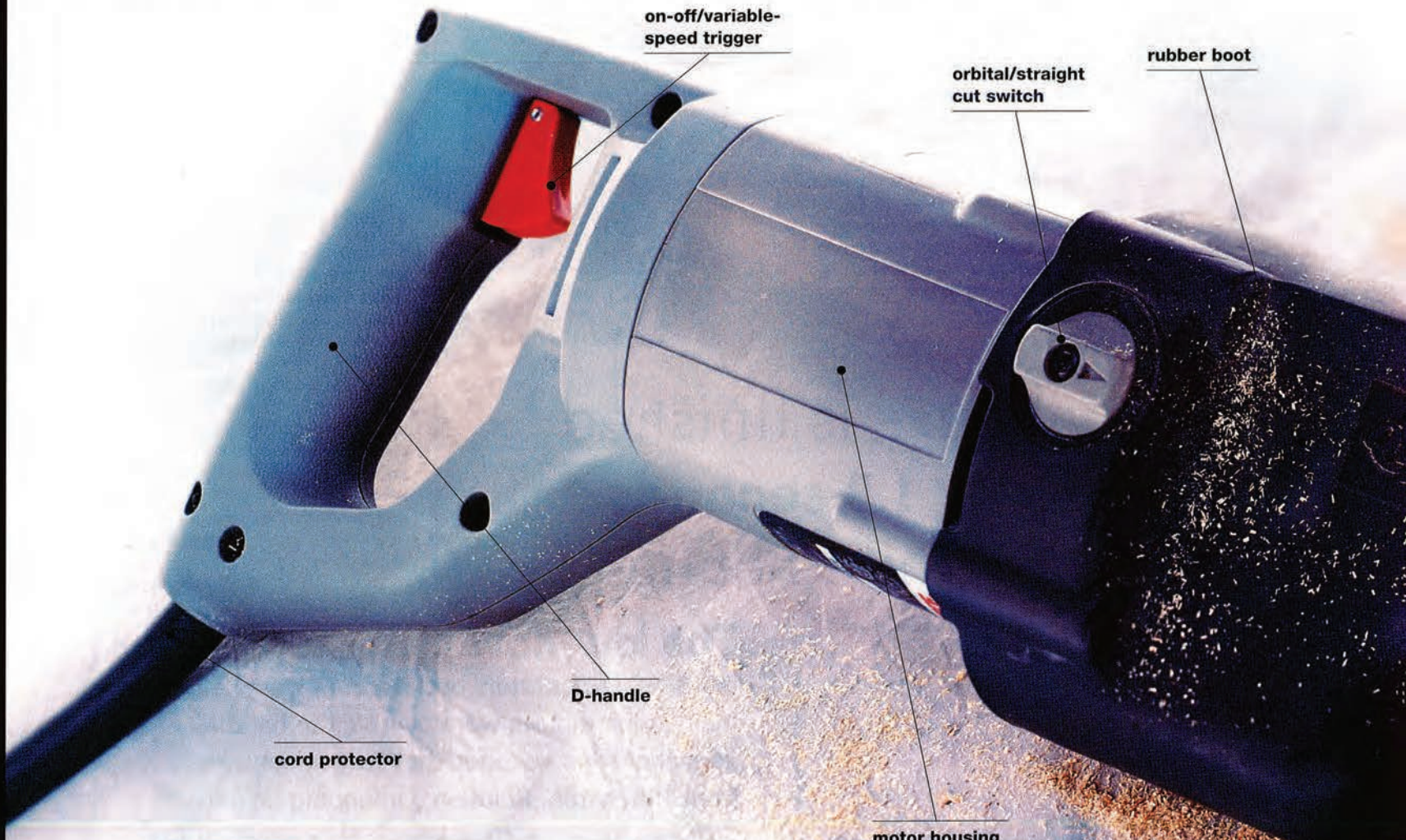
The low-flow plug

Pre-1992 refrigerators and freezers waste electricity: their motors were overbuilt to handle household line voltages that vary nationwide from 108 to 130. Solution: Greenplug ($25 to $32), the low-flow showerhead for electricity. On start-up, when a motor needs maximum power, its gated-thyristor circuitry provides a higher voltage "soft start" (to preserve motor life) then cuts back to a more efficient 106-volt operating level. Our 12-year-old office refrigerator runs quieter and cooler on a Greenplug; they're also available for washers and dryers, soon for power tools.



THE TOOL THAT STARTED IT ALL

The original "reciprocating-action saw" was the handsaw at the end of a carpenter's arm, but it tended to be slow and prone to muscle fatigue. In 1951, the Milwaukee Electric Tool Co. introduced the first portable electric reciprocating saw, tagged "Sawzall" for its versatility. Essentially a powerful in-line jigsaw, it weighed 6¾ pounds, produced 2,250 strokes per minute and cost a hefty $78.50. The Sawzall trade name has since become shorthand for any reciprocating saw, although at least six other brands are now on the market. The tool is a favorite of many tradespeople, including plumbers, electricians, and old-house remodelers.



basic use

Contractor Tom Silva is an old-house guy: He smiles when the walls are open and old wood, sawdust, pipe stubs and piles of stuff are all over the place. It's hard on his reciprocating saws. "I've gone through a lot of 'em," he says—but when he has to replace one, Tom knows what he wants: **variable speed** controlled by a trigger. It gives more control over the cut, and, he says, "I really don't want to stop the saw to adjust its speed."

He also likes **dual orbital/straight cutting action.** On the orbital setting, the blade moves up and down slightly as it goes back and

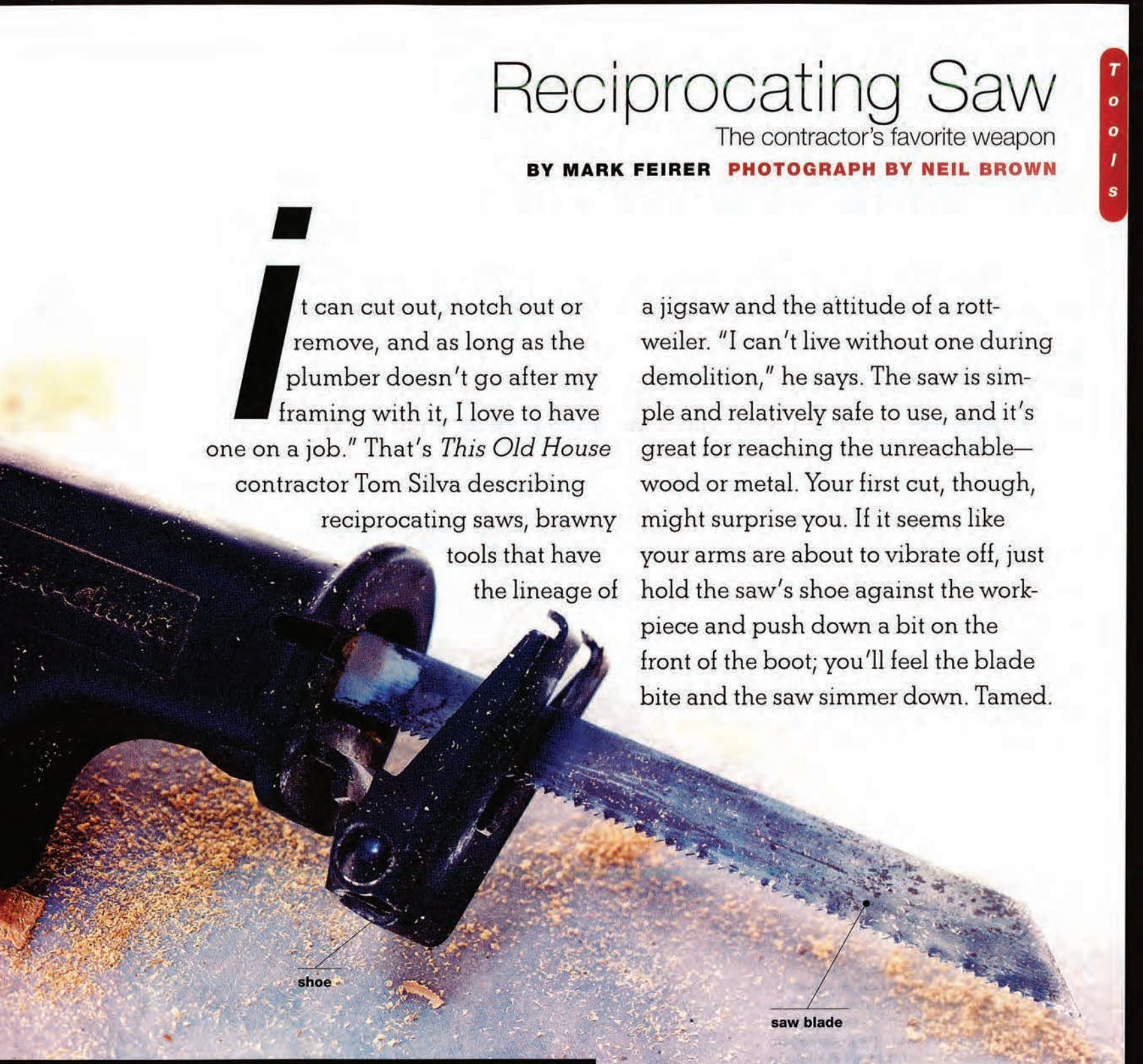
LEFT PHOTOGRAPH BY J MICHAEL MYERS

Reciprocating Saw

The contractor's favorite weapon

BY MARK FEIRER **PHOTOGRAPH BY NEIL BROWN**

It can cut out, notch out or remove, and as long as the plumber doesn't go after my framing with it, I love to have one on a job." That's *This Old House* contractor Tom Silva describing reciprocating saws, brawny tools that have the lineage of a jigsaw and the attitude of a rottweiler. "I can't live without one during demolition," he says. The saw is simple and relatively safe to use, and it's great for reaching the unreachable—wood or metal. Your first cut, though, might surprise you. If it seems like your arms are about to vibrate off, just hold the saw's shoe against the workpiece and push down a bit on the front of the boot; you'll feel the blade bite and the saw simmer down. Tamed.

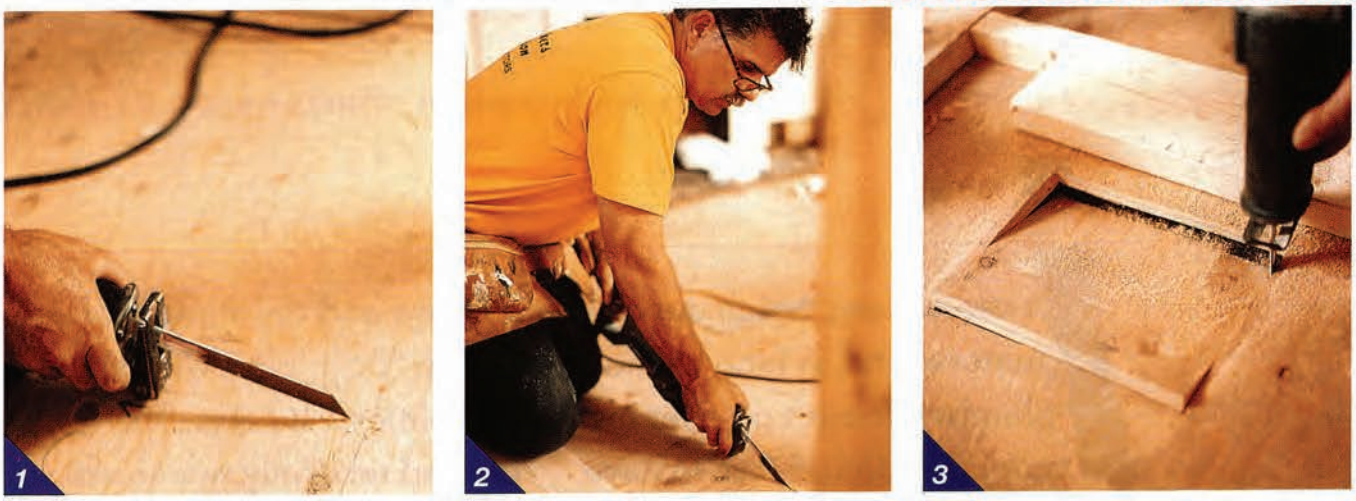


forth, cutting through wood faster. On the straight setting, the blade moves back and forth only; it's better for cutting metal and making fine cuts in wood. Figure on paying $130 to $150 for a reciprocating saw with these features.

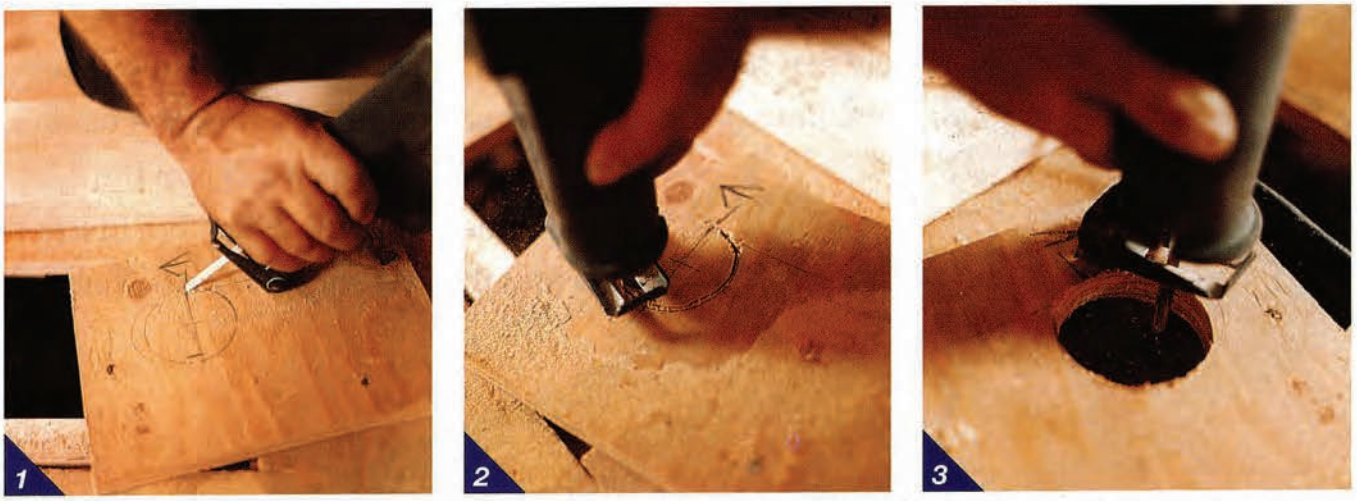
Tom favors **bimetal blades** for most of his work. These blades have flexible spring-steel bodies and hardened, tool-steel teeth, characteristics that make them ideal for cutting nail after nail in demolition work. Spring-steel blades cost less but won't cut through more than a nail or two without being damaged.

Reciprocating Saw Basics

PHOTOGRAPHS BY J MICHAEL MYERS



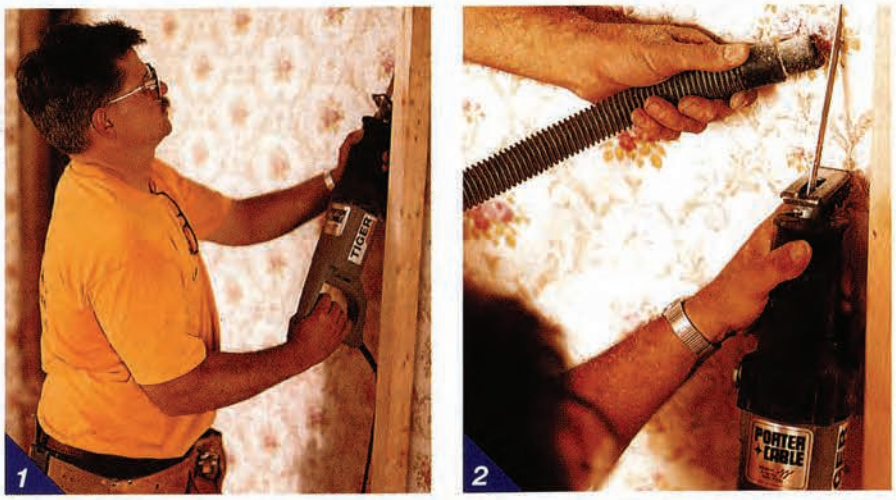
PLUNGE CUTTING The key to plunge cutting (in this case, through a plywood subfloor) is to start the saw at a shallow angle using a long, stiff blade. **(1)** Rest the saw's shoe against the floor and start the blade slowly; it will scrape, then claw into the wood. **(2)** When you feel the blade penetrate, increase its speed and gradually lift up on the handle, pivoting the saw on its shoe. **(3)** Maintain a shallow angle until you are sure there are no wires or pipes beneath the floor; then complete the cut with the saw straight up and the shoe flat against the wood.



CUTTING A HOLE **(1)** After running a couple of screws into the subfloor to steady this small access plate, Tom plunge cuts the hole. **(2)** Once the blade gets through, straighten up the saw and twist it slowly but firmly to keep the blade on course. **(3)** Follow through with the cut until the scrap drops free. Another way to make this cut is to drill a small pilot hole just inside the guideline before inserting the blade.

TIPS FROM TOM

- **A reciprocating saw can open a wall with ease, but Tom will tell you—rather emphatically—that you'd better be careful. (He once sliced through six water pipes leading to second-floor radiators.) "Use the angle of the saw to control the depth of the blade," he cautions.**
- **Tooth wear is typically greatest within an inch or two of the saw's shoe. To get more life out of a worn blade, adjust the shoe so a slightly different portion of the blade gets more of the action.**
- **You can turn a long, stiff blade with localized tooth wear into a rather handy handsaw for cutting holes in drywall: Simply wrap the shank with duct tape to make a handle.**



CUTTING THROUGH A WALL **(1)** Cut at a shallow angle to keep wood lath behind a plaster wall from vibrating loose. Any reciprocating saw is a two-handed tool: The trigger hand controls speed and depth while the hand holding the boot guides the blade. **(2)** To minimize dust, have a helper hold a vacuum nozzle alongside and slightly below the cut line.

(Continued on page 35)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[1]Excludes other GM products. [2]See dealer for availability.

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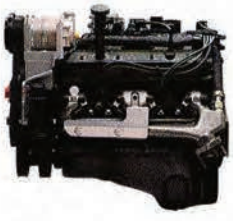

our legendary 5.7 liter V8 is a potent increase of over 27 percent in horsepower, and over 6 percent in torque. So if you feel the need for something more and something on the side, call 1-800-GMC-TRUCK and ask about the GMC Sierra. We're confident you'll be impressed.

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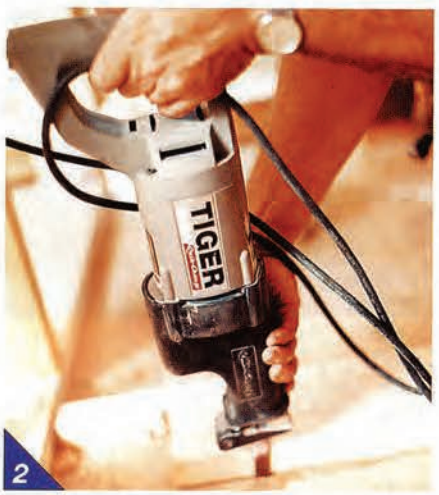
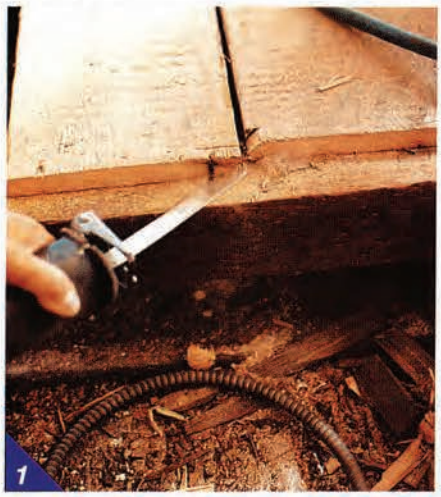
Reciprocating **Saw** Basics

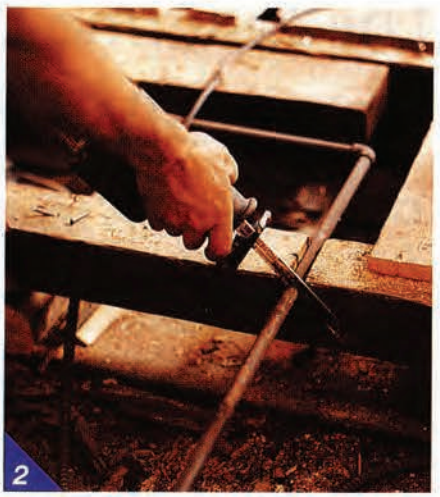
PHOTOGRAPHS BY J MICHAEL MYERS

CUTTING STONE A carbide-grit blade grinds through ceramic and stone (here, a slate shingle). **(1)** Tom changes the blades on his saw by turning the spring-loaded locking collar with one hand while slipping the blade into place with the other. Always unplug the saw first. Releasing the collar locks in the blade. (Some saws require an Allen wrench to tighten a clamp around the blade.) **(2)** Start with a slow, shallow cut, holding the shoe off the slate to keep from damaging the stone. **(3)** Straighten the tool to complete the cut.



GUIDING A STRAIGHT CUT **(1)** For very accurate cuts, Tom pins a scrap 2x4 to the floor with his knee or a nail. Holding the saw's shoe and blade against the 2x4, he starts off with a plunge cut. **(2)** If he runs out of room, he reverses his grip; here, Tom's right hand pushes while his left operates the trigger and keeps the power cord safe.





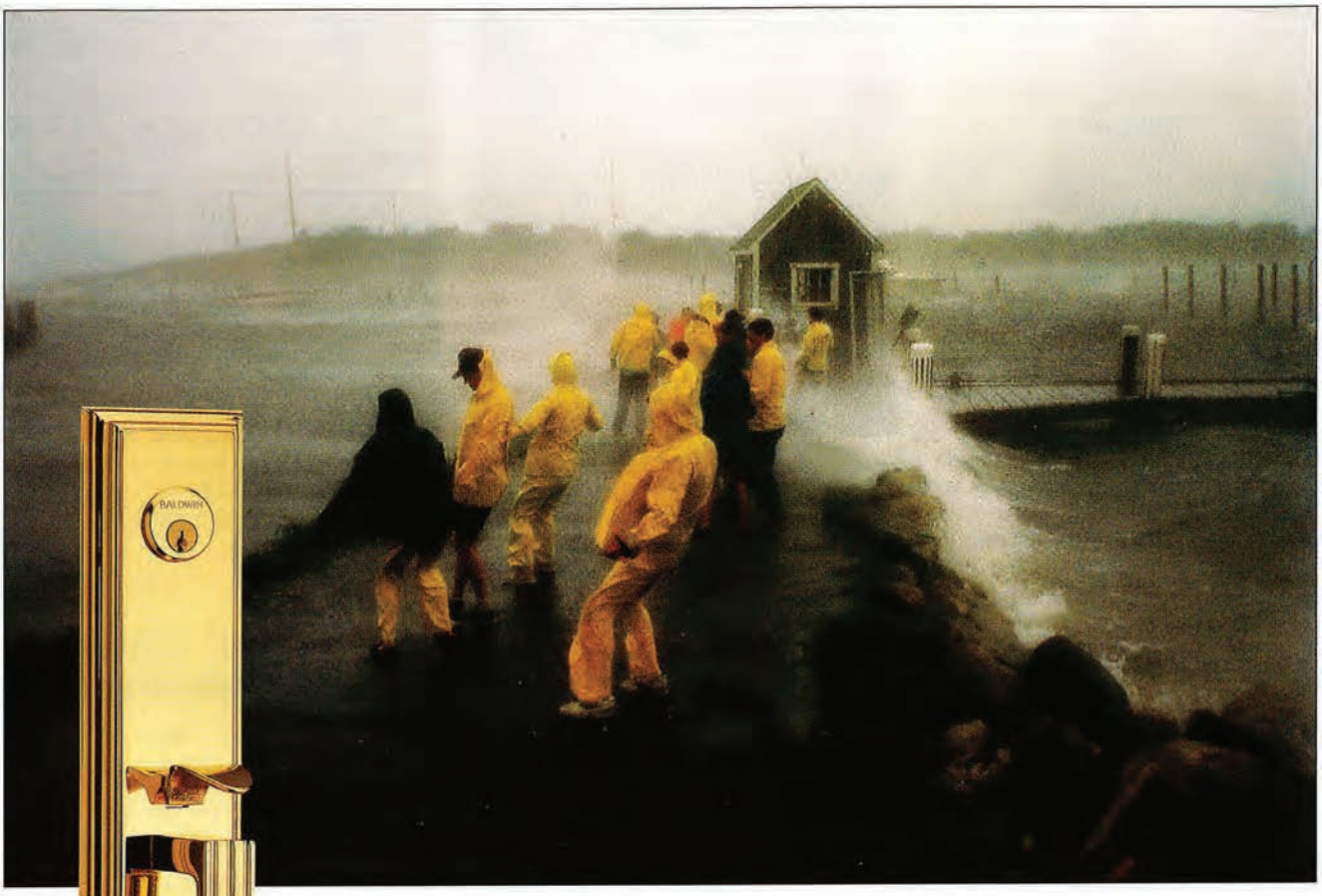
CUTTING NAILS AND PIPE **(1)** To remove a floorboard intact, first plunge cut to start the blade, or pry up the floorboard slightly. You'll feel the saw slow when it hits a nail, then surge when it cuts through. **(2)** Secure pipes so they don't rattle while being cut. Here, an existing notch steadies an old pipe for cutting as Tom pivots the saw on its shoe.

tool safety

- Always wait for the blade to stop before pulling it from a cut—otherwise the blade will bend and the saw will kick back at you.
- Air rushing out the side of a reciprocating saw blows dust around. Tom always wears safety glasses, and he keeps a dust mask and vacuum ready.
- Slice lumber or pipe so that the kerf (the saw cut) opens up as the blade moves through, otherwise the blade will get pinched and may bend or break.
- A cut pipe is like a sword: Make sure it lands clear of your power cord.
- When cutting through wall studs, brace the pieces to keep the kerf open as the cut is completed.
- Learn to read the saw's vibration—if it increases, that's a clue that the blade is binding or that the saw's shoe is not firmly against the workpiece.

(Continued on page 37)

Style is everything.



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The Blades

PHOTOGRAPHS BY DARRIN HADDAD

the cutting edge

It's not unusual for Tom and his crew to blaze through $150 worth of blades in a month; most are either 7-inch all-purpose blades or 12-inch rough-in blades. "I like the finer cut that the all-purpose blade gives on wood, especially plywood," he says, "but the other one cuts faster." He checks used blades for sharpness by pressing a thumb against the teeth. "You'll feel the sharp blades—toss the others." A blade gets hot in use: Wear gloves or let it cool before changing it.

METAL SCROLL BLADE
Cuts curves in metal and wood. (10 teeth per inch)

TWIN EDGE BLADE
A stiff blade for plunge cuts and rough-in work in close quarters. Uneven wear pattern shows the alternating set of the teeth. (7 teeth per inch)

ALL-PURPOSE BLADE
A flexible blade for cutting nail-embedded wood, plastic and nonferrous metals. (10 teeth per inch)

WOOD BLADE
A flexible, general-purpose blade, primarily for cutting wood. (6 teeth per inch)

ROUGH-IN BLADE
A stiff blade for plunge cutting and general use in nail-embedded wood. Note missing and dull teeth; Tom retired this one. (6 teeth per inch)

PIPE-CUTTING BLADE
Cuts plastic and metal pipe, wood, composition materials and nonferrous metals. (10 teeth per inch)

SCROLL BLADE
Cuts contours in softwood and hardwood. Bluish area indicates overheating and loss of temper. (6 teeth per inch)

PLASTER BLADE
Cuts on forward and backward stroke through plaster and through wood or metal lath. (6 teeth per inch)

ABRASIVE BLADE
Cuts rigid fiberglass, ceramic tiles, cast-iron pipe and stone. Edge is lined with tungsten-carbide grit.

WOOD ROUGH-IN BLADE
For general rough-in work in difficult-to-reach places. This blade shows tooth damage but still has some life left. (6 teeth per inch)

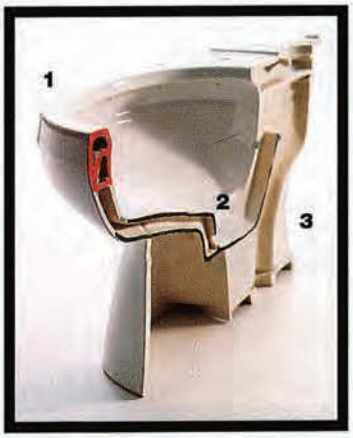
(See Directory, page 118, for details and sources)

Choosing a Toilet

What nobody else will tell you

BY WILLIAM MARSANO **PHOTOGRAPHS BY JAMES SCHNEPF**

Taken for granted, covered with euphemisms and hideous fuzzy tops, toilets aren't usually the focus of attention. But that's changing now that federal law requires new models to use only 1.6 gallons per flush—a marked decrease from the 3.5 gallons or more currently going down the drain.



To make the most of the 1.6-gallon flush limit, new toilets have features even many plumbers wouldn't spot at first glance: (1) under-rim water jets to wash the bowl; (2) precisely angled "exit jet" to start outflow; (3) narrow trapway for increased siphon effect.

The big decision about low-flow toilets, manufactured since 1994, isn't which style to buy (The Patriot? The Pillow Talk? The Trocadero?) or the designer color (Fawn Beige? Tender Gray? Innocent Blush?) but the very *kind* of toilet to install. "It's gotten out of hand," actress and skilled do-it-yourselfer Sandra Bullock, star of *Speed* and *The Net*, told Jay Leno on *The Tonight Show* last summer. "It's hard to decide." Her dad solved the problem by buying her one. You, however, will have to do your own homework.

Essentially, there are three types: gravity-operated (the vast majority), pressure-tank models (increasingly popular) and the rest (obscure, often very expensive).

New gravity models use refined fill mechanisms to limit inflow and improved flush-valve, bowl and drain designs to meet the 1.6-gallon requirement. Some contain 3.5 gallons but use the excess only to develop "head pressure," which powers the flush; shutoff valves close after the legal limit.

The pressure-tank toilet, commonly (but incorrectly) called a "flushometer," looks about the same as the gravity type, but inside its standard ceramic tank is a sealed pressure tank. During filling, water enters it under line pressure, compressing the air within. During flushing, the compressed air expands, rapidly and violently forcing water into the bowl and down the drain, accompanied by a sonic boom that could loosen your fillings.

"The noise you either get used to or can't stand," says plumber Pete Hemp, author of *The Straight Poop*. "It makes the old Archie Bunker sound effect seem quiet."

Toilets that cost hundreds of dollars are made by the same process as those worthless ceramic ashtrays from summer camp: A clay solution ("slip") is poured into molds, left to harden and then unmolded.

Once unmolded, toilets must air-dry to the "lightening" stage (a moisture content of 0.5 percent) before being fired, lest they explode in the kiln.

CROSS SECTION PHOTOGRAPH BY SPENCER JONES

The **Kohler** Factory

RIGHT: The kilns at Kohler's plant in Kohler, Wisconsin, operate around the clock every day of the year. Robots can take care of bathtub making, but toilet-bowl construction is still done entirely by hand.

ABOVE: It's hot, dusty work, but skilled potters have to do it.
BELOW: Engineering drawings are refined and adapted for new toilet designs.

But noise is relative; listen before you write off pressure tanks. Most makes sound alike because almost all manufacturers install the same Sloan Flushmate pressure tanks. Kohler's proprietary tank is notably quieter.

Where water pressure is low (below 20 to 25 psi static), go with gravity-operated. Where house-to-sewer drains are long (50 feet or more) or prone to clogging, the extra oomph of a pressure tank can help.

Many manufacturers offer only one flush system. American Standard and Crane are among the big names that offer both, and Kohler offers two varieties of each. A refinement of Kohler's basic gravity model has a cam-actuated flush valve that lets you choose a standard 1.6-gallon flush or a 1.1-gallon flush (for liquids only). Most Kohler pressure-assist units use air tanks, but the top-of-the-line models have submerged electric pumps. They're expensive, but very quiet.

When it comes to choosing an individual model, consumers face two problems. One is that water-miser toilets have no "buy points"—that is, specific features that make them must-haves or must-avoids. There are things to consider, though, such as the size of the "pond," or water patch in the bowl. Larger is better. Small ponds mean frequent cleaning. And check the height of the seat on the manufacturer's spec sheet: some are higher than the standard 14 inches.

The other problem is that price is no guide to performance, so get the February 1995 *Consumer Reports* "Super Bowl" issue, which rated 32 models from 11 makers. It found that Gerber's $210 Ultra Flush 21-302 performed just as well as an $815 famous-name competitor. Among other surprises, one big-name manufacturer had three models flunk for excess consumption.

"Function comes first and fancy comes second," advises *This Old House* master plumber Richard Trethewey. "Plumbers sometimes get bad-rapped as nonprogressive for not being interested in color and styling, but those aren't primary concerns. Get the toilet that does the best job."

Saving Without Replacing

You don't have to buy a new toilet to save water. Seepage through the flush valve can be detected by putting food coloring in the tank. Don't flush; if color later appears in the bowl, you're wasting approximately 30 gallons a day. If the seepage is actually loud enough to hear, the loss rate is more like 250 gallons a day.

In either case, the fix can be as easy as scrubbing the metal seat of the flush valve with steel wool to remove accumulated gunk. Or buying a new flapper valve or flush ball, which can be installed in a matter of minutes.

Kohler's selectable-flush mechanism, which allows you to choose a regular flush or 1-gallon flush, has been imitated by parts manufacturers. The generic versions save about half a gallon with each "short flush." But note that one size does not fit all, and neither does one shape. Remove and measure your current flush handle before buying, bearing in mind that it probably has a left-hand (counterclockwise) thread.

Other modest savers include water dams, which isolate part of the tank, and bricks. Dams can be finicky to fit, and bricks can leach gunk into the tank; instead, use a half-gallon jug of water, with some stones for ballast. If the jug interferes with your tank's fill mechanism, don't be tempted to make room by manhandling the ballcock or other parts. "That stuff has been underwater for years," Richard says, "and that makes the parts brittle."

What about reducing inflow by fiddling the fill? Bad idea. That reduces the water level and consequently the head pressure necessary for an effective flush. Jugs work by displacing water to reduce inflow without affecting head pressure.

Can owners of Victorian houses save water and maintain historical correctness by installing Sloan Flushmate pressure-assist units inside the wall tanks of their toilets? In a word, no. Those tanks, mounted overhead, develop abundant power already; adding pressure-assist will produce spectacular results. One of them is the dread "Geyser Effect."

Unfortunately, saving water costs money, so be on the alert for local and state rebate programs. Some pay the whole cost of replacement, depending on make and model selected. Those in New York City and Los Angeles have been fairly well publicized, but even so, many people don't realize that single-family houses qualify for the rebates, not only apartment buildings and offices. Finding out about rebate programs takes persistence; you may have to call regional water boards to cover all bases. A good informed source would be your plumbing supplier, as rebate programs represent revenue opportunities he's unlikely to overlook.

Replacement parts for low-flow toilets cost more too, because most are specific to make and model. Hunter Plumbing, Fluidmaster and other major manufacturers produce competitively priced replaceables such as fill mechanisms and flush valves (also called flappers). The risk for the homeowner is in using cheap generic parts found in hardware-store blister packs. These will malfunction unless designed for the toilet they're used in.

Since even the best miser toilets don't always flush as well as the water-wasters, take a hint from the experts: Use less toilet paper (a major cause of clogs). Options that eliminate paper (while improving hygiene and assisting the elderly and handicapped) are Toto's Washlet SIII and Zöe toilet-seat bidets, which use electrically operated water sprays. Another trouble-saving choice is Kohler's Peacemaker, a seat that flushes the toilet electrically (and only) when closed.

Finally, what about "the rest"? They're mostly for extreme conditions. Sim Van der Ryn, author of *The Toilet Papers*, recommends composting toilets like the Sun-Mar and the euphoniously named Clivus Multrum, which return the soil to the soil, so to speak, without water. The Incinolet, which burns waste, requires electricity, as does the Microflush, whose air compressor provides a quiet half-gallon flush. Simplest is Canada's economical Ultra-Flush, adapted from motor-home designs, which uses only one *quart*. Those with difficult septic tanks and backwoods cabins, take note.

Out With **the Old**, In With **the New**

PHOTOGRAPHS BY J MICHAEL MEYERS

The First Thing to Do

Richard Trethewey says, "Start by measuring the rough-in, the distance in inches from the wall—not the baseboard—to the center of the soil pipe. It's usually 12 inches but sometimes 10 or 14. If you don't know it, one of two things will happen when you buy your new toilet. Either the clerk will ask for it and you'll have to say, 'Duh'—or he won't, and he'll sell you a toilet that won't fit."

Toilets are fastened with closet bolts, so measure from the wall to the center of the bolt on one side of the pedestal. Older fixtures have two bolts per side; measure to the nearer bolt.

"Write the rough-in down in a safe place," Richard says. "Your forehead, for example."

Tools You'll Need

Assemble tools and materials the day before. You will need:

- 8-inch adjustable wrench
- 8-inch straight-blade screwdriver
- spud wrench or 10-inch water-pump pliers (Channellocks)
- hacksaw
- 24-inch level
- solid brass closet and tank bolts (if included with toilet, test with a magnet; if they're just plated steel, replace with brass)
- wax closet seal
- flexible supply tube
- penetrating oil
- sponges and rags
- old newspapers
- hand cleaner
- a couple of beers

What Richard does in an hour will take you a little longer. For efficiency's sake, read through the process twice and start work early (but never on a holiday; you want the plumbing-supply store open). This won't be pretty, so kick the family out of the house, especially anyone you happen to be married to.

Removal: **1** Shut off the angle stop (the small water valve protruding from the wall below the left side of the tank). **2** Flush the toilet and sponge out remaining water from the tank. **3** Remove the supply tube leading from the angle stop to the tank. **4** If your toilet is a one-piece type, proceed to step 5. If it's "close-coupled"—tank bolted to bowl—unscrew the bolts and lift off the tank. Some tanks are screwed to the wall and connected to the bowl by a flush pipe. Unscrew this pipe, "or simply slice it with a hacksaw—that's the quick-and-dirty way," Richard says. "My favorite." Now sit on the bowl backward to remove the tank, letting it settle gently onto your knees as the last screw comes out. **5** Remove caps from closet bolts and unscrew the nuts. If they're corroded, use a hacksaw or penetrating oil. **6** Tilt the bowl forward to avoid spilling residual water, then remove. Stuff a large wad of newspaper into the soil pipe to block sewer odors. **7** Inspect flooring around the closet flange (where the toilet joins the soil pipe) for rot caused by seepage. "That," says Richard, "would be your cue to grab a Bud and call your plumber."

Installation: **8** Replace the old wax closet seal and closet bolts with new parts. (Richard prefers wax seals; they're cheap, and one size fits all. Rubber seals cost more, though they are more "beginner-tolerant.") **9** Gently set the new bowl in place. Sit on it, compressing the seal for a tight fit, then tighten the nuts with your fingers. Continue pressing the bowl down and tightening the nuts alternately. As resistance increases, level the bowl, shimming if necessary. Overtightening nuts can crack the fixture, so tighten nuts further during the next few days, as the toilet settles. **10** Pour buckets of water into the bowl to check for leakage. **11** Now mount the tank: Press the large gasket over the spud projecting from the tank and set the tank onto the bowl. Line up the bolt holes and insert bolts and washers, tightening the nuts from underneath. Tighten them alternately, using a screwdriver and wrench. Don't overtighten. **12** Fasten chain to flush handle, leaving minimal slack. **13** Reconnect the supply tube: If the new tank is higher or lower than the old, the original supply won't fit. For amateurs, a flexible supply usually solves the problem; tighten nuts gently at angle stop and fill mechanism until supply is firmly seated. **14** Open the angle stop fully. When the tank has filled completely, flush the toilet several times to check that it operates properly. **15** Install the toilet seat.

16 Step back and admire your work.

(See Directory, page 118, for details and sources)

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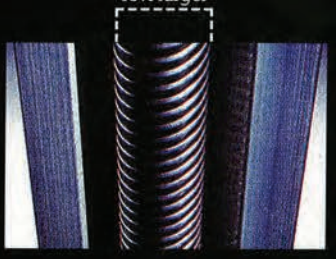

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Getting It Straight

A lesson on levels from Norm Abram

BY STEPHEN PETRANEK **PHOTOGRAPHS BY J MICHAEL MYERS**

Somewhere out in the space directly in front of master carpenter Norm Abram hangs a perfect horizontal line. The line is imaginary, but Norm wants to find it anyway, because he's putting up a kitchen cabinet and he doesn't want the dishes to go sliding. "Of course, I'll never find a true level line," he says. "I'm going to be very close, but even my 48-inch level, over 50 feet, will be off half an inch or so."

Or more: Most 48-inch spirit levels can be off by 1½ inches over 100 feet and still indicate a level plane. "Levels are limited by length," Norm says. "If you're leveling nice and straight 12-foot deck joists, even a 28-inch level will do. But if you're setting grade for a 90-foot foundation wall, you need a transit." Norm uses his level mostly to find plumb (vertical) lines. "A living-room floor that goes for 30 feet isn't that uncommon," he says, "but a wall is rarely more than 10 feet high."

Norm likes to use his level to locate studs when installing wallboard. First he makes marks on the floor or ceiling extending from the center of each stud. Then he puts up the wallboard, holds one end of the level at a mark and moves the other end until the bubble is centered in the vial. A line drawn against the level will center each screw in the stud.

WHAT'S INSIDE THAT VIAL?

Spirit levels used to be called "whiskey sticks" because the glass vials were—and still are—filled with alcohol. A dye, usually green, is added to make the bubble inside the vial more visible, especially outdoors. Vials are either injection-molded acrylic plastic, milled from a block of solid acrylic or made of Pyrex glass. The glass vials are often favored for being more consistent—they tend to expand and contract less with variations in temperature. Pyrex and acrylic vials are first filled with methanol, then welded shut with heat or ultrasonic sound, though one manufacturer still caps glass vials with solder, the old-fashioned way.

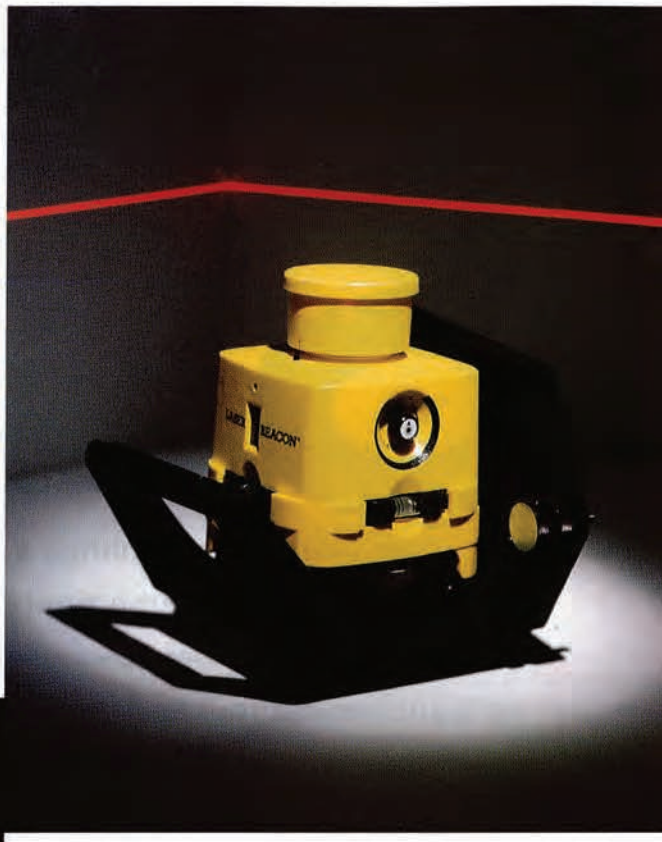
But is it really level?

Accuracy is relative. Many levels use 45-arc-minute vials, which are surprisingly insensitive to minor changes in pitch. (The arc-minute measurement refers to the number of degrees in a circle: 360 degrees in a circle, 60 arc-minutes in each degree, so 45 arc-minutes is ¾ of a degree.) In a 45-arc-minute vial, the bubble won't move unless the level is tilted at least ¾ of a degree. The smaller the arc-minute number, the greater the sensitivity. Look for a level that has at least a 35-arc-minute rating.

laser **levels**

beacon

The Stanley Laser Beacon creates a continuous line of light vertically or horizontally. It can be hung from a wall bracket to create a level line around the top of a room—for example, to mark the perimeter of a drop ceiling. Or it can be placed in a floor bracket to mark a level baseboard rule or a plumb line on a wall. It can also be mounted on a tripod to create a line around a room for a chair rail. (Don't look directly at the laser, which can cause eye damage.)



laser/vial

A laser built into a spirit level effectively extends its length. Laser levels also tend to have much more accurate bubble vials—down to 5 arc-minutes. The Cuppson On Line Lazer Level combines a laser light with a 32-inch bar. Center the bubble, then push the button to activate the beam. A small red dot appears on walls as far away as 400 feet. It's accurate to within ¼-inch at 60 feet.

video

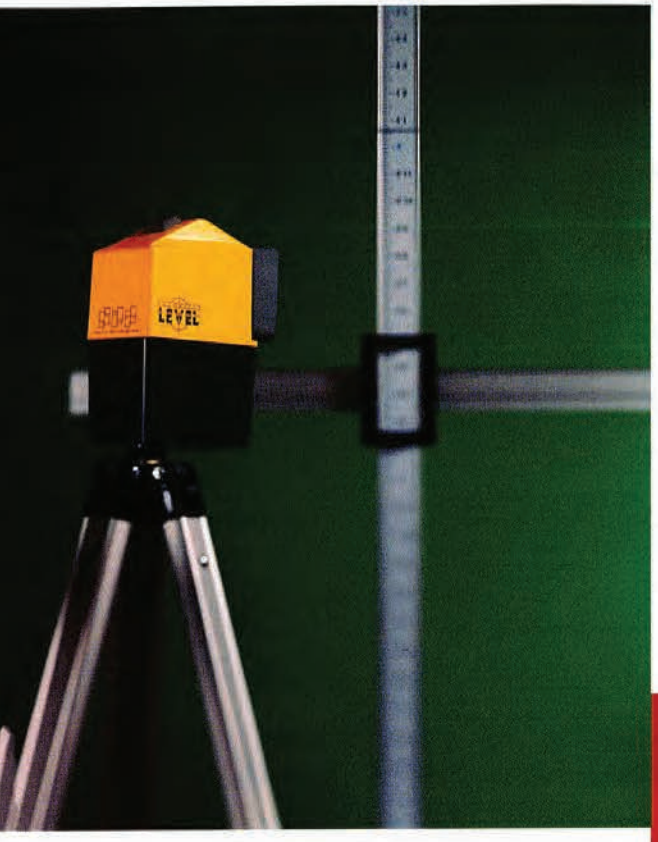
Zircon's Laser Vision 6.6 adds sound to laser projection in an 18-inch level. The unit beeps continuously when level, making work easier in confined spaces where bubble vials are difficult to see. A video display tells which direction to move the unit to find level. A push of the "slope" button memorizes any angle so that it can be repeated, useful for establishing pitches on roofs, decks and driveways. The manufacturer claims accuracy to within ⅜-inch at 50 feet.

water level

The age-old knowledge that water seeks its own level applies here. For example, to hang shelves, hang the reservoir on a nail, establish the level of water in the tube at the height you want to repeat, then move the tube anywhere in the room, wait for the water to settle, and mark.

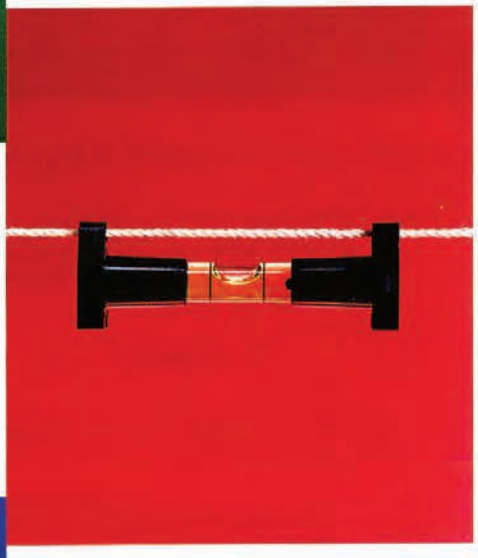
eye levels

PHOTOGRAPHS BY KEVIN WILKES



mirror transit

The Cowley level works like a surveyor's transit but is much easier to use. The operator sights a target within the rectangle on the measuring stick and sees a split image like that found in a camera viewfinder. When the target is raised or lowered to level, the split images come together. The unit, which operates on a mirror system, does not have to be leveled to make sightings. It is helpful for laying foundations, checking masonry walls, establishing drainage patterns and leveling large areas such as tennis courts.



string

String levels, like this Glo Lime Line Level from Johnson Level & Tool Co., are among the least accurate levels but can be very helpful in special situations. Used by masons to roughly level brick and stone walls, string levels are also useful for homeowners who want to level chalk lines before snapping them. They are useless for finding plumb lines.

torpedo

Torpedo levels are often described as the quickest way to find plumb and horizontal surfaces. Used by plumbers, electricians and homeowners, they are tapered at each end to make them easy to shove into a pocket. Like this one from Empire Level Corp., they are usually 9 inches long and come in magnetic (to stick to pipes or circuit-breaker boxes) and nonmagnetic models. They're perfect for leveling a washing machine or hanging a picture.

norm's tips

1. Always check a level before buying it. Place it on a flat surface, then level it by adding sheets of paper under one end. Carefully mark where the ends rest, then rotate the level end-for-end. If it still reads level, it's okay.
2. Avoid levels with adjustable bubble vials. They seem to get out of whack easier. Buy levels with vials that are firmly glued in or plastered in.
3. Treat a level as a delicate instrument. If dropped only once, it may be ruined.
4. Always read the bubble straight-on. Reading it at an angle adds to inaccuracy.
5. One level is not enough. I use a 48-inch for framing, a 28-inch for checking door and window headers and an 18-incher for tight spaces.
6. Levels don't last forever. They do get dropped. Don't try to compensate for a damaged level—get rid of it. I've gone through at least seven 48-inch levels in 20 years.

(See Directory, page 118, for details and sources)

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Chimney Fix-up

Repointing and reflashing to keep out water

BY THOMAS BAKER **PHOTOGRAPHS BY DAVID BARRY**

Built of brick bedded in mortar, chimneys ascend from the basement to well above the rooftop, vertical passageways for soot and gas. These edifices are paragons of solidity compared with a house frame, which flexes radically in response to changing temperatures and humidity. For the two to coexist, a house frame has to remain independent of its chimney, even on the roof.

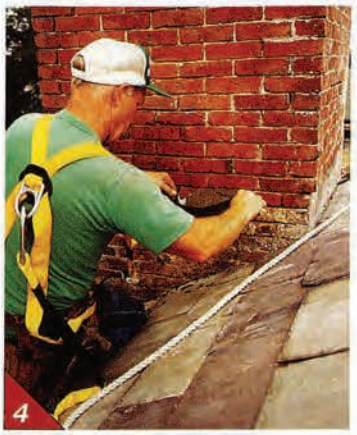
Never use tar or caulk to seal the gap between roof and chimney, say *This Old House* contractor Tom Silva and his longtime mason, Lenny Belliveau. Tom and Lenny always weatherproof the gap with overlapping layers of flashing and counterflashing. The flashing, which is attached to the roof, bends upward to rest against the brick. The counterflashing, embedded in the mortar between the bricks, curves downward to cover the flashing. Together, they allow house and chimney to go their separate ways without water coming between them.

Standing nearly eight feet above the roof, the massive brick chimneys on the current *This Old House* project in Salem, Massachusetts, appear to be robust survivors of the days when fireplaces, not furnaces, heated homes. But a close inspection by Steve Thomas reveals problems. Streaky white stains run down the masonry face, indicating that water—lots of it—was leaking into the house, particularly on the side facing the roof peak. Some mortar was so crumbly that he was able to poke a knife all the way into the flue. Tom Silva's three-part solution to these maladies: repoint (replace the mortar); install new flashing and counterflashing; and add a cricket, or sloped mini-roof, to shed water trapped on the chimney's uphill face.

Chimney Fix-up

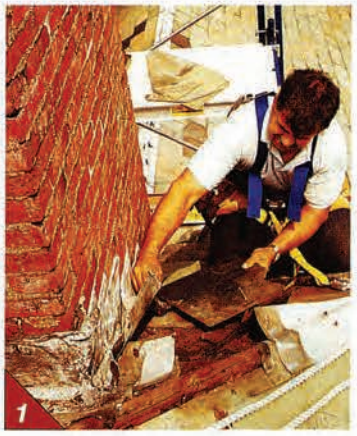
REPOINTING

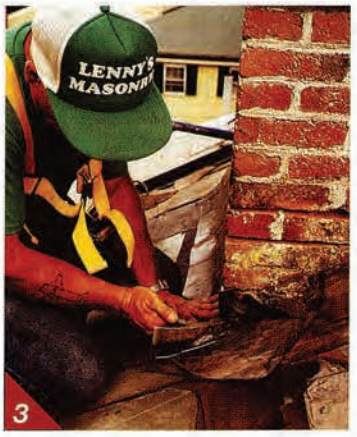


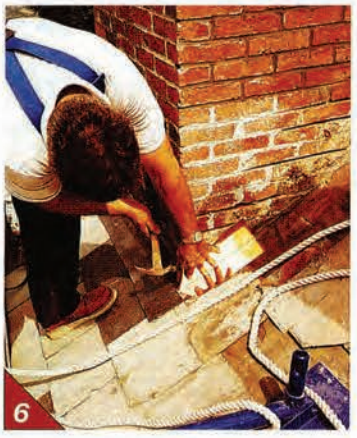



(1) Lenny Belliveau examines earlier, messy repairs to the mortar joints. **(2)** With hammer and chisel, he rakes out all crumbly mortar to a depth of about an inch. **(3)** For each batch of mortar, he mixes 4 shovels sand, 1¼ shovels type N (portland cement/lime) masonry cement and half a gallon of water. **(4)** After dampening the brick with a spray bottle (to reduce suction of water from the mix), he applies mortar with a tuck-pointing trowel, then packs it into a concave shape with a ⅜-inch jointer. A final brushing after the mortar has set (but not dried) leaves a clean job that should last 20 years.

FLASHING AND COUNTERFLASHING



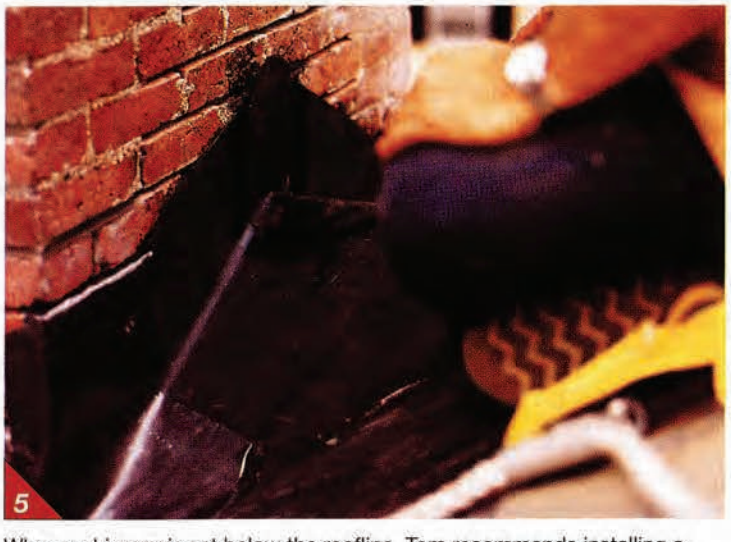


(1) No wonder this chimney leaks! Tom Silva finds no flashing under the old counterflashing. **(2)** On the chimney's lower side, Tom flashes with adhesive roof membrane over the slate. Lenny then fits an apron of 10-inch lead counterflashing into the raked joint, holding the lead in place with a rolled lead shim. **(3)** At the corner, Lenny hammers the lead against the brick, then neatly folds the top flap down. **(4)** Tom cuts step flashing from a sheet of 16-ounce copper, scoring it first with a utility knife. Each piece is 7 by 12 inches. **(5)** Using a metal brake, he bends the pieces in half lengthwise, just short of 90 degrees. **(6)** With a copper nail, Tom attaches the first step flashing to the roof deck at the bottom corner. The flashing runs 3½ inches up the chimney and 3½ inches onto the roof. He nails a slate over it, then follows with the next piece of flashing, which overlaps the first by 2 inches. Bottom edges of copper and slate should align. **(7)** When the flashing is complete, Lenny inserts the lead step counterflashing in the open brick joints, shimming it tight. Each piece overlaps the previous by 2 to 3 inches. **(8)** After the counterflashing is in place, Lenny mortars the joints.

(Continued on page 49)

MAKING A CRICKET



When a chimney is set below the roofline, Tom recommends installing a cricket—a miniature peaked roof made of two identical right triangles—on the uphill side. To find the length of the top edge, he sets a framing square between the roof and chimney perpendicular to the chimney's centerline; for the other edges, he measures from the point where the square touches the chimney to the chimney corner. **(1)** Tom cuts two triangles out of ¾-inch exterior grade plywood. **(2)** He bevels the four longest edges, then nails the pieces together. **(3)** After first waterproofing the roof deck with roof membrane, he nails the cricket to the deck. **(4)** Using black contact adhesive, he attaches a sheet of rubber roofing to the cricket to serve as flashing. He brushes on the adhesive to hold the roofing snugly against the brick. **(5)** After the rubber is in place, Lenny adds stepped lead counterflashing.

Tips From Lenny

- **Repoint all parts of the chimney at once to get the same color and look.**
- **Make sure tools stay wet so mortar won't stick to them. On the job, Lenny keeps his tools in a bucket of water.**
- **Neatness counts. "A final brushing of the brick is most important if you want your work to look nice." Don't wait until the mortar dries.**
- **Work on the shady side. Direct sun dries out the mortar too fast, compromising its strength. Mix only what you can use in an hour.**
- **Check the lead. If it is brittle and hard to work, the counterflashing has too much iron in it and is likely to develop rust.**
- **Trim the lower edge of the step counterflashing to the same angle as the roof pitch. Then, after it's bent over the step flashing, all edges will line up parallel to the chimney.**
- **Mortar should be firm enough to stick to the underside of a trowel—"the consistency of peanut butter."**

special care for old bricks

Preservation experts who repair old masonry follow two basic rules when repointing: Chisel out mortar by hand, and replace it with a "soft" mortar high in lime. The reason? Any damage to an old brick's hard outer skin shortens its life and alters its look. Electric grinders and pneumatic chisels, even in the hands of expert masons, can wreak havoc in the wink of an eye. Hand chiseling, though slow, is far safer, and on vertical joints it's the only way to go.

A "hard" mortar with too much portland cement can also injure brickwork, albeit more slowly. As masonry expands and contracts, hard mortar can actually spall a brick's face or break away from the brick, opening an avenue for water. A good mortar recipe for old chimneys is 6 parts damp sand added to a type N mortar consisting of 1 part masonry lime and no more than 1 part Type I or II portland cement.


Avoid using grinders to remove old mortar.

(See Directory, page 118, for details and sources)

A Clean, Well-Lighted Place

BY SCOTT LANDIS **PHOTOGRAPHS BY FURNALD/GRAY**

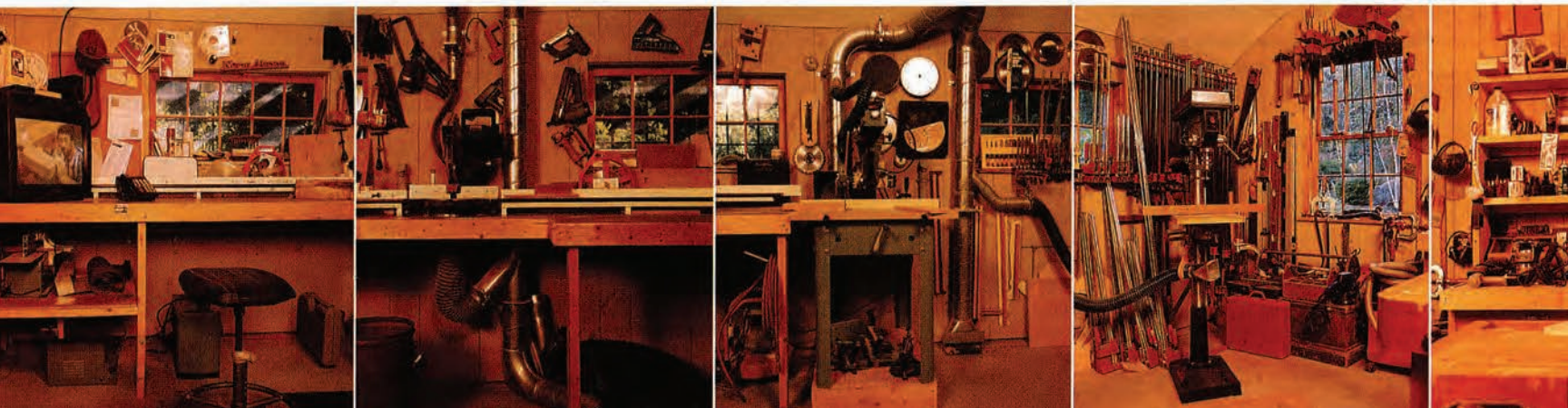
Everyone knows it takes good tools to do good work, and the workshop may be the most essential—and the most neglected—tool of all. Work space, storage and good equipment are the basic ingredients of any decent shop, but what makes a comfortable shop? "There are no set rules," Norm Abram says, but in his New Yankee Workshop, good light, clean air and unobstructed space make the difference between an adequate and an enjoyable woodworking environment.

"New Yankee Workshop is my home away from home," Norm explains, and it fits him like his leather nail apron. On a busy day, he might spend 12 hours in the shop—building prototypes, checking projects against plans and getting ready for a shoot for his TV program, *The New Yankee Workshop*.

The 936-square-foot space is more functional than fancy. It's neat but not meticulous and roomy without being extravagant. "The place really works," Norm says.

The current New Yankee Workshop was built in 1988 as an addition to an existing shop and toolshed. A few design decisions were made to accommodate the TV cameras, but they also enhance the shop's efficiency, safety and comfort. Its high, open ceiling—supported by a 36-foot steel I-beam that runs the length

Panorama of **Norm's New Yankee Workshop**

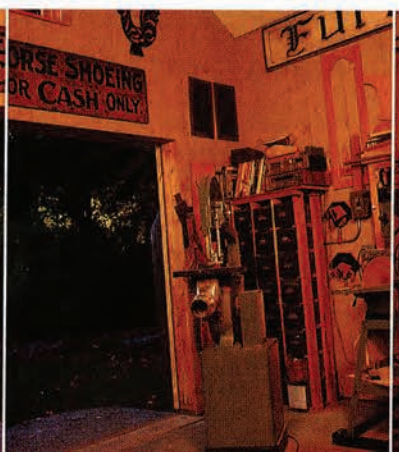


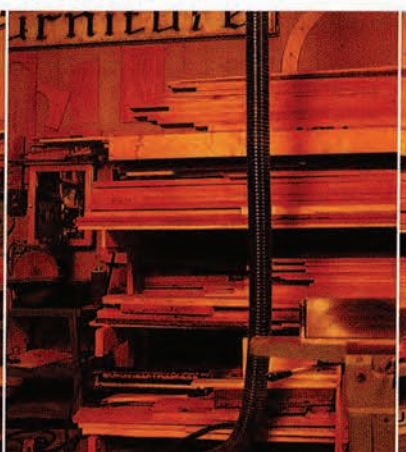
of the space—allows for free movement of tools and materials, without columns or trusses getting in the way. Three skylights, a dormer window and the white-painted ceiling bathe the interior with diffuse, natural light.

The ideal workshop doesn't sprout overnight. Norm worked for years in a cramped, dingy basement, lugging his tools and equipment from job to job. "The key," he points out, "is to let the place expand with your needs and resources."

Outside and in, the New Yankee Workshop makes a pleasant woodworking environment. OPPOSITE PAGE: A vine-covered pergola shades the windows above the bench from the harsh summer sun. BELOW: The 6-by-7-foot sliding barn door provides access to the lumber storage racks, along with plenty of light, ventilation and room for working long stock. The structure itself is sheathed with cedar shingles and painted clapboards to match the original workshop and to reflect New England's architectural vocabulary.

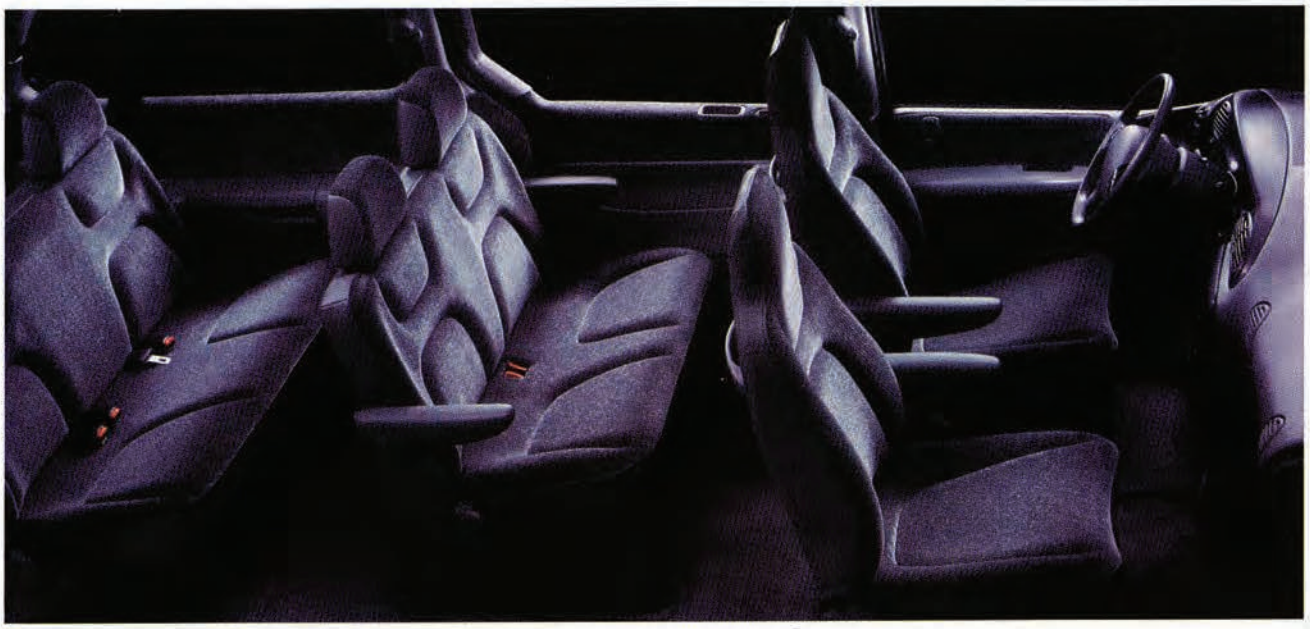
(Continued on page 54)





PLYMOUTH GRAND VOYAGER. THE

How about the flashlight? Or Dad's sunglasses? One thing you'll have no trouble finding in the all-new Plymouth Grand Voyager is storage space. More storage bins, cubbyholes, drawers, pockets and just plain old places to hide things away than ever before. Lift up the rear armrests, for example, and you'll find two huge storage bins. Tucked neatly beneath the front passenger seat is an available drawer with its own security lock. (By the way, that's where you'll find the map of Colorado.) Also available is an overhead console with a place for those



sunglasses as well as the garage door opener. There's a center console with a slide-away coin holder, cubby-hole and a compartment for storing stuff like CDs and cassettes. You'll find (eventually) well over a dozen storage spaces—and that doesn't even include the glove box. Not to mention Grand Voyager's cup holders.

The front ones, for instance, hold everything—from a four-ounce baby bottle to a full one-liter jug; they even hold juice boxes and coffee mugs. And should you have to hold something a bit bigger than a pacifier, well, that's where our new Easy Out Roller Seats™ come in. Or, should we say, come out; these industry-exclusive

IT SIMPLY SLIDES, ROLLS, FOLDS, PRO

†Always wear your seat belt. ††Excludes base models. Big Gulp® is a registered trademark of The Southland Corporation.

NEXT GENERATION OF THE MINIVAN.

bench seats now glide on nylon wheels, making them a cinch to move and roll away. All of which says nothing of the safety features hidden within Grand Voyager, like dual air bags,† four-wheel anti-lock brakes* and available integrated child safety seats. Simply put, the new Grand Voyager is better than ever—redesigned around the needs of people. You'll appreciate the convenience of our new driver's side sliding door—the only one of its kind available today. You'll also appreciate how easy Grand Voyager's sliding doors are to slide, now that they're on inclined tracks. We even made the exterior door handles with an extra degree of thoughtfulness—they're easy to grasp and operate even with a gloved hand. And while you're trying

Can you spot the tissue box, the pacifier, the baseball glove, Fido's chew toy and the map of Colorado?

to spot things, note that the sliding doors' middle tracks have virtually disappeared, integrated into the rear window frames. For more information, call 1-800-PLYMOUTH or see your local Chrysler and Plymouth dealer. They'll be happy to show you everything you don't see here. **Plymouth**

TECTS, UNFOLDS AND DRIVES BETTER.

Managing **Dust**

Two vacuum systems clear the air

Assuming we are what we eat, most woodworkers must be partially sawdust. When it comes to dust collection, Norm says, "I started with nothing. When you're young, you just don't think about it." In time, he became more sensitive to the fine dust produced by sanding redwood, mahogany, Port Orford cedar and other resinous wood species. He developed a sinus condition that eventually required surgery.

Norm first attempted to limit his exposure by using simple fiber filter masks. These are minimally effective, especially for a bearded woodworker, and they fail to remove the finest dust spewed by saws and sanders. Such residual airborne particles are particularly dangerous to inhale, and they can create a fire hazard or foul a finish. The problem is not restricted to the workshop; one of the biggest complaints from homeowners in the midst of renovations is the amount of dust that spreads throughout the house. "Anything you can do to keep the dust down will certainly be appreciated," Norm says.

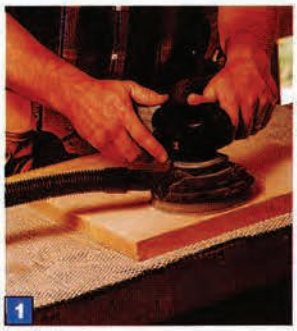
Random-orbit sanders are among the worst offenders. In the New Yankee Workshop, Norm relies on two lines of defense. The first handles dust collection right at the source: A hose plugged into a tight-fitting shroud on the head of the sander suctions the fine dust into a portable shop vac or a central vacuum system. A separate, two-stage cyclone collector removes the heavier dust and small chips from the work areas around each stationary machine by means of pickups and hoses. The bulkier particles are deposited in a canister beneath the cyclone blower, and the finer dust—about the consistency of milled flour—is siphoned off to a fabric filter bag in a separate room.

Good dust collection can make a big difference to your health and comfort in the shop, but there is a downside. "The big disadvantage," Norm says, "is I don't have enough sawdust around to mix with glue for filling gaps in a joint."

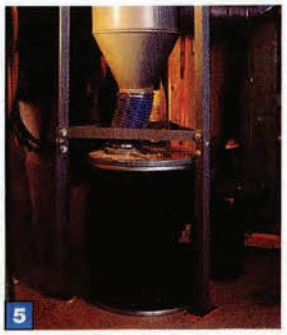
Barn doors and vacuums keep air fresh in the New Yankee Workshop. A central vacuum is accessible through wall fixtures, and a cyclone blower through ducts and flexible tubes, such as the hose at right.

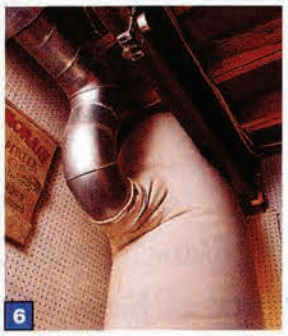
Catching the Fine Dust

Fine dust created by sanding is the hardest to capture and the most dangerous to inhale. In the New Yankee Workshop, most of Norm's sanders attach directly to a collection hose **(1)** that runs either to a portable shop vac **(2)** or the central vacuum system. The portable vacuum is triggered automatically by the sander switch; the central vacuum is accessible through a wall-mounted intake fixture **(3)**. The central collector **(4)** is located outside the work area in an adjacent shed.



Gathering the Heavy Chips

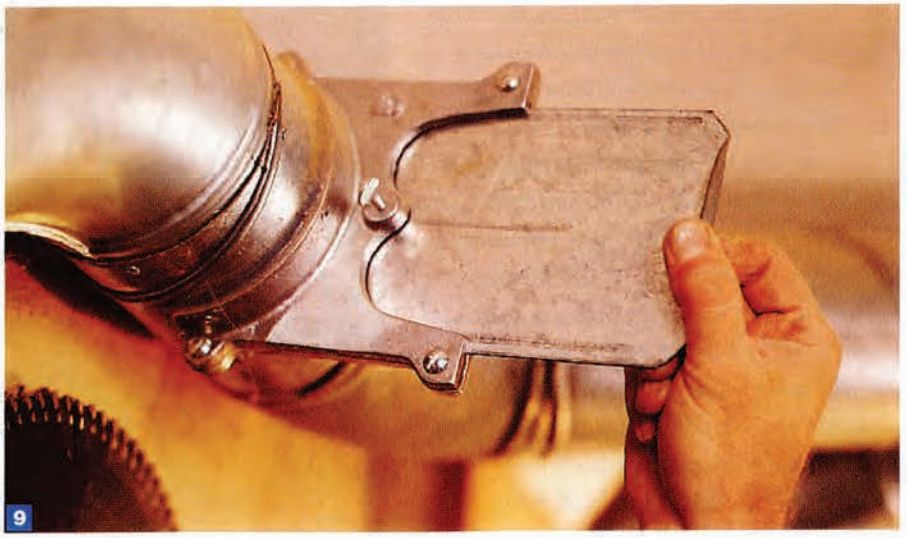




The cyclone blower takes care of heavy chips by suctioning them through a series of branching metal collection tubes and depositing them in a canister **(5)** beneath the blower. Finer particles of dust are carried through the system to an outside shed, where they are trapped inside a cloth filter bag **(6)**.

Two Easy Pickups

The weakest link of many workshop dust-collection systems is at the source. Norm solved this problem with specially designed pickups and chutes, such as a flexible drill-press connector **(7)** and a floor sweep **(8)**. The sheet-metal hoods effectively pull heavy chips from the floor and from around tool heads. Suction can be directed to any machine by opening a blast gate **(9)** in the appropriate branch line.



(See Directory, page 118, for details and sources)

How to Buy a Wreck

Where to turn when your mortgage banker pales

BY WILLIAM MARSANO

The 1948 movie *Mr. Blandings Builds His Dream House* (required viewing for anyone afflicted with the renovation virus) has a strong subplot about finances. Financing, however, is glossed over. Jim and Muriel Blandings pay for their glorious hovel, its subsequent razing and its rebuilding with no more than spare cash and a note signed by their lawyer.

In real life, most of us have to rely on mortgage bankers and appraisers instead. And there we encounter a basic formula: The bank calculates its loan based on the current appraised value of the house. Potential value—what you know the house will be worth after you've worked on it—is irrelevant. If you fall for a wreck and know it can be a palace, you will have to find the cash for the transformation yourself.

Or ask the federal government. A little-known program of the Federal Housing Administration can finance the ruin of your dreams. In fact, the 203(k) was specially created to encourage people who want to buy and rebuild houses. It bundles purchase and fix-up funds in one convenient loan and has several other appealing features.

Borrowers like it—once they learn it exists. From 1961 to 1990, only 5,382 such loans were written, an average of 186 a year. But in 1993 there were more than 200 a month, and after the FHA began advertising it early this year—and real-estate agents recognized it as a selling tool—the program really took off: 203(k)s for second-quarter '95 more than doubled over the same time period last year.

The 203(k) was created in 1961—"but

THE HANDYMAN'S SPECIAL
The rapacious real-estate agent (Ian Wolfe) introduces the Blandings (Cary Grant, Myrna Loy) to the old Hackett place, their "dream house."

EVERETT COLLECTION

quickly forgotten," says John Leith-Tetrault of the National Trust for Historic Preservation in Washington, D.C. "It was ahead of its time. People bought new-builds then, and later, when the economy encouraged renovating older homes, people used home-equity loans to expand their current houses. But the situation is changing. Historic preservation is growing, partly because more people realize sweat equity can mean a house of real character in a stable neighborhood. It's an alternative to a tract house in a featureless development. A 203(k) can make it happen."

Here are the 203(k)'s salient features. Most homes are eligible, as are most improvements over $5,000 (barring luxuries like new swimming pools) and most potential buyers: owner-occupants, investors and developers. There are no income limitations, and little up-front cash is required. Closing costs and six months of payments can be built in. Bundling the renovation and purchase funds means that closing costs are incurred only once. Buyers with provable skills can do some of the work themselves.

the **203(k)** was specially created to encourage people who want to **buy** and **rebuild** houses

The trade-offs? Higher administrative costs mean fixed-rate, 30-year 203(k)s usually cost 1.5 points more than conventional mortgages, so they're most attractive in down markets. There are regional loan caps. And they're more complicated than regular mortgages. "But that shouldn't be a problem," says Leith-Tetrault, "unless your banker is a doughnut." Complications and administrative costs stem from preplanning and appraisal requirements. In preplanning (nonexistent in conventional mortgages), an FHA-certified consultant examines your renovation plan and cost estimates, which should be precise and accurate (none of that "Well, maybe we'll put in a window" stuff). Homeowner labor must be estimated at a contractor's "book price"—that protects the lender against homeowner burnout. If the preplanner spots health or safety hazards, you must budget for fixing them.

Then an FHA-certified appraiser estimates the property's post-renovation value. That figure will be the maximum borrowable amount. All this takes time. "Make sure your contract's contingency clause specifies 'subject to 203(k) financing,'" says FHA architect Ken Crandall. "That allows you an out, if needed, and lets the seller know response won't be immediate." After closing, you and your contractor have 30 days to start work and rarely more than six months to finish. Renovation funds are paid out on a schedule as work is completed and approved during up to five FHA inspections, so make sure your contractor can wait for payment. An unexpected hazard is the doughnut mentioned earlier—a banker unfamiliar with 203(k)s. "Some lenders took six or eight months, giving the program a bad name," says Crandall. "If your lender can't complete in 90, 60 or even 45 days, go to someone who knows what he's doing." And get a copy of the U.S. Department of Housing and Urban Development's 203(k) booklet (50 cents) before you start hunting for your handyman's special.

THE DEAL-BREAKER

A letter from one of our readers, Bill Brower of Hempstead, New York, illustrates one of the problems that can derail a 203(k) loan: the banker.

In January, Bill and his wife, Debbi, sought a 203(k) of $120,000 for a 1928 gambrel-roofed Dutch colonial. After four months of form-filing, the loan was approved. On the day of closing, the bank told the Browers how much they'd be expected to put in escrow: $101,986.36. After gasping—and then scrambling, scraping and calling all their relatives—the Browers were able to buy the house. Then Bill asked us to figure out what had gone wrong. "I got him to write the letter to you," says Debbi. "He had pulled out all his own hair and was beginning to reach for mine."

Numbers proliferate menacingly on an FHA Mortgage Credit Analysis Worksheet. That's because the sheet encompasses the dollar value of both purchase and renovation:

$100,000.00	**purchase price (less down payment)**
98,466.16	**estimated renovations**
5,125.00	**borrower's closing costs**
14,379.15	**contingency fund (15% of renovations)**
$217,970.31	**total to be secured**

The numbers got out of control in a couple of ways. First, Brower, a veteran contractor, discounted the work he'd do himself—but the preplanner added 25 percent to reach "book price." Then the amount of the contingency fund came as an ugly surprise. Finally, the appraisal was only $175,000.

But what about the house? Doesn't the house secure the loan? Not here. When renovations virtually equal purchase cost, you're not talking kitchen facelift but a gut job. A house can secure a loan, but a jobsite cannot. Brower would have to escrow $102,000 to draw down as work progressed.

"Okay, the numbers didn't work," Brower says. "But why torture me for four months?" His loan officer, Dean Hartman of Exchange Mortgage in Huntington Station, New York, says, "That's a tough question. I probably wasn't well-versed enough at the time to give him the numbers he needed. There was miscommunication, and I take most of the responsibility—it's my profession." Hartman says lenders weren't prepared for this year's flood of 203(k) applications. "It was a new loan product to us in the first quarter [when Brower applied]. We hadn't learned where to look for red flags, and a lot of people got hurt," says Hartman. "Now, six months later, we know where the red flags are. If Bill were to come in today, we'd be done in about an hour."

THE FINAL CUT

Ian Richardson returns as the nefarious Francis Urquhart in this final installment of the *House of Cards* trilogy. After explosive political backlash and personal repercussions, does he finally meet his match? Some might think so but we couldn't possibly comment. Airing in February.

Thank you
Mobil
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Masterpiece Theatre.
Here's to the best season ever!

Sunday nights on PBS
Produced by WGBH Boston

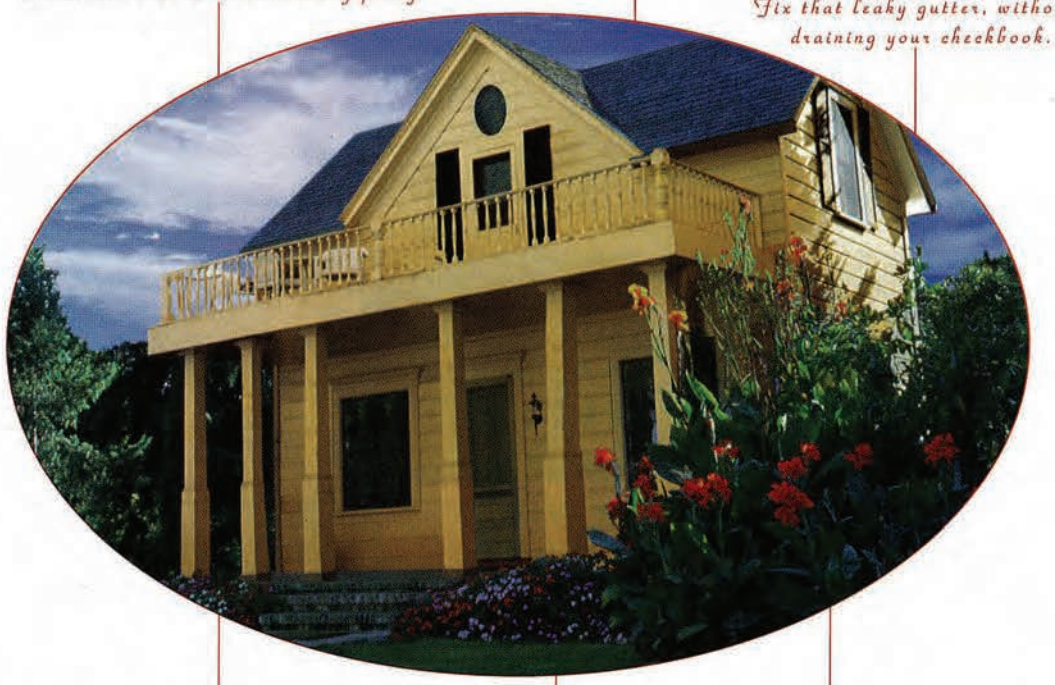
WGBH

THE BUCCANEERS
Inaugurating its 25th anniversary year in October, *Masterpiece Theatre* offered Edith Wharton's adventure of four young American heiresses who invade Britain in search of social respectability and aristocratic husbands. What they had to pay is more than they had in mind.

PRIME SUSPECT
Helen Mirren stars as Superintendent Jane Tennison in two upcoming, all-new films. In *Inner Circles* (airing this winter) and *The Scent of Darkness* (airing this spring), corruption, fraud, and serial murders test Tennison's mettle – as an officer, as a woman.

Masterpiece Theatre **is made possible by a grant from Mobil**

Finally, multimedia finds a home.



③ Design and build a backyard deck. Celebrate with a deck-warming party.

② Landscape your yard like a pro, without having to hire one.

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④ Compare specs and dealer invoice prices on more than 800 new cars. Watch video demos in our PC "showroom."

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A LETTER FROM

This Old House

With 124 Federal Street (the current *This Old House* project in Salem, Massachusetts) well into its allotted 18 shows, we asked Deborah and Kevin Guinee, the homeowners, to tell us about life with Norm and Steve—not to mention the director, the cameraman, the sound engineer and the grip. "It's always interesting," says Deborah, "but sometimes it's a little humbling." The Guinees, who renovated two previous houses themselves, cannot help comparing the crew's work with their own. "Like watching Norm and Steve tile the kids' bathroom," Deborah says. "They were marvelous. They worked quickly without wasting time. They got the tiles spaced evenly, just right. When I did that, I was happy just to get the tiles to fit."

Kevin has been working six days a week at his Ford dealership. Deborah, whose work as a coronary-care nurse gives her a slightly more flexible schedule, has appeared more often on the show. Norm, Steve and company are completely used to chatting to the cameras without any scripts; for Deborah, of course, it's a new experience. She occasionally feels the pressure of having to "hit my marks," in stage terms. "When I mess up my lines," she says, "Russ is always very kind. He always says not to worry and just try again, but of course the scene does have to be done over, and the frustration does have to come out somewhere. So there'll be a dramatic shout to the guys: 'One more time, please!' as if it was all their fault."

On their marks: architect Ann Beha, *This Old House* director Russell Morash, and homeowner Deborah Guinee.

The renovation project itself has been visited by the glitches of Salem. The town's streets are narrow, and there is no space in front of the house, so the Guinees planned to build a carriageway through a rear ell that had been added to the house, in order to gain parking space in the backyard. Altering the exterior of any house in the historic McIntire district of Salem requires approval from the architectural review board, a process that always takes a bit longer than anyone expects.

Also: "We had planned to revise the kitchen's window treatment, which I have since learned to call 'fenestration,' to expand the view of the backyard," Deborah explains. "When Tom Silva set to work, he discovered that the walls between the windows were badly rotted. That was bad enough, but this part of the kitchen was a shedlike later addition, and the builder had simply cut right through most of the load-bearing supports. There was nothing holding up that part of the house." The first Deborah knew of this was when Kevin one morning said casually, "Oh, I think Tom has some problems with the walls. You might want to go see him." Deborah went over to the house and headed straight for the hammering sounds. "I opened the door to what I thought was the kitchen and practically walked into the backyard. The structure was in such bad shape that Tom had simply torn it down."

Amazingly, the Guinees are enjoying the process. "Our previous renovations were hard work, and I was just some ordinary person with crooked tiles and paint in her hair," says Deborah. "This time around it's a dream come true. Not only do I know that everything is being done right, but I'm also meeting nationally known restoration experts. It's a thrilling experience."

PHOTOGRAPH BY MICHEAL MCLAUGHLIN

They came from as far away as Anchorage, Alaska.

"Attention: there's a white Saturn with its lights on..."

The whole thing had folks, well, all fired up.

Wave, build a car, wave, build another car...

Some little folks made the most of our dent-resistant doors.

Spring Hill, the home stretch.

Maybe you read about it. Or perhaps you saw the commercial on TV—the one where 44,000 people gave up their usual summer vacations to come visit Spring Hill, Tennessee, the place where Saturns are made. ■ It was called The Saturn Homecoming. And it probably says more about customer satisfaction than any auto industry poll ever could. Not that we're knocking polls, mind you; we happen to do very well in them. But a poll just can't measure things like why a man from Portland, Oregon would stand in line for over an hour outside the factory just for the chance to go inside and thank everyone for a job well done. ■ A poll can't quantify what it meant to a family from Boston to have their picture taken with the people who painted "Ginsberg," their '93 Saturn wagon. ■ A poll can't tell you the effect of seeing several thousand enthusiastic owners spontaneously sign their names to what was, just a few hours earlier, a blank wall over in the final assembly area. ■ And a poll certainly won't reflect what it felt like to be a team member on the line that day, being reminded over and over that what you do matters. ■ No, there are a lot of things about The Saturn Homecoming that just can't be explained rationally. Perhaps the best and most accurate description can be found in the words of a Saturn owner who was there: "It was something." ■ Yes, it was.

The 1996 SL

Last summer, thousands of Saturns were returned to the factory.

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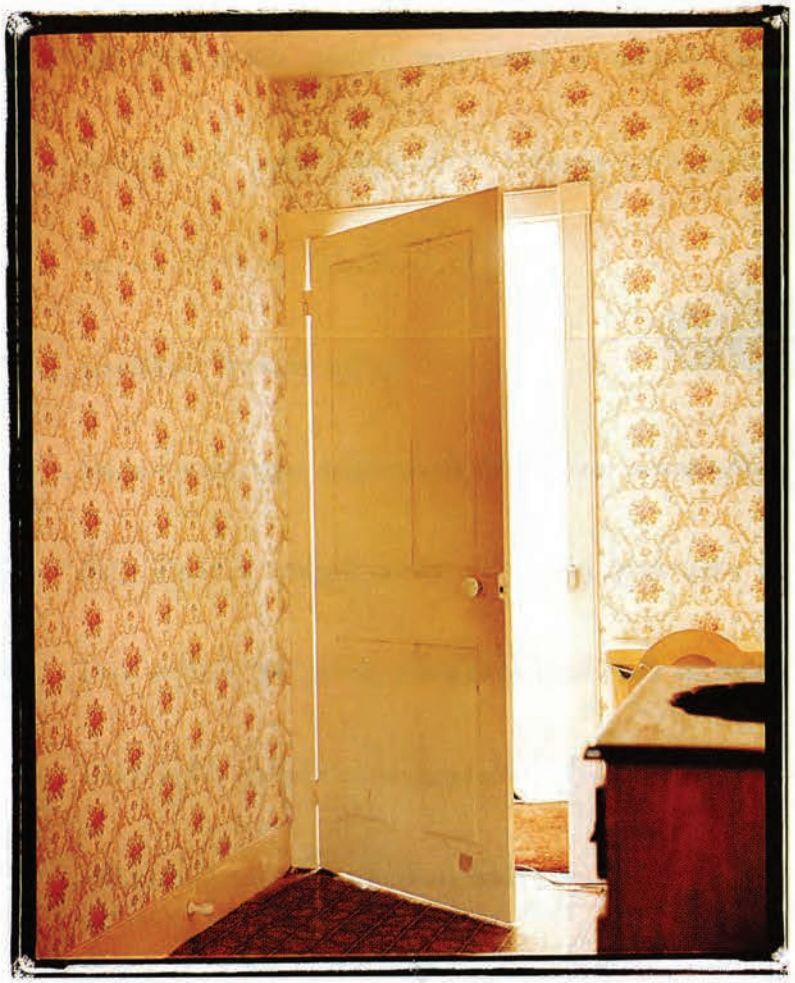
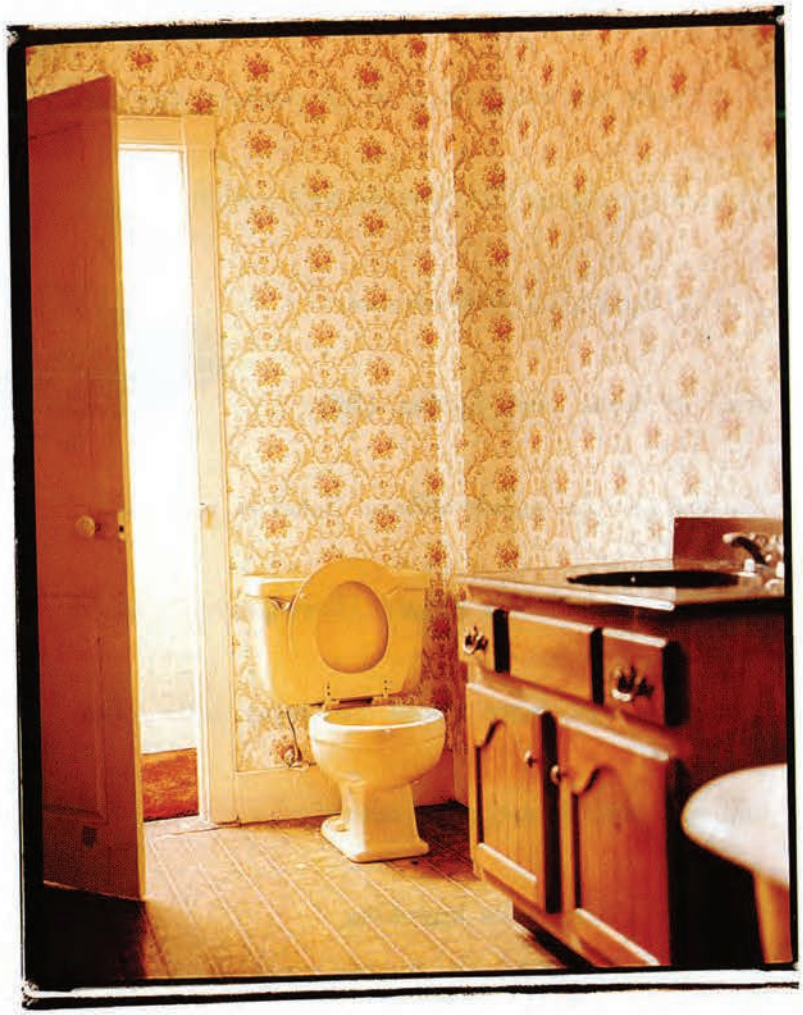
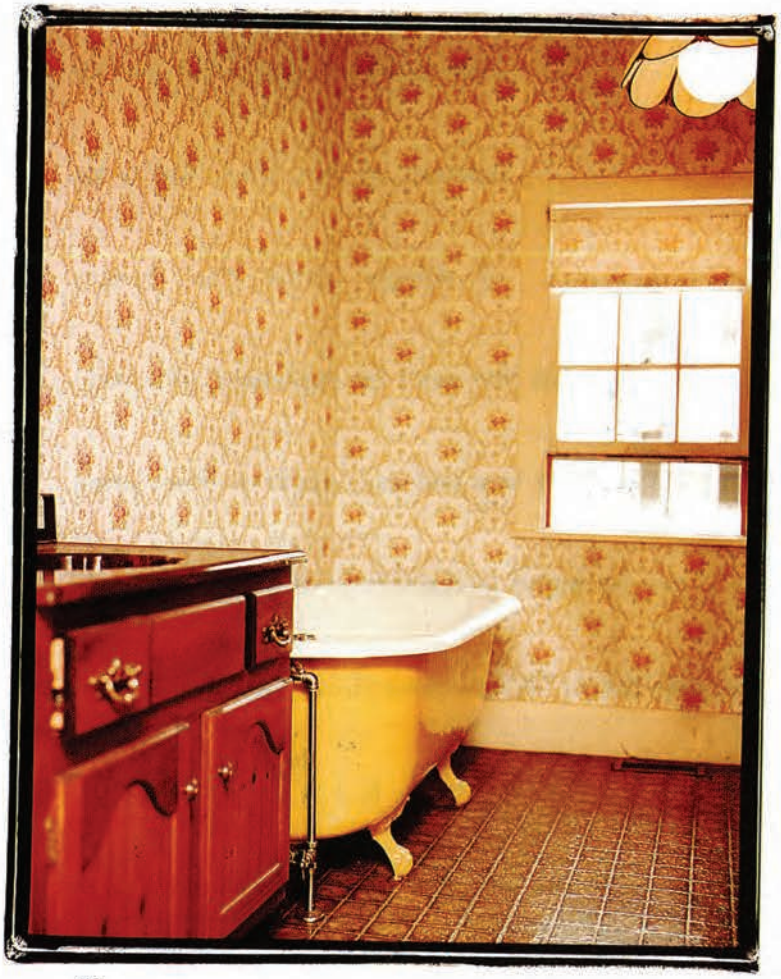
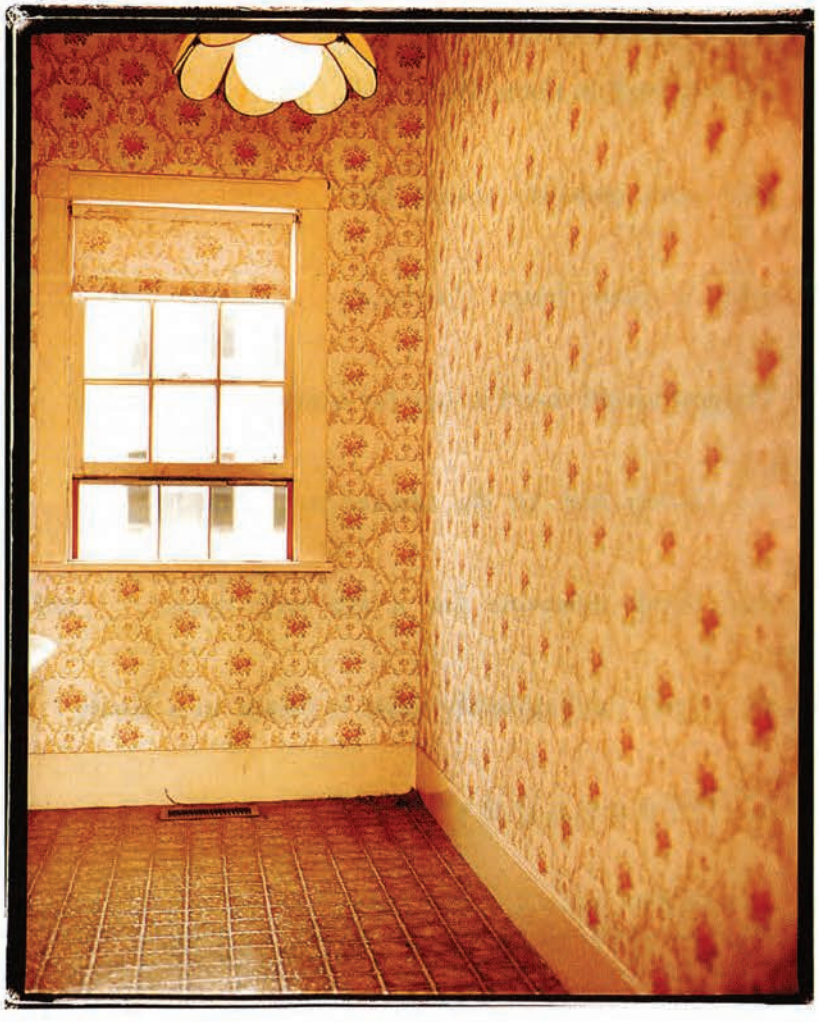
This 1996 Saturn SL has an M.S.R.P. of $10,885, including retailer prep and transportation. Of course, the total cost will vary seeing how options are extra, as are things like tax and license. We'd be happy to provide more detail at 1-800-522-5000 or look for us on the Internet at http://www.saturncars.com.







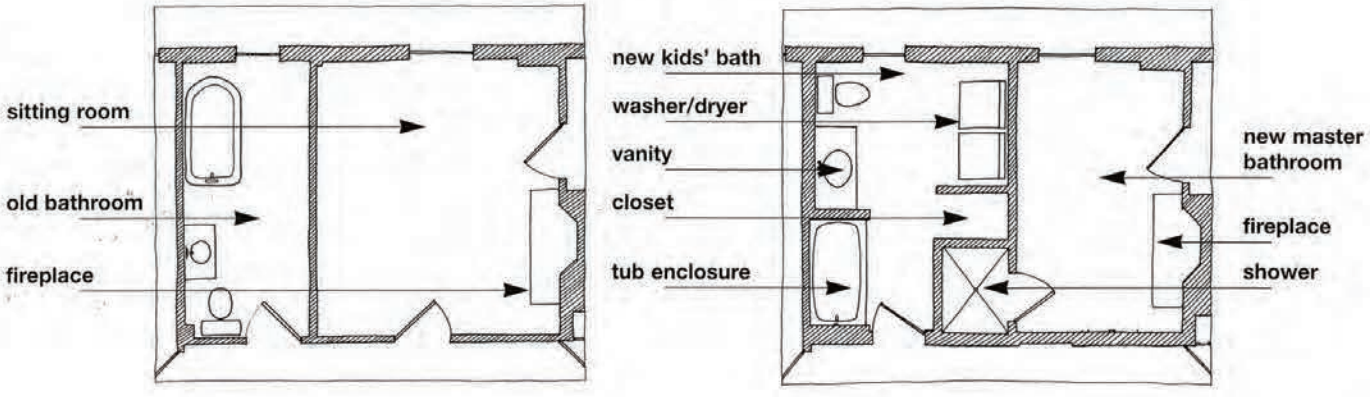


bathroom

By Pamela Hartford Photographs by J Michael Myers

A truly comfortable house these days can't have too many electrical outlets or bathrooms—two items in short supply in many old houses. Kevin and Deborah Guinee's 19-room 1760s house had only one narrow second-floor bathroom, to be shared with their two children and anyone sleeping in the guest room. Deborah wanted a children's bath that was easy to clean and offered storage for linens as well as bath toys and cleaning supplies. She also wanted her washer and dryer close to the bedrooms. To solve these problems, a small sitting room between the bathroom and the master bedroom was converted into a new master bath, and the existing bath was redesigned for children and guests. Here is how architect Ann Beha, the Guinees and *This Old House* redid the old bathroom.

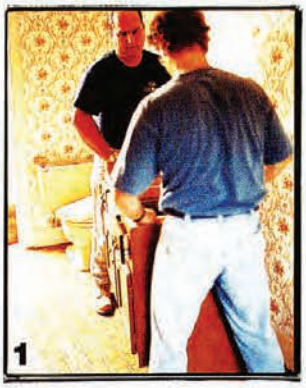
Before and After

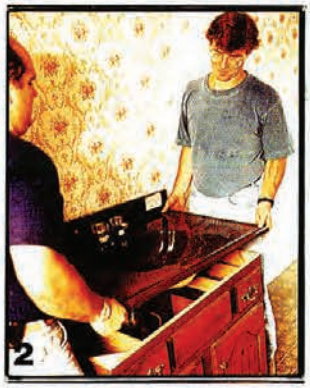


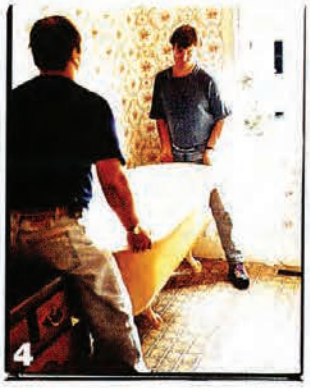
ILLUSTRATIONS BY JOHN MURPHY

DEMOLITION

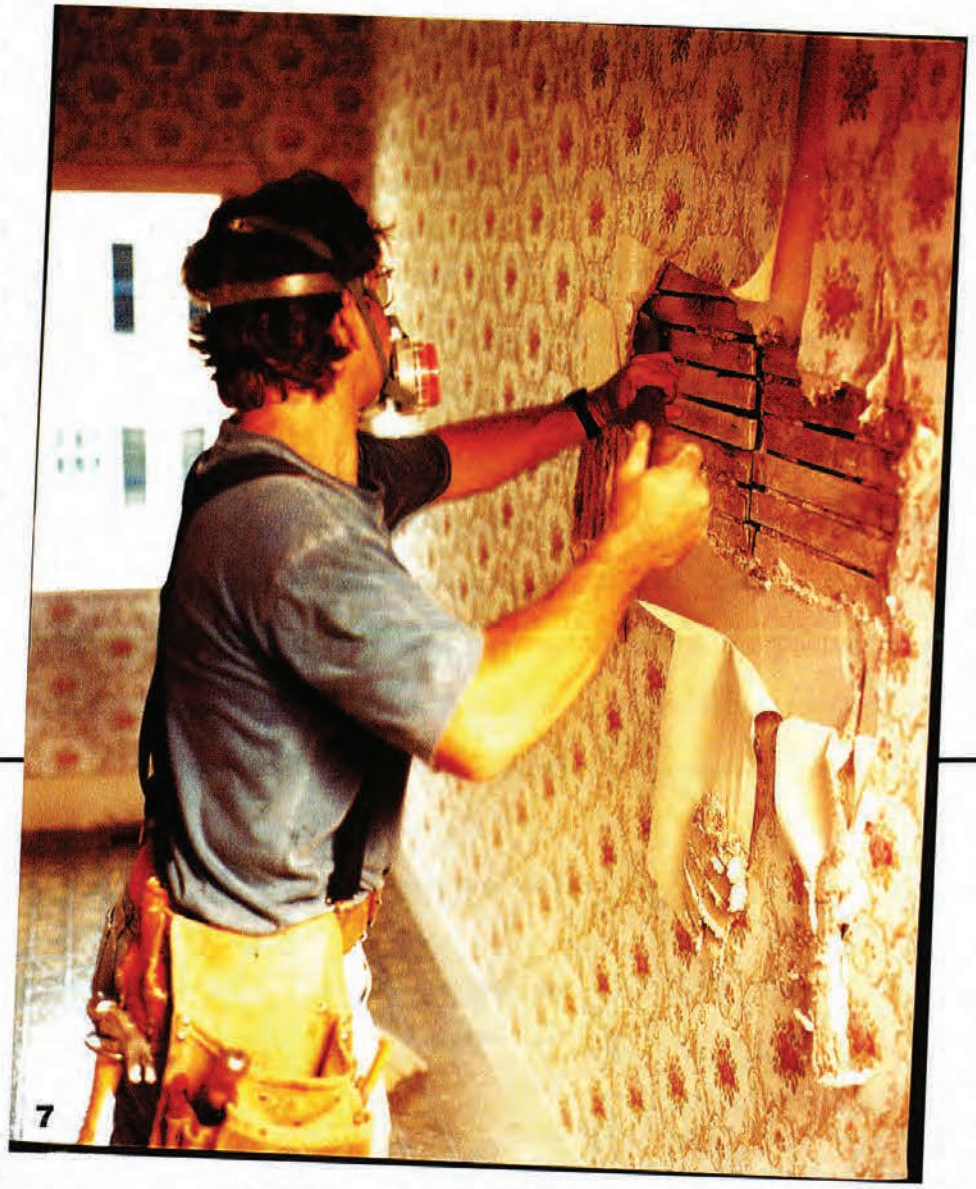
(1) Before demolition begins, Richard Trethewey shuts off all water flowing to the bathroom. He also shuts off the electrical service. **(2)** He and Steve disconnect the old vanity from the water pipes and carry it off. **(3)** Richard cuts off the claw-foot tub's pipes with a reciprocating saw. **(4)** The tub is carried out to be resurfaced and moved to the master bath. **(5)** Richard pulls the vinyl floor covering off the wood floor beneath.





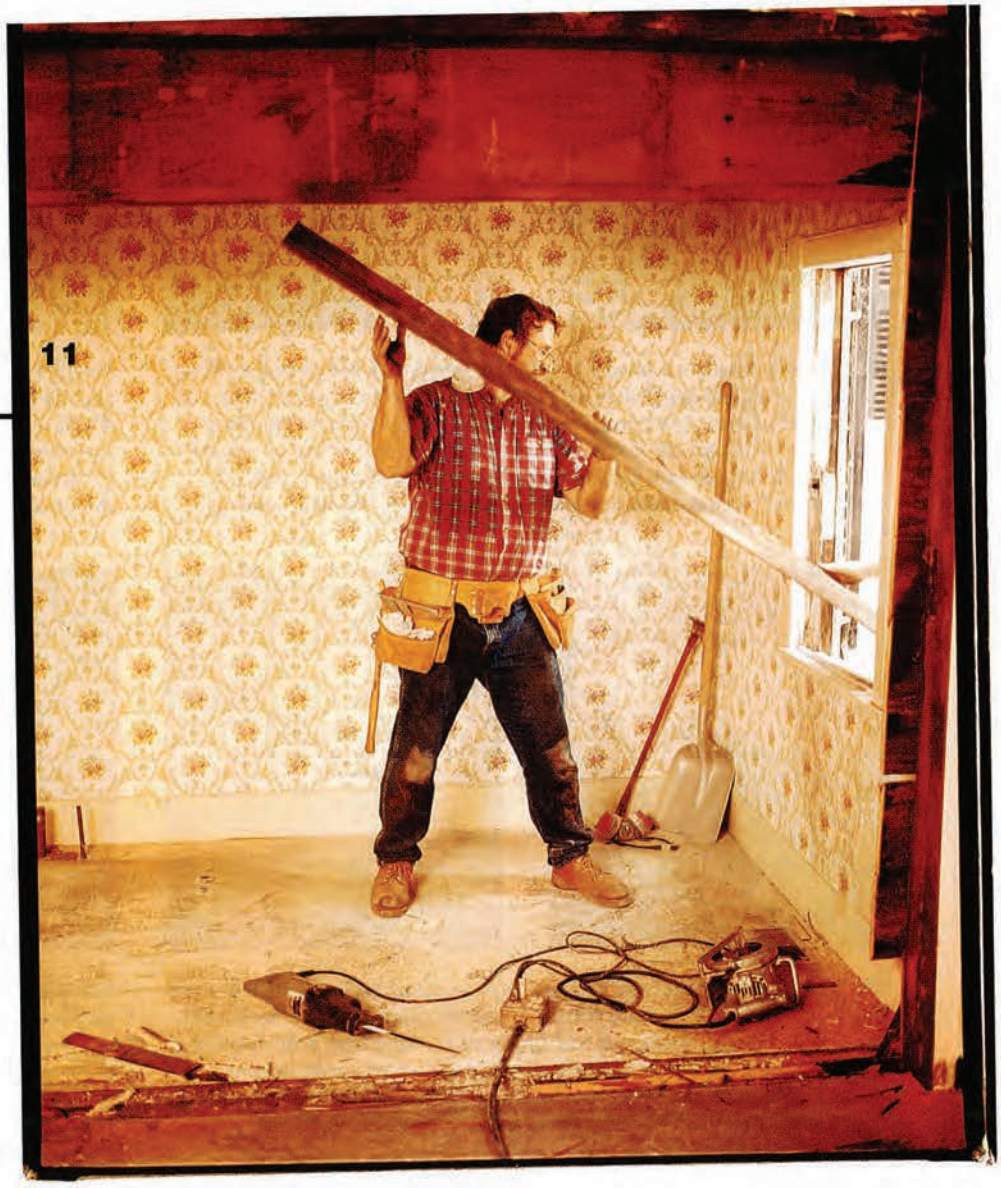


In conversations with the Guinees, Steve Thomas, who helped to design his own children's bath, recommended a tiled floor and tub enclosure and a sink with ample counter space. Norm Abram suggested a bathtub with a shelf at one end, practical for kids. The resulting layout features a 4-foot vanity with a solid-surface top and integrated sink, set near the window to take advantage of daylight. A new full-height closet with wire-coated shelves provides storage space, as do shelves over the washer and dryer. Master plumber Richard Trethewey selected a low-flow toilet and a hand-held sprayer for the tub faucet, great for getting shampoo off small heads. Deborah Guinee chose hand-painted decorative tiles that will retain their appeal as the children grow up.



(6) Norm uses a ripping bar to lift off the flooring to get to the subfloor. **(7)** Steve dons a respirator mask and hefts a square shovel to pull the wallpaper and plaster from the lath. **(8)** After the plaster is cleared away, he and Norm study the exposed hand-split lath. Behind the studs they discover the original exterior wall of the house, made up of 18-inch rough-cut boards that have been beveled on each edge.

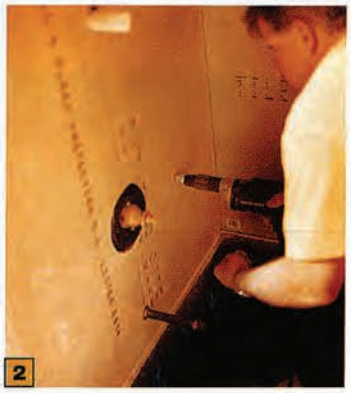
(9) Richard and Norm discuss the location and construction of the new bathroom walls. The old walls are too shallow to carry the venting and plumbing for the new fixtures; each new wall is designed to give Richard enough room to accommodate the necessary plumbing. **(10)** Norm breaks the wall frame away from the old exterior sheathing and dismantles the rough-cut boards. **(11)** He sends the studs and sheathing out the window into a dumpster below.

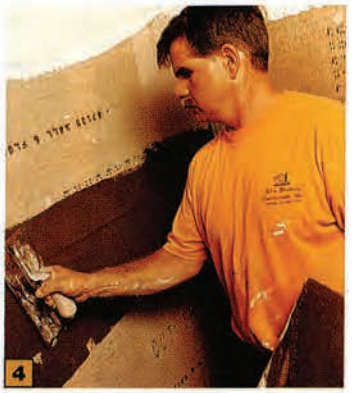


Carpentry work was minimal, but reconfiguring the plumbing system demanded some ingenuity from Richard. The vent pipes were moved and the old chase for the toilet eliminated. After the old subfloor was relaid to provide a sturdier base for the washer and dryer, Richard installed radiant in-floor heating; the Guinees will walk on warm tile floors all winter. He also installed safety features on the washer, including an overflow pan and an electronic shutoff valve that cuts the water supply to the hoses when the machine is turned off. To keep costs down, the design of the floor and tub surround was simple (no diagonals or fancy cuts) so tiling could be done by Norm and Steve. When the crew leaves, the Guinees will take care of the paint and wallpaper.

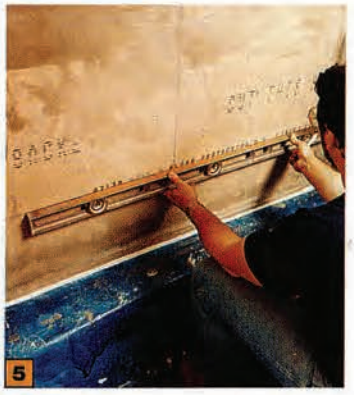
(12) Tom Silva and his nephew Charlie raise a newly framed furring wall of 2x3s to go behind the vanity. **(13)** The new 2x6 wet wall holds plumbing for the washer and dryer, the chase for the toilet and the 4-inch dryer vent. **(14)** Charlie Cashin rough-plumbs the fixtures in the new tub enclosure. **(15)** Tom puts in fillers before re-attaching the subfloor. **(16)** Charlie puts up greenboard (drywall with a water-resistant finish) around the closet and laundry door.

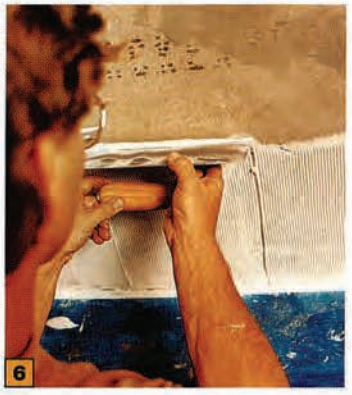
THE TILING

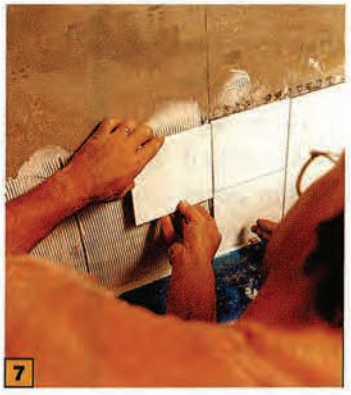


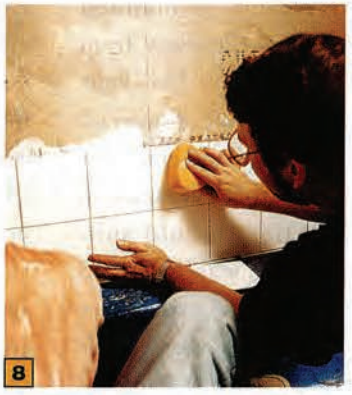


(1) Tom Silva lines the framed tub area with cement backer board, a strong substrate designed specifically for tile installation, to a height of 5 feet, well above the wet area. The board has an interior core of sand and portland cement and an outer reinforcing skin of fiberglass mesh. It can be scored and snapped, or cut with a diamond blade if a smooth edge is desired. **(2)** Tom attaches the board using self-drilling screws. The blue coating on the tub is a temporary sealer to protect it from damage during construction. **(3)** On the upper wall, which will not be tiled, Tom puts up greenboard, a type of water-resistant drywall. He applies a water-resistant joint compound to the seams with a 6-inch knife. The compound takes 90 minutes to harden. **(4)** With a flat trowel, he applies a portland cement mix over the seams and corners, which have been taped with fiberglass tape.

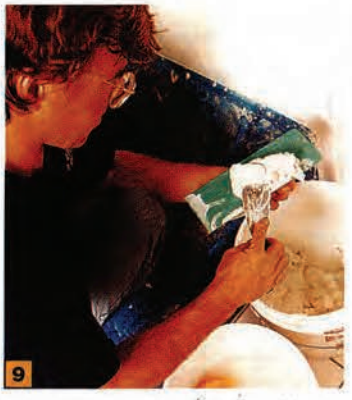








(5) Norm begins the tiling by establishing a level line and a plumb line—the key to laying out tile. He sets the first tile at the point where the lines meet. The process is a lot easier in a new area built for tiling than in an existing, out of square area. **(6)** Steve applies enough premixed acrylic adhesive to cover a section he can tile in 10 minutes. He uses the notched side of his spreading trowel, held at a 30-degree angle, to make a ridged base into which he and Norm press the tiles. The depth of the trowel notches should be about two-thirds the thickness of the tiles. **(7)** The 6-inch tiles fit snugly together and are self-spacing, although they are slightly irregular and must be worked in place to keep the lines straight. Shims under the starting line of tiles provide space for caulking. **(8)** Norm sponges adhesive from the tiles before it cures; if the adhesive dries, thinner is needed to remove it.



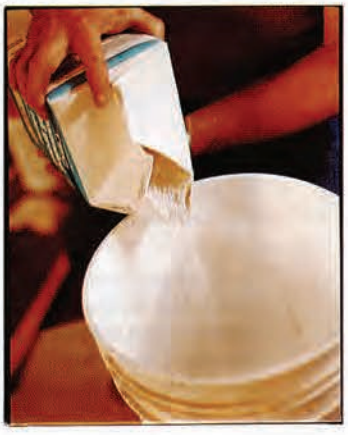
(9) Steve prepares a trowel full of mixed grout, then applies it to a small area of the wall. Sand is often used as a filler in grout, but because the joints between these tiles are less than 1/16 of an inch, unsanded grout is used to allow a tighter fit. White grout was chosen to blend in with the tiles. **(10)** Steve spreads the grout with a float held at a 30-degree angle, making one pass vertically, then another horizontally. **(11)** He presses the grout into the tile joints until they are filled. Then he makes a final pass, holding the float diagonally and at a 45-degree angle to the tiles. **(12)** After the entire enclosure is grouted, Steve uses a barely-damp sponge to wipe down the tiles before the grout hardens. He damp-wipes in a circular motion, taking care not to gouge out the hardening grout. In 24 hours, when the grout is almost dry, he will remove any residue by buffing with a dry cloth.

THE SIZING AND CUTTING

For straight cuts and trimming narrow slices of tile, a diamond-blade wet saw (top) is the surest and easiest tool to use. Too large and expensive for the homeowner's arsenal, it can be rented from most tile dealers or home centers. The diamond-tipped blade is cooled by a stream of water from a recirculating pump. Tom Silva uses nippers (middle) to make a curved cut to go around a pipe fitting; he first marks the cut with a grease pencil, then nips out small bits of the tile until the opening is clean. The hole will be covered by the faucet trim, so a perfect fit is not critical. For cut tile that will be visible, such as the piece that curves around the tub, nippers can be used to cut the curve, and the untoothed blade of the wet saw (bottom) can follow up to create a smooth, slightly rounded finish. Norm tried out a new cordless handheld diamond wet saw (above) that proved quite versatile, combining the clean cuts of the stationary diamond saw with the nippers' maneuverability. "It's great for complex cuts that a nipper couldn't do," he says, "and for doing a few tiles at a time, like a repair job, it beats setting up the big saw." Here Norm cuts a tile freehand.

MIXING THE GROUT

After the tile adhesive has set for 24 hours, Norm mixes the grout. Instead of using water, he prefers an acrylic-latex base that contains adhesives and becomes water-resistant when dry. Norm pours the base (called "milk" in the trade) into a pail, using slightly less than he thinks he will need to allow for adjustment. He slowly adds powdered grout, a little at a time, mixing after each addition and checking the result. "The consistency of the grout is critical—too much liquid will weaken it. When it feels like cookie dough, it's ready to go."



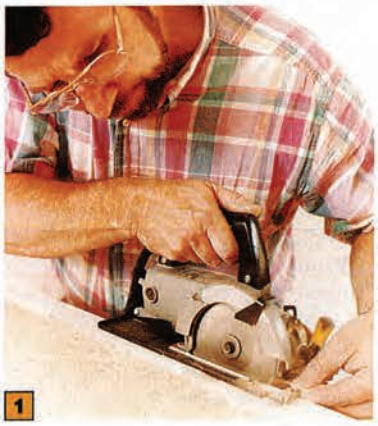
CHOOSING TILE

Tiles are produced from fired clay or cut from natural stone. Most tiles sold in the United States are **ceramic tiles**, made from clay, ground shale or gypsum and other ingredients such as talc, sand or vermiculite. Ceramic tiles are categorized according to **permeability** (water absorption) by the American National Standards Institute, which determines how the tile can be used. Categories run from **nonvitreous (readily absorbs water)** to **semivitreous, vitreous** and **impervious**. The vitreous tile the Guinees chose for their floors was fired at 2,200 degrees Fahrenheit, which fuses the ingredients like glass, making the tile both durable and appropriate for use in a wet area. The tiles also have a matte finish that is less slippery when wet. A waterproof glaze was fired onto the nonvitreous wall tiles the Guinees chose for the tub enclosure.

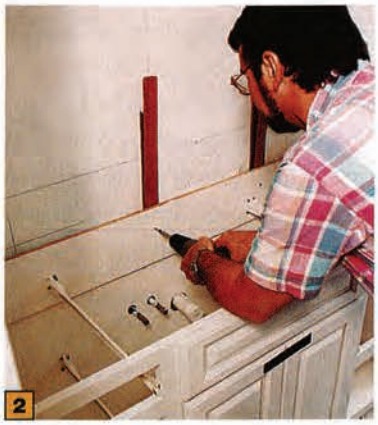
In terms of design, tiles are either **field tiles** (those set in the main field of an installation) or **trim tiles** (those shaped to border and complete the main field, such as a bullnose). Tiles with hand-painted designs or raised relief shapes are called **decoratives**. Most tile makers offer a range of trim tiles designed to be used with their field tiles. It is almost impossible to get a trim tile from one manufacturer to match a field tile from another; it's better to work out solutions with what's available in one line. When ordering, bring a measured drawing of the areas to be tiled so a dealer can help design the installation, ensuring that the trim tiles cover the corners and meet the edges properly. The dealer will estimate the number of tiles needed, adding at least 5 percent to provide extras in case of miscuts or breakage and for later repairs.

All tile must be laid with consistent spacing. Some tiles come with **self-spacing lugs** on the edges, determining the width of the joint. The Guinees' floor tiles were not self-spacing, so they used ⅛-inch spacers (above). **Spacers**, small plastic devices in varying widths (from 1/16 to ½ inch), are fairly new; tile setters traditionally use anything from nails to a **stringcourse**.

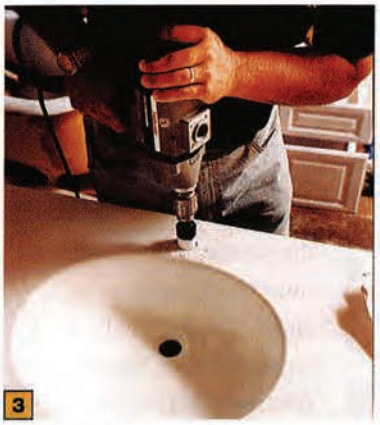
FINAL TOUCHES



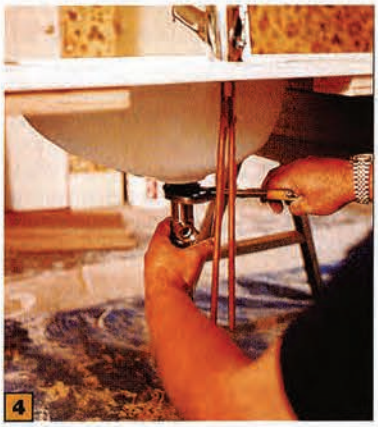
Norm prepares the stock vanity for installation. He uses a trim saw to scribe and trim the edges that will meet the walls and the floor so the vanity will sit level and plumb.



After he cuts holes in the back to accommodate the plumbing and sets the cabinet in position against the wall, Norm screws it in using 2½-inch screws.

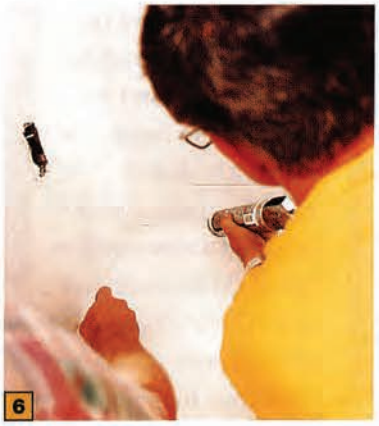


In the next room, Richard readies the integrated sink and countertop to receive the single-lever faucet, chosen by Deborah Guinee to be easy for small children to use.



Richard tightens the drain on the sink in preparation for installation. He always installs the faucet and drain assembly before setting the countertop in place on the vanity.

He puts small beads of silicone for adhesion along the top edge of the vanity, then carefully checks the final positioning of the countertop before he and Norm gently set it in place.



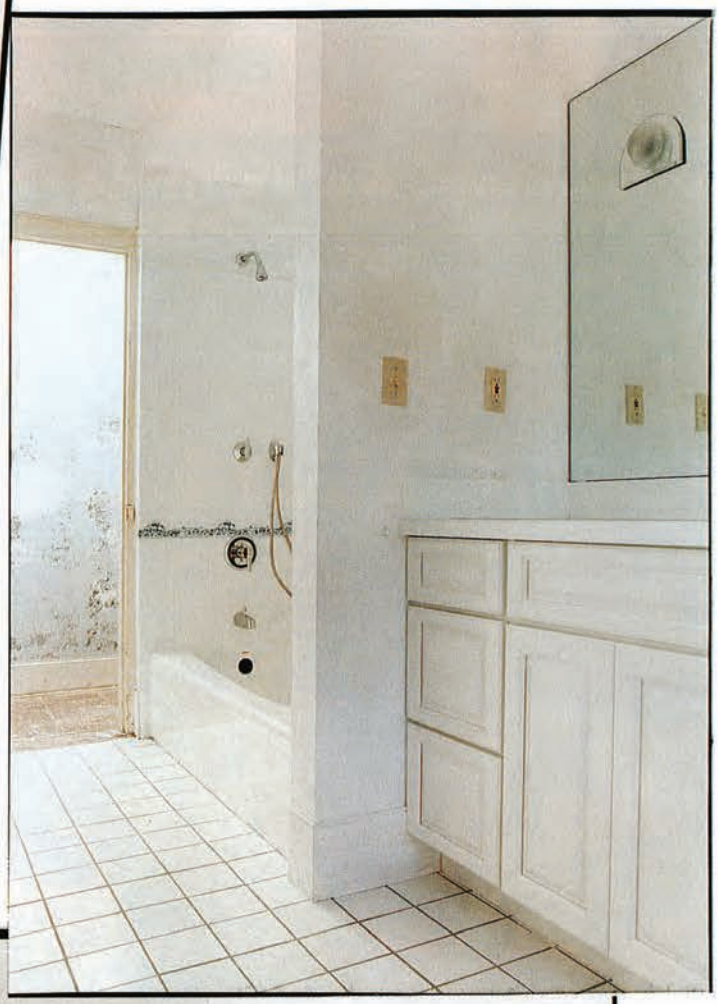
Tom applies a silicone caulk that contains a mildew preventive, first sealing the countertop to the wall, then sealing the backsplash to the countertop and the wall.

Electrician Jeff Perry wires the electrical box. It has been recessed so that halogen lights can be mounted flush against the mirror to be installed above the vanity.

Norm puts mirror adhesive in dabs along the wall. Dabs, rather than a solid line, help the mirror adhere to the uneven wall surface (even newly built walls have some imperfections).

Small rubber blocks are set along the backsplash so the mirror is not in direct contact with the solid surface. Steve and Norm will brace the mirror to the wall while the adhesive dries.

♦ *See Directory,* on page 118, *for details and sources*



PUNCH LIST

A listing of final details that require attention:

- A door from the Guinees' bedroom will be recycled for the bathroom closet. Norm built a new frame for it and will hang it after it is painted.
- The trim around the door and window will get a fresh coat of paint.
- The tub-to-tile connection needs to be caulked after the grout has cured for two weeks.
- The tub drain and faucet plate are on order and need to be installed.
- The thermostat is not hooked up yet.
- The window sashes will be painted and reinstalled before the cold weather sets in.
- Deborah Guinee is shopping for hardware for the vanity, towel hooks, a toilet-paper holder and the perfect shower and café curtains.
- She will also paint the baseboard herself, and wallpaper the walls.


EVERG
No pruning. No painting. No fall bare spots.

REENS

Plant dwarf conifers to make a living fence.

In summertime, a tangle of shrubs and flowers creates an effective barrier around many properties. Come fall, leaves drop, and the neighbor's pool looms large between the fence slats. It's time for a permanent screen: beautiful, alive and as good from the back as from the front. We're planting a living fence, a hedge of evergreens.

BY KEN DRUSE

PHOTOGRAPHS BY CHRIS SANDERS

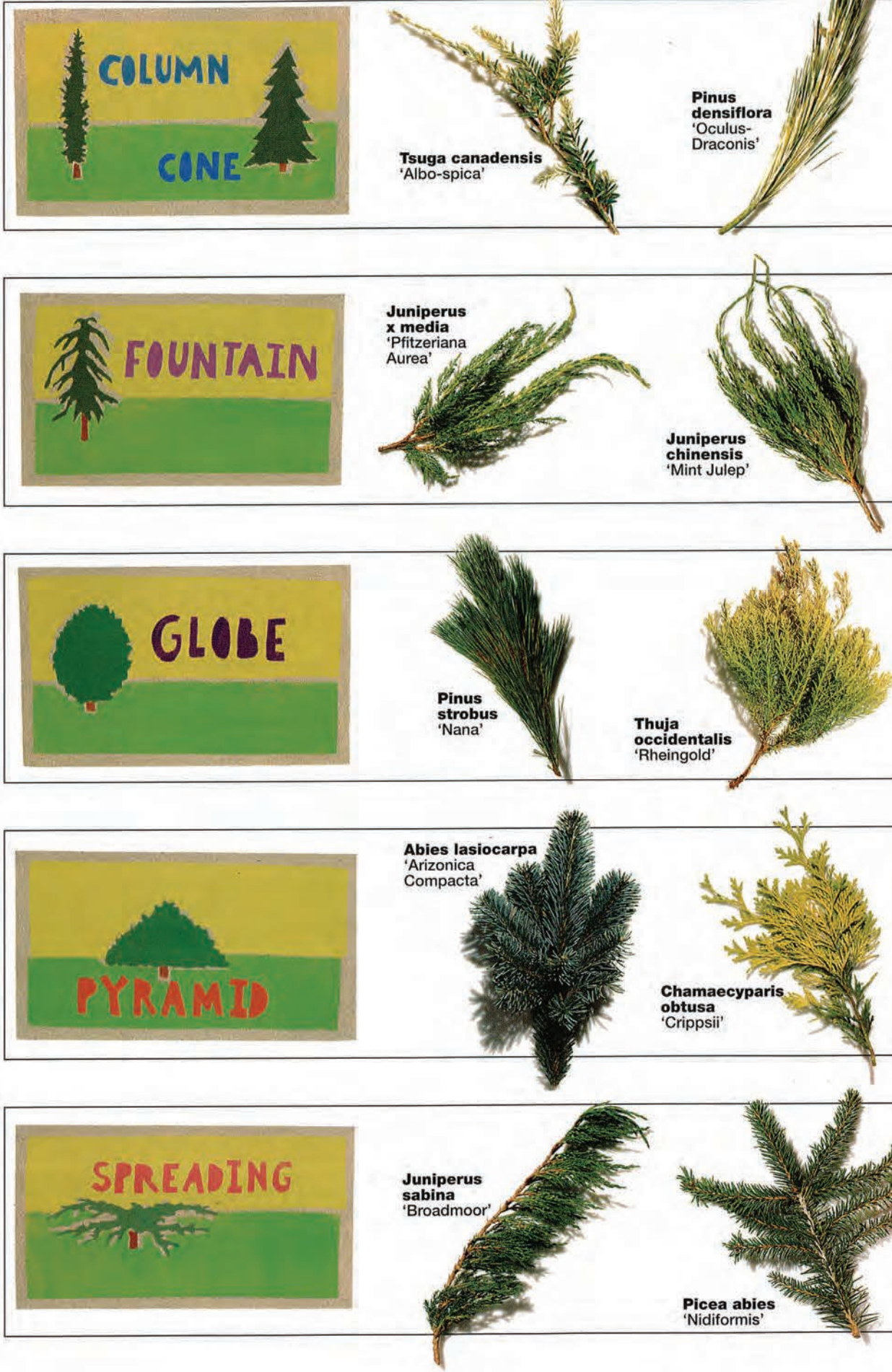
Choices

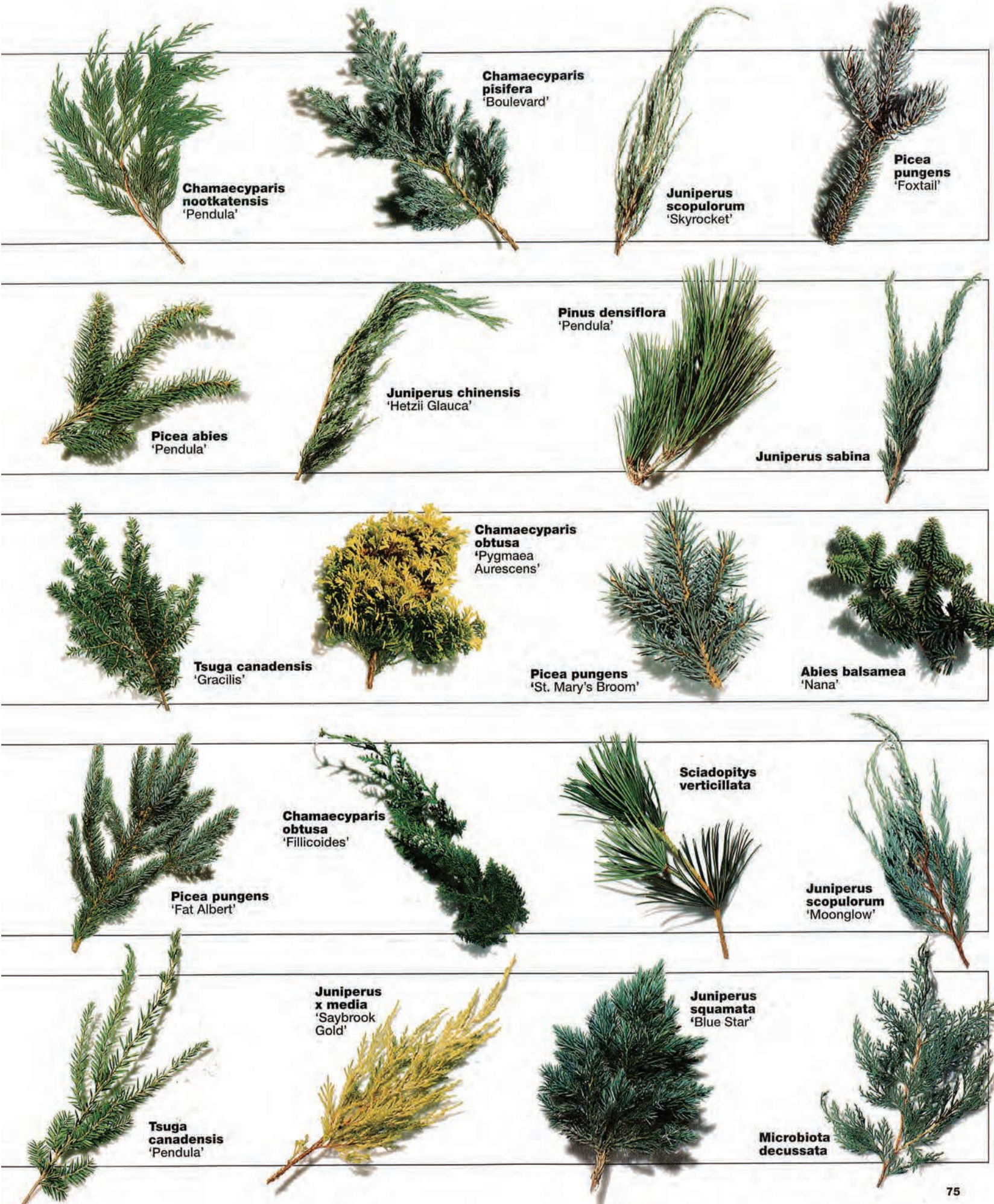
Illustrations by Mark Gagnon Photographs by Darrin Haddad

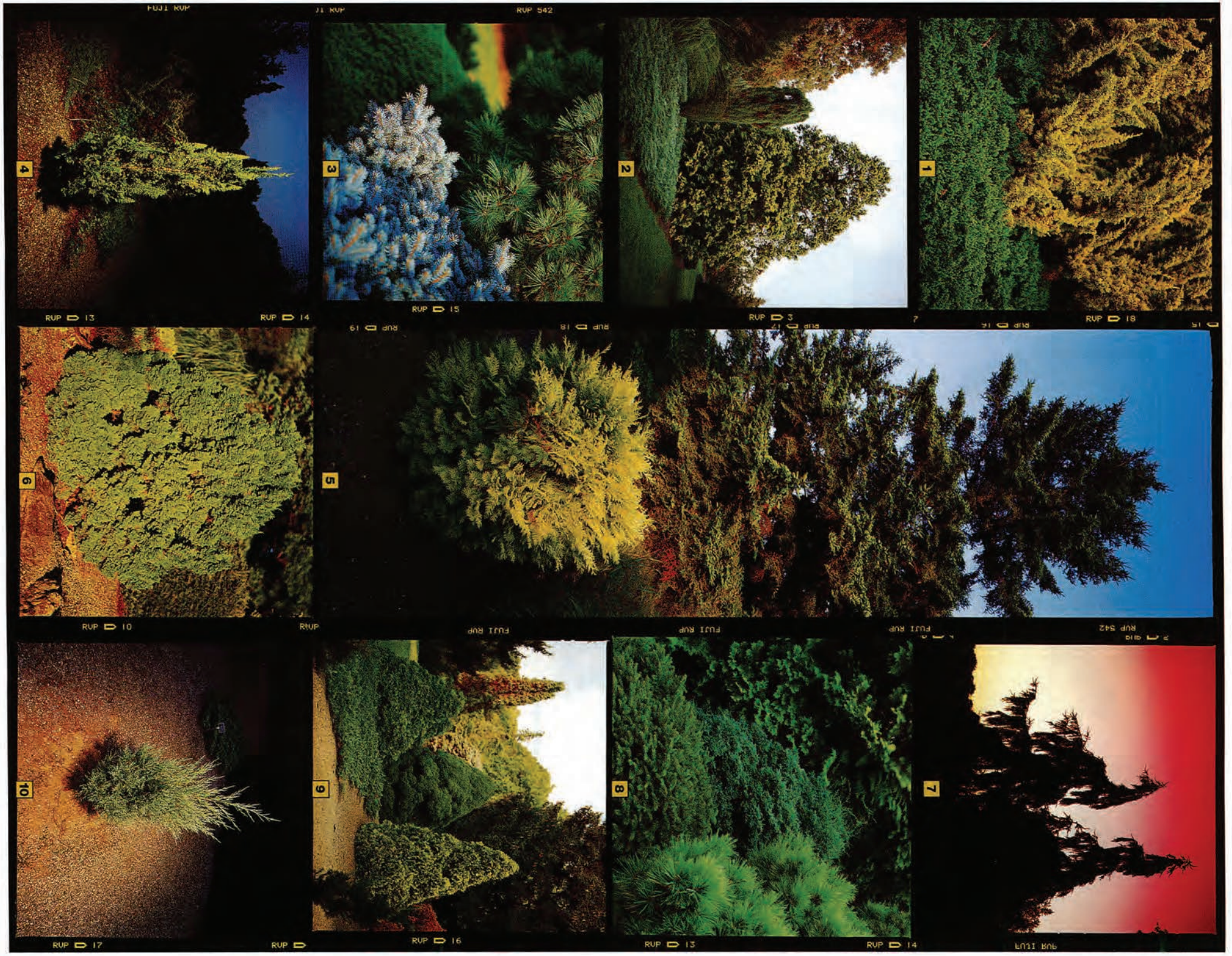
While evergreen refers to any plant that keeps its leaves year-round, we recommend building the living fence from slow-growing, cone-bearing, needle-leaved shrubs—dwarf conifers, in short.

Dwarf conifers, by definition, are well-proportioned and compact. The varieties pictured here grow from less than a foot high to about 35 feet—predictably. You can find something that will fit in front of a window, for example, and never grow up to block the view.

Conifers also come in predictable shapes. A **cone,** like the familiar Christmas tree, comes in both broad and narrow variations. *Juniperus scopulorum* 'Skyrocket' will grow 20 feet tall and only 3 feet wide—like a blue-green **column.** The **fountain** shape suggests a weeping or cascading habit of growth; some varieties may need to be trained. **Globes** and mounds have a rounded appearance; some grow—naturally—into perfect spheres. A cone shape that spreads wide at the bottom is a **pyramid.** There is an extensive selection of **spreading** evergreens on the market today. These will cover an embankment or become the base for a planting of assorted conifers. Some stay as low as six inches tall—no shearing, clipping or mowing.




Chamaecyparis nootkatensis 'Pendula'
Chamaecyparis pisifera 'Boulevard'
Juniperus scopulorum 'Skyrocket'
Picea pungens 'Foxtail'
Picea abies 'Pendula'
Juniperus chinensis 'Hetzii Glauca'
Pinus densiflora 'Pendula'
Juniperus sabina
Tsuga canadensis 'Gracilis'
Chamaecyparis obtusa 'Pygmaea Aurescens'
Picea pungens 'St. Mary's Broom'
Abies balsamea 'Nana'
Picea pungens 'Fat Albert'
Chamaecyparis obtusa 'Fillicoides'
Sciadopitys verticillata
Juniperus scopulorum 'Moonglow'
Tsuga canadensis 'Pendula'
Juniperus x media 'Saybrook Gold'
Juniperus squamata 'Blue Star'
Microbiota decussata



TREE SPECIMENS PHOTOGRAPHED AT THE NATIONAL ARBORETUM, WASHINGTON, D.C.

Shape and Texture

Say good-bye to blocky hedges, clipped bowling balls and somber green tombstones. The plants shown here have a loose informality while still retaining a tidy, controlled form throughout their lives. They look best when planted next to one another so that contrasts in their shapes, textures and the colors of their needles—from chartreuse to steel blue—can be appreciated.

By tradition, a hedge is a lineup of same-species shrubs—a monoculture, like corn in the field. And therein lies its weakness: If a host-specific disease or insect attacks one of these plants, they all go. That's the pragmatic reason to mix species; there's an aesthetic reason too. A row of identical plants will not grow at identical rates in identical shapes. For neatness, they will need to be trimmed once or twice a year. A staggered row of dwarf conifers selected for their differences, on the other hand, creates another impression. Clearly, the gardener's aim is naturalistic, so natural variations are enjoyed, not eliminated.

For the most natural look, plant clusters of three of each kind of conifer with an occasional individual specimen as an accent: three green cones, for example, with a golden globe at their feet. Using our six basic shape outlines, draw a planting plan. Then pick the individual species that fit the plan and provide a wide variety of color.

Fall is the best time of year to plant conifers, and it's also a good time to hunt for bargains—nurseries tend to reduce their prices now. Decide on the shapes and ultimate heights you want. Visit local nurseries with lists in hand and ask for more suggestions. Buy the largest specimens you can afford so you'll get more satisfaction sooner from these slow growers.

A lengthy fence of mature dwarf conifers will not be cheap. But don't think of evergreen shrubs only as problem solvers. The gifts these handsome plants bring to the landscape are great: They can screen unsightly views, brighten the bleak winter scene, deaden traffic noise and even help lower winter heating bills. The challenge is to combine them into artistic arrangements that capitalize on the best of their utilitarian attributes and at the same time are strikingly beautiful.

1. TOP: ***Juniperus x media*** **'Plumosa Aurea'**
   BOTTOM: ***Juniperus procumbens*** **'Nana'**
2. TOP RIGHT: ***Chamaecyparis obtusa*** **'Crippsii'**
   MIDDLE: ***Juniperus communis*** **'Pencil Point'**
   BOTTOM: ***Juniperus horizontalis*** **'Wiltonii'**
3. TOP: ***Pinus mugo***
   BOTTOM RIGHT: ***Picea pungens*** **'Compacta'**
4. ***Chamaecyparis lawsoniana*** **'Little Spire'**
5. TOP: ***Abies firma***
   BOTTOM: ***Chamaecyparis obtusa*** **'Elmwood Gold'**
6. ***Chamaecyparis obtusa*** **'Kosteri'**
7. ***Picea abies*** **'Pendula'**
8. MIDDLE: ***Chamaecyparis pisifera*** **'Dwarf Blue'**
   BOTTOM RIGHT: ***Pinus strobus*** **'Nana'**
   BOTTOM LEFT: ***Picea abies*** **'Nidiformis'**
9. TOP RIGHT: ***Picea abies***
   MIDDLE RIGHT: ***Thuja occidentalis*** **'Pumila Sandwelli'**
   MIDDLE: ***Picea glauca*** **'Conica'**
   MIDDLE LEFT: ***Thuja occidentalis*** **'Pygmaea'**
   BOTTOM LEFT: ***Juniperus horizontalis*** **'Douglasii'**
10. ***Juniperus virginiana*** **'Burkii'**

Care and Maintenance

The evergreens shown on these pages are hardy individuals that will put up with quite a bit of neglect, With proper care, however, they will flourish. They do not need to be pruned, but make sure to remove any injured or dead branches and cut back those that obstruct paths. Insects are rarely a problem; keeping shrubs healthy is the best defense. Feed evergreens in spring with a general garden fertilizer. In drought years, supply water—the equivalent of one inch of rainfall per week. The roots of the evergreens continue to grow after the weather turns cold, which is one reason why fall is a good time to plant. The application of an anti-desiccant spray to newly planted evergreens helps the needles retain moisture in the winter and prevents windburn and sun scald.

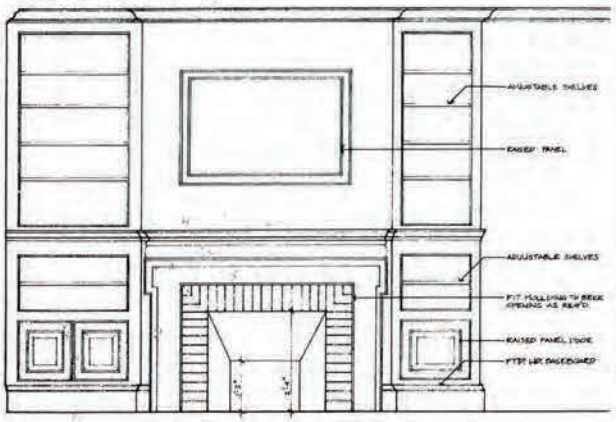
See Directory, on page 118, *for details and sources*

BUILD THE PERFECT book

Converting a room into an

elegant library is an ambitious project. But it's considerably less daunting if the cabinetry is understood as a series of big boxes on which shelves (and even doors or drawers) can hang. The bookcases evolve into a library, not just a grownup version of boards on blocks, by being made to look like a part of the room. The designers of the units on these pages, architects Lisa Cunningham and George Warner of Brookline, Massachusetts, say they try to fit at least one side of a bookcase into a wall, even if it means building a wall with no other purpose, as was done here. Then they run the room's baseboards and crown molding around the bookcases. And they search for other architectural tie-ins. In this room, a midlevel molding links the mantel to the library units and even runs around a corner into the next room. Proportions count. Shelves only ¾ of an inch thick often look too thin. Use a thicker material, or do as master carpenter Norm Abram does: Glue a thicker hardwood strip to the front of standard ¾-inch shelves. Both solutions also help keep the shelves from sagging. Warner and Cunningham have found that most clients want adjustable shelves. Holes for shelf-support pegs will look far better than metal channels with clips.

the architects' plan



CONSTRUCTION

MAKING THE BOXES

(1) The first step is to translate your plan (or an architect's rendering) into sketches that show joinery and dimensions. Cut the tops, bottoms and sides of the cabinet boxes from ¾-inch birch plywood. Backs are ½-inch plywood, although ¼-inch would do. Shelves and trim will be cut later so they can be sized to the completed boxes. **(2)** Dadoes, or grooves, cut into the side pieces add stability and provide a place for the top, bottom and single fixed shelf to sit. Here, cabinetmaker Freddy Encalada lifts a piece into a jig that prevents slippage as the cut is made. **(3)** He easily marks the location of shelf-support holes by tapping on a board from which screw tips protrude every inch. **(4)** He clamps a scrap board onto a drill press table to support the long side pieces, then zips through the hole-cutting. **(5)** Sanding the inside surfaces is easier now than after the box is glued up.

ASSEMBLING THE BOXES

(6) To put together the first box, Encalada squirts glue into the dadoes and smooths it with a plumber's acid brush. **(7)** When sides, top and bottom are assembled and secured with drywall screws, the back is slipped into place. He makes certain the box is perfectly square by pushing on corners as needed until diagonal measurements agree, then uses finish staples to hold the back in place. **(8)** In this library, the box fronts will be covered with a thick poplar frame that leaves a bit of the box edge visible. To dress up the exposed plywood edge, Encalada glues on thin strips of poplar, cut slightly wider than the thickness of the plywood. **(9)** When the glue is dry, a pass with a cabinet scraper shaves the extra poplar until it's flush with the box. Sanding would be slower and might round the edge.

THE FACE FRAME AND SHELVES

(10) Encalada shapes one of the thick poplar pieces that will frame the front.
(11) He glues on one side piece, then carefully fits the other three pieces until all joints are tight, returning to the miter saw several times to shave off tiny amounts. **(12)** To strengthen the face frame joints, he uses a biscuit joiner to cut matching grooves in the frame pieces. He inserts a glue-covered wooden wafer before gluing the bottom to one side, then does the same with the top piece. The other side piece is left loose so it can be shaped to the wall on the day the bookcases are installed. **(13)** For the shelves, a shaper, similar to an oversize router, cuts a fancy edge. **(14)** Encalada tests the fit of one shelf before cutting all the others.

c a s e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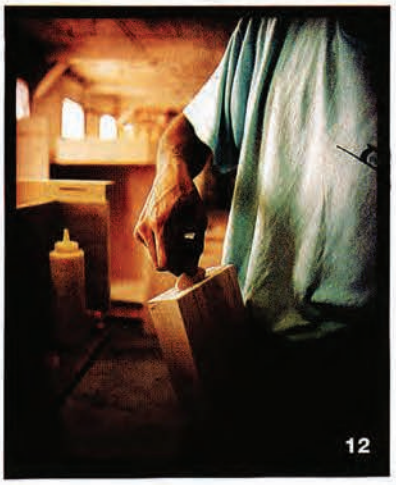
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BY JEANNE HUBER PHOTOGRAPHS BY PATRICIA McDONOUGH

MAXIMUM SHELVING SPAN

MATERIAL	SHELF THICKNESS (all measurements in inches)			
	⅝	¾	1	1¾
SOLID WOOD				
soft pines		33	44	76
cherry or poplar		34	45	79
oak or maple		36	49	85
COMPOSITES				
MDF	18	21	28	
particleboard*	16	19	25	
plywood*	29	34	46	

Based on an estimate of 40 pounds of books per square foot and an allowable sag of no more than ⅛ of an inch over 45 inches.

The length of any span on this table can be increased by attaching a hardwood strip to the front or back edge of the shelf for continuous support. For instance: * The maximum spans for particleboard shelves (at the thicknesses shown in the chart above) can be extended to 24, 26 and 29 inches if a ¾-inch-thick, 1-inch-deep hardwood strip is attached, and to 34, 35 and 37 inches if a 1½-inch strip is used. Spans for plywood shelves rise to 32, 36 and 46 inches with a 1-inch strip, and to 39, 42 and 50 inches with a 1½-inch strip.

mdf or particleboard?

Shelves in this library are made of a relatively new product, medium-density fiberboard. Usually called MDF, it's a heavyweight version of standard particleboard. Like particleboard, MDF is made from bits of wood glued together with a resin, usually urea-formaldehyde. But in MDF, the wood chips are first steamed and processed. The fibers separate, so they can be glued and pressed into homogeneous mats with no air spaces. Surfaces hold a crisp edge if cut on a router or shaper; Norm warns that the dust is particularly painful if it gets in the eyes or lungs, but says MDF takes paint beautifully. It was used here because the architects called for inch-thick shelves with a shaped front edge. The National Particleboard Association publishes a pamphlet with tips on how to machine and use MDF. MDF can be difficult to find; check the Yellow Pages for companies specializing in plywood sales.

Compare 1-inch-thick MDF (top three boards) with ¾-inch particleboard (lower three).

INSTALLATION

(1) After the boxes are completed, installation begins; about one-third of the work is still ahead. First, Encalada sets one bottom box in place. The case tilts toward the fireplace, so he pushes short pieces of shingles under the base on that side. (Shingles make good shims because they're tapered.) **(2)** When the cabinet appears level, he checks by laying a 2-foot level across the top. After several adjustments, he's satisfied

(5) Once the bottom is secure, the top cabinet is lifted into place. Leveling isn't necessary, because the base is level. Encalada simply screws the top box to the walls. **(6)** He holds the side frame piece in place (the part that wasn't glued on back at the shop) so it can be fitted to the wall. He uses a compass, adjusted to the gap between the wall and the wood, to transcribe irregularities in the wall to the edge of the frame piece.

(9) Ribbons of molding tie this bookcase to the room. Trim carpenter Robert Caruso applies the crown molding, often tricky because corners are rarely perfectly square. He cuts two short pieces to test the angle of the miter cut, so he won't waste time coping the other end of a piece that doesn't fit. **(10)** The middle molding in this design is built up from several pieces and continues around a corner into the next room.

with the side-to-side look. **(3)** He uses a 4-foot level to see whether the case tilts from top to bottom. **(4)** Clamps hold the bookcase tight to the wall as he screws it in place. He puts this screw where it will be covered by molding. When that's not possible, he puts screws in line with the shelf-support holes; screws placed there are hardly noticeable once they are puttied over and the finish paint coat is applied.

(7) He uses a jigsaw to rough-cut the scribed edge, but switches to a belt sander to hone off the last sixteenth of an inch. **(8)** Tipping the belt sander so that it grinds more from the back edge will help to ensure a tight fit in the front, where the meeting of edges will be visible. When the cut is right, the piece is glued into place on the box and secured with screws drilled in from the side.

(11) Architect George Warner joins in, positioning tiny molding pieces on the mantel corner. He and Encalada use glue and finish nails shot from a nail gun to attach the molding. **(12)** At last, the bookcase is done. Matching cabinets will go in on the other side of the fireplace, and doors will be hung on the bottom sections. Bottom shelves on one side are coated with plastic laminate; they're for firewood storage.

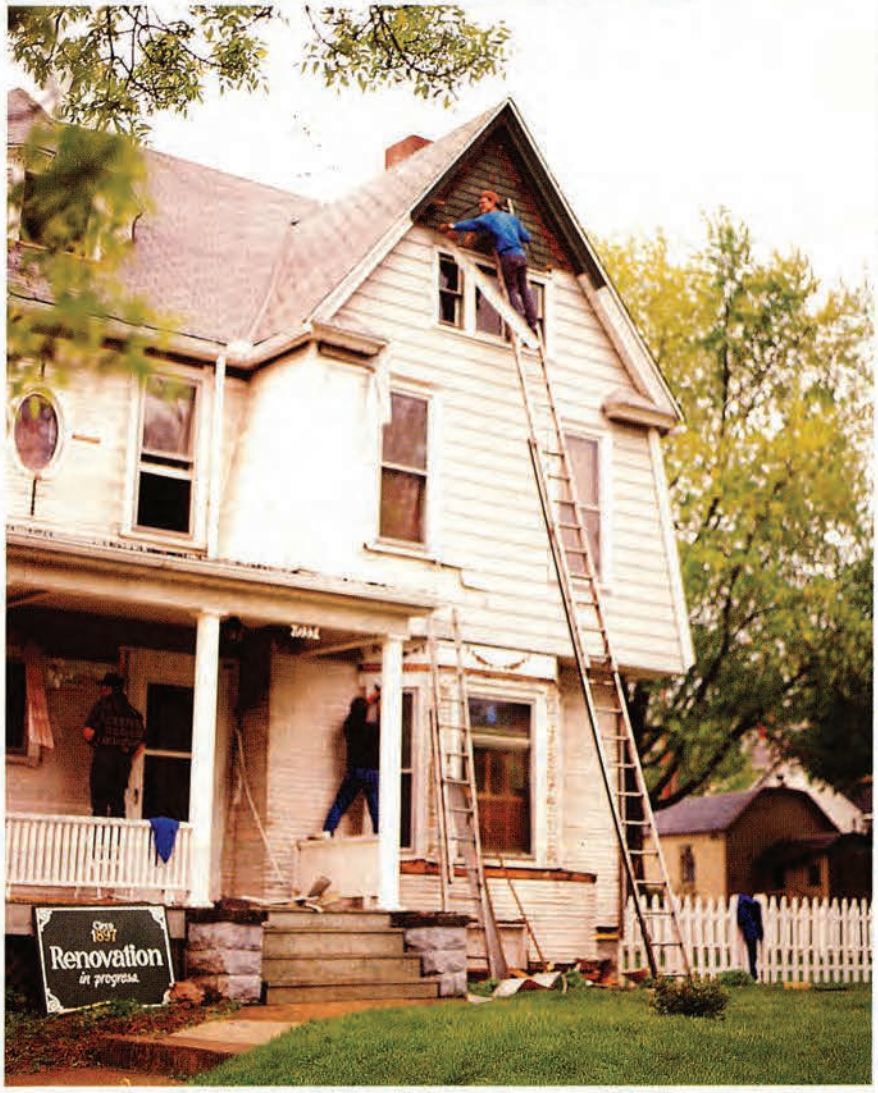
mail-order libraries

Most components of a library—the cabinet boxes, shelves, even doors and drawers—can be ordered in custom sizes, leaving only the installation, face frame and molding to be done at the site. We found two sources of ready-to-assemble cabinet boxes and custom-cut shelves. Both sell only to contractors, but neither has a minimum order requirement, so anyone with a contractor friend could place an order. A box 30 inches tall, 36 inches wide and 12 inches deep costs about $35; shelves cost $6 to $10, depending on size and veneer. Several companies sell ready-made drawers. The nicest have solid maple sides and dovetailed joints; a fully assembled drawer 16 inches wide, 12 inches deep and 8 inches high seems a bargain at just $25. Another company sells drawers the same size in birch plywood for less than $20. (See Directory for sources.) — **Ben Kalin**

A FINISHED PROJECT

Going from a simple bookcase to a full-scale library is just a matter of how many boxes you build. This library, by the same architects and cabinetmaker, uses similar molding and shelving. Built-up paneling, screening off space where the sloping roof would have made shelves unusable, helps tie cases to the room.

♦ *See Directory,* on page 118, *for details and sources*


Renovation
in progress


BROADWAY
BROADWAY

what's that siding hiding?

BY THOMAS BAKER
PHOTOGRAPHS BY DAVID BARRY

Volunteers strip

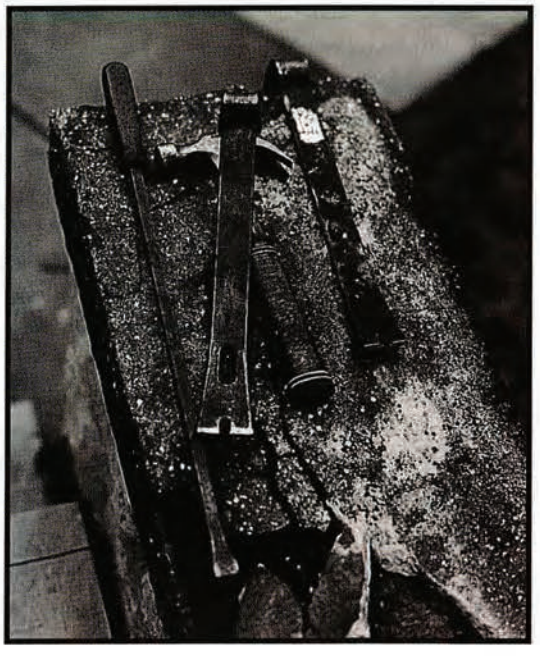
aluminum, asbestos **and** vinyl

from homes in Rock Island, Illinois,

to reveal the beauty **beneath**

WHEN LEWIS AND CASEY WASHINGTON MOVED INTO THEIR HOME IN Rock Island, Illinois, two years ago, the 1897 Dutch Colonial wore a drab aluminum shroud devoid of detail or texture. Not that the siding bothered Lewis Washington at first. But when he decided to brighten the house on 20th Street with a fresh coat of paint, his wife suggested taking it off instead. He learned the stripping would be free, courtesy of a neighborhood preservation group; a scrap yard would buy the siding, and the city's Project Facelift would contribute $2,500 toward paint and repairs.

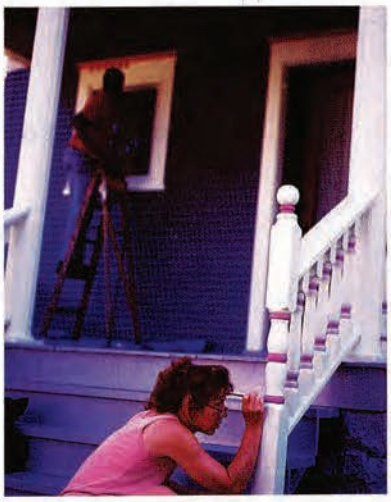
And so the Washingtons became the latest beneficiaries of the Great Unveiling, an annual "unsiding celebration" organized by



Armed with prybars and fueled by pizza, pop and community pride, a volunteer crew rips the siding off a vintage Rock Island house. Homeowners Lewis and Casey Washington (top left) are the beneficiaries of the Great Unveiling.

the Broadway Historic Area Association (BHA). Every spring, the group finds willing homeowners—sometimes all it takes is showing them a photo of what their house used to look like. Then they recruit zealous members and helpers to spend a few hours peeling off the vinyl, faux brick, asbestos shingle, asphalt shingle, aluminum, even Permastone, that had blighted their neighborhood. Unveilings are scheduled to coincide with bulky trash day, so worthless debris is carted to the dump free of charge. Aluminum fetches 50 cents a pound at the scrap yard—enough to help owners pay for the repainting. Since 1990, more than 45 vintage Rock Island houses have been unveiled, sometimes as many as eight in a single day.

Lewis Washington (right) paints the hundreds of dentil moldings being put back on his house. Joe Westmorland (at far right in bottom photo), with his crew and the homeowners, savors the finish of a marathon painting spree.



BHA Vice President Paul Fessler says each house has its own surprise. Often the original wood is in great shape, needing only paint or minor repairs. Sometimes the strippers uncover fancy shingles and decorative friezes, the kinds of details that give a house personality. Other discoveries are less welcome: rotted sills and sheathing, the "shadows" of ornamentation hacked off when the aluminum siding was installed, animal nests, and, says association president Karen Williams, "We always find a snake or two."

The Broadway association "has made a tremendous difference," says city planner Jill Doak. "There's been a complete changeover on 17th Street, and the concept has expanded beyond the Broadway area to other neighborhoods."

Back at the Washingtons' house, the clock was running down on the city's $2,500 contribution, which was set to expire at the end of the week. On Tuesday night, carpenter Joseph Westmorland and his three-man crew stepped in, painting under floodlights till dawn, then resuming work after a couple hours' rest. The painting marathon continued almost nonstop for the next two days. Cheered on by the neighbors, who brought them pizzas, the crew finished with just hours to spare. The Washington house stood transformed, another successful unveiling.

See Directory, on page 118, for details and sources

the scre

BY JEANNE HUBER PHOTOGRAPHS BY SPENCER JONES

1785

A blacksmith made this screw, used in the Corsen house in New Dorp, New York. The rough shank is still black from forging. The threads were cut in a die; the off-center slot was pounded in.

1855

Though still blunt-tipped, this screw was made by machine. Note the smooth, shiny shank, uniform lathe-cut threads and centered slot. It was found in the parsonage at Historic Richmondtown, New York.

The ancient Greeks invented the screw, but not as a fastener. They used an inclined plane wrapped in a spiral around a shaft to lift water and to press the juice from grapes. The Romans did use hand-filed screws as fasteners, but the concept then apparently vanished until the Renaissance. Even then, screws were far too expensive for common use; nails and pegs secured almost everything. William McMillan, who oversees colonial homes at Historic Richmondtown on Staten Island, New York, and has spent a lifetime studying early American buildings, says the earliest screws he has found were used with butt hinges and locks imported from England after the Revolutionary War. By the mid 1800s, when wood screws finally became common, they had evolved to a form still sold today. But the traditional wood screw may be doomed. Much has changed over the past decade, and no one who has tried some of the new screws would think of going back.

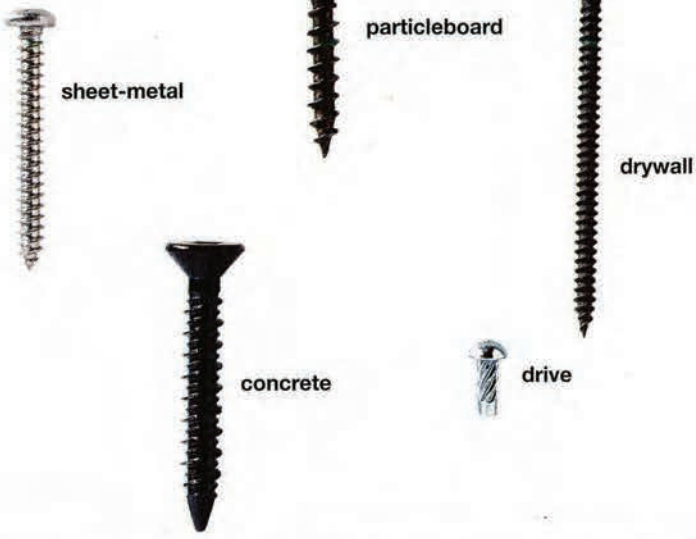
Sleek new designs make standard wood screws obsolete

1868

With a gimlet point, popular after 1846, this lathe-cut screw could pass for the traditional wood screws still sold today. It was used in an 1868 addition to the Crocheron house at Historic Richmondtown.

5 basic **screws**

Screws of the new generation are straight from head to tip, never tapered like traditional wood screws. Called **rolled-thread screws**, they are **formed by pressing indentations** into a wire blank instead of cutting away excess metal on a lathe. **This results in a stronger screw,** because the grain of the metal is uninterrupted. Rolled-thread screws are not as new as they may seem: The first patent was issued in 1836, but the technology did not catch on until **better alloys** were developed.



A new screw vocabulary has yet to evolve, as shown by these "drywall screws" for use on decks.

The current revolution in screws has its roots in the construction boom of the 1950s. Drywall hangers working on metal studs needed a quick, machine-driven method to hold gypsum panels in place. Their solution was the drywall screw—sharp and skinny, requiring no pilot hole and featuring a gently curved bugle head that could be countersunk without ripping the paper. Drywall hangers started using them on wood studs too, and manufacturers responded with coarser threads. Furniture makers discovered they also held well in particleboard and plywood. Then, in 1979, *Fine Woodworking* magazine ran a tip from a reader about how wonderful drywall screws were for all sorts of wood-holding tasks. Editors replied, "Wood screws are inferior; the only reason they continue to be used is ignorance."

The world of screws has never been the same.

"That was the first time I ever saw anything written on this," says James Ray, president of McFeely's, a mail-order screw supplier. "After that point, everyone who wrote in with a tip started saying, 'Use a drywall screw.'"

Cordless drills (which can double as power drivers) became common, and at prices even hobby woodworkers could afford. People started using drywall screws where nails used to do. The screws held better, and there was no risk of a hammer blow jarring pieces out of alignment.

Other power-driven screw designs quickly followed. Many, like the original drywall screws, are self-driving, which means they push out a path by compressing the fibers in their way. Other new screws are truly self-drilling, which means they bore a hole through metal or wood, reducing strain on the screwdriver motor and keeping the material from splitting. Some screws can even cut threads in predrilled concrete, greatly simplifying a task that used to require big holes fitted with plastic or lead anchors.

The slotted head rarely appears on these new screws because drivers used with them slip easily. At minimum, the screws have Phillips heads. Norm Abram predicts that most screws soon will have square recesses, which virtually eliminate "cam-out," the annoying tendency of a screwdriver to lift up and out of the slot.

Just what is a screw?

The American National Standards Institute defines the screw as an externally threaded fastener. Its definition of a bolt is identical. But in common usage, screws are relatively short (less than 4 inches), pointed and threaded into the materials they fasten. Long, blunt fasteners that thread into nuts are called bolts. Bridging the two categories are machine screws (small and blunt) and lag bolts (big and pointed). Then there are drive screws, more commonly called screw-shank nails. With helically threaded shanks, they qualify as screws. But they are driven with hammers—precisely how most people define nails. Ring-shank nails, though they look similar, are definitely not screws. Their cone-shaped ridges form a series of rings rather than a continuous thread up the shank. Beyond defining parts of a screw and insisting that they be no longer than labeled, the standards-setting arm of U.S. industry is silent about what screws must be made of. "No standard says anything about material requirements," says Steve Winistorfer, a research engineer at the Forest Products Research Laboratory in Madison, Wisconsin. Screws are made and sold, he explains, generally without any warranty of performance or means of tracing them once installed.

Drywall screws: not always a safe choice

James Mortensen, a contractor in Charlton, Massachusetts, spent three months on his back after a roofing bracket secured with 3-inch drywall screws collapsed. The screws sheared off, all at once, teaching Mortensen what metal experts have long known: Drywall screws, though wonderfully suited to their initial task, are hardened in a way that makes them unsafe for carrying heavy shear (lateral) loads. The screws have no "fatigue zone," where they might stretch out of shape but not break; they just snap. "Assume they have zero rated strength," says Joseph R. Loferski, associate professor of wood science and forest products at Virginia Tech in Blacksburg, Virginia. They should never be used to carry structural loads. Nor should they be used to hang kitchen cabinets or heavy bookshelves. What about deck screws that look like drywall screws? They're probably fine for decks. But assume they are brittle too. "We have a whole division that imports drywall screws by the container load, coats them and sells them for deck screws," one executive told us. Drywall-shaped screws made of stainless steel in the 300 series are safe for shear loads; they're not brittle.

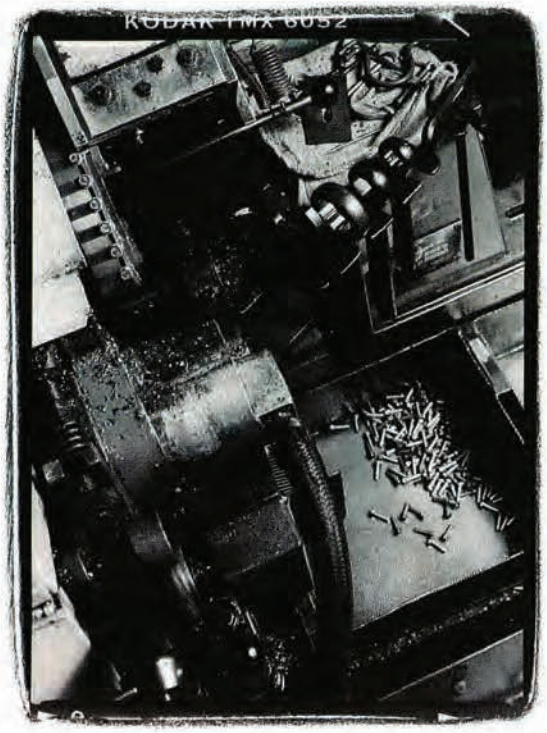
factory visit

Next to an idyllic pond on a rural road in Massachusetts, a building full of hot, noisy machines helps America retain a foothold in screw manufacturing. With most of the business now in Asia, Stillwater Fasteners survives because it excels at one small niche: making externally threaded nonferrous fasteners.

Formed in 1948 to explore methods of cold-forming stainless steel, this small company turns out an amazing variety of bolts and screws in stainless steel, brass and aluminum.

Pounded and rolled into shape, stainless steel screws are dull. Acid bath leaves them bright.

Stillwater starts by feeding large rolls of wire into machines that chop pieces to oversize lengths, then squash one end to make heads. Phillips, square or other recesses are pounded in; straight slots are cut by machines outfitted with small circular saws. The headed blanks are then pressed between carefully grooved metal plates. Stillwater stockpiles thousands of these threading forms so it can be ready for whatever customers order. The company's name is never on the finished product. "I don't know where our stuff ends up," says Vice President and General Manager Michael H. Goldberg. The companies that order the screws, not Stillwater, have to be responsible for making sure the screws are engineered to suit their task.



Many parts are made of a stainless steel called 302 HQ (for "heading quality"). Containing 8 percent nickel, 18 percent chromium and 3 percent copper, it's very resistant to corrosion yet still easy to cold-form. It actually gets stronger by being pressed into shape.

Circular saw blade cuts slots into hex-head blanks.

The right material for the job

Choose screws made of a material suited to the task. Steel, tough and cheap, is most common but rusts if wet. Though a zinc coating helps, galvanized screws can still stain redwood and cedar and corrode in pressure-treated wood. Some patented finishes cover zinc with baked-on paint to prevent galvanic reactions, which can occur whenever two dissimilar metals are exposed to water. Check labels carefully: Finishes not backed up by a zinc layer can scrape off while the screw is turning, leaving the metal free to rust with the first rain. Norm Abram's choice for outdoor use is stainless steel. It is safe with all woods and has no coating to chip off.

Aluminum: little strength; for light jobs only.

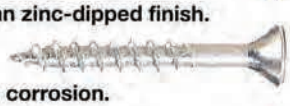
Silicon bronze: doesn't rust, costly; boaters' choice.

Solid brass: very soft; mostly for decorative uses.

Mechanically galvanized: inexpensive; zinc is pounded on.

Yellow-zinc plated: more protection than bare zinc.

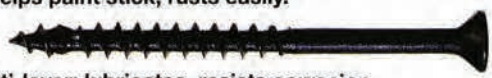
Zinc plated: thinner, smoother than zinc-dipped finish.



Stainless steel: highly resistant to corrosion.

Epoxy coated: lubricates; can glue itself into plastics.

Black finish: helps paint stick; rusts easily.



Durocoat: multi-layer; lubricates, resists corrosion.

See Directory, on page 118, for details and sources

Nov/Dec 1995

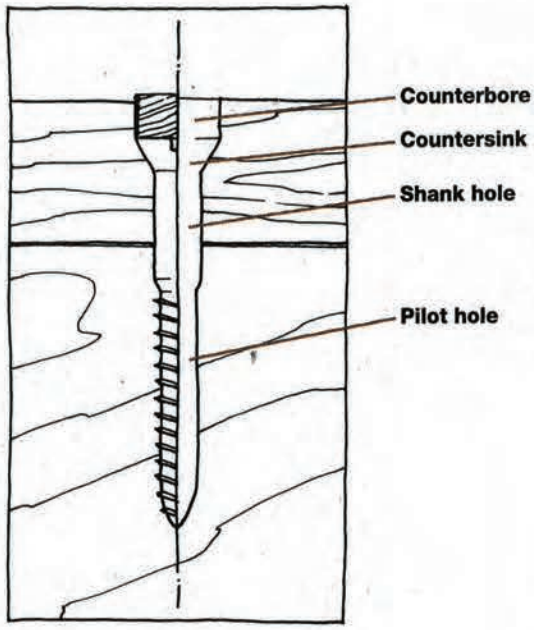
ISSUE 3

SCREWS

OPEN HERE

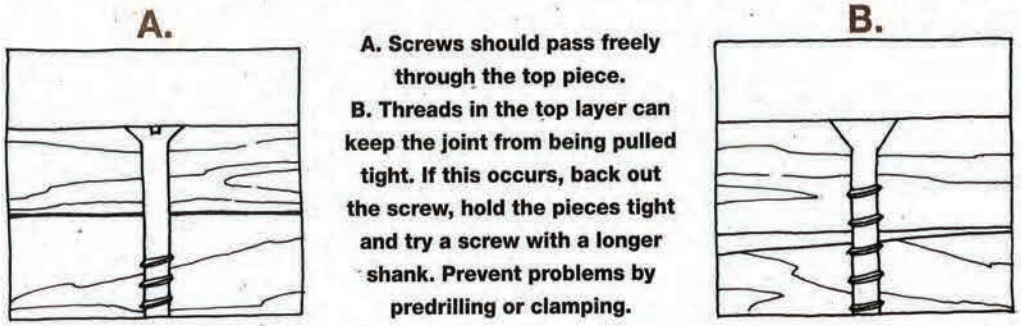
Illustrations: **Clancy Gibson**

Installing a traditional wood screw **properly** can mean drilling up to four holes of different sizes: a **shank hole** in the top piece, no narrower than the screw shank; a tapered **pilot hole** in the bottom piece, 60 to 70 percent of the root diameter in softwood and 80 to 90 percent in hardwood; a **countersink** to accept the underside of the head; and a **counterbore** to hold a wooden plug over the screw head, if desired. **Newer** screw designs often **eliminate** the need for **pilot holes.** When predrilling is needed (near board ends, in hardwoods and where pieces can't be held firmly together), a single, straight hole fits both shank and root.



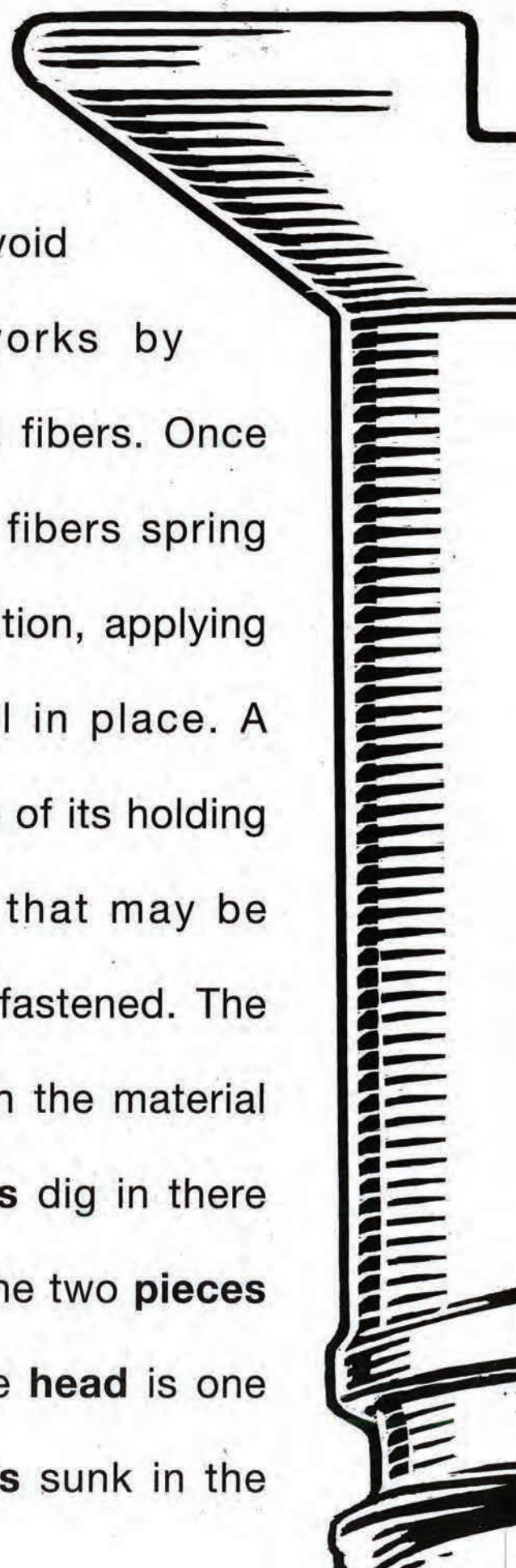
A tip: Any screw drives more easily if first scraped on a cake of **wax**. Don't use soap; it can absorb water from the wood, causing rust.

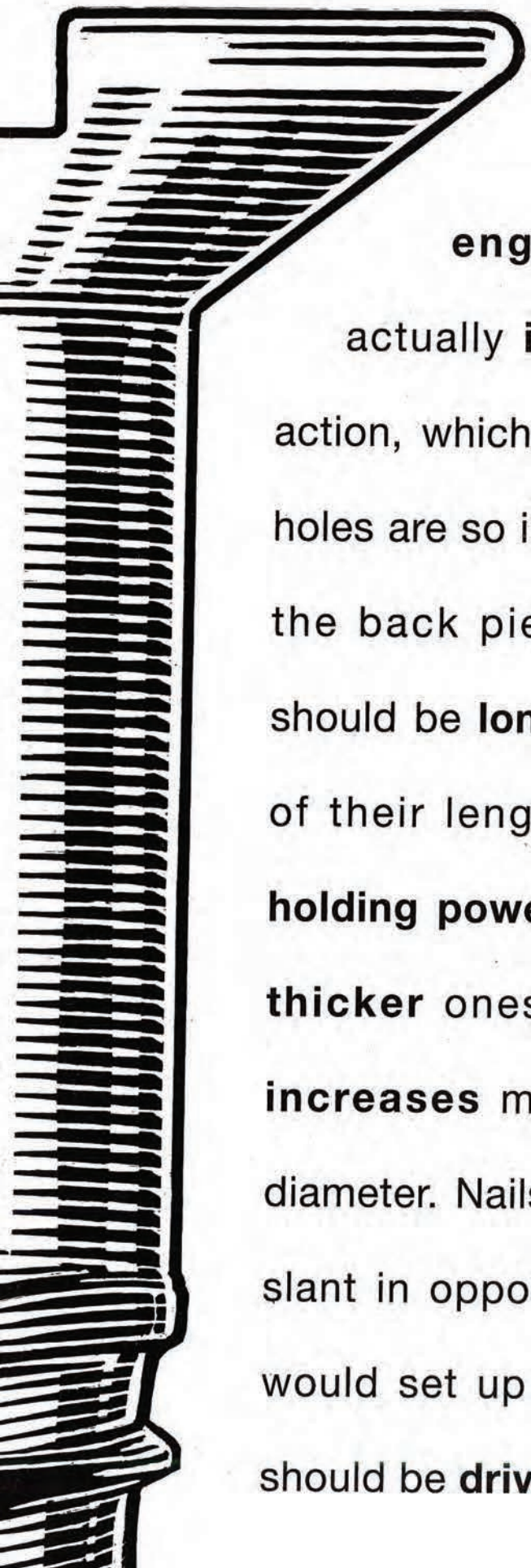
Illustrations at right: **John Murphy**



A. Screws should pass freely through the top piece. B. Threads in the top layer can keep the joint from being pulled tight. If this occurs, back out the screw, hold the pieces tight and try a screw with a longer shank. Prevent problems by predrilling or clamping.

Think of **screws as miniature clamps** instead of nails with ridges and you'll avoid many mistakes. A **nail** works by **wedging** itself between wood fibers. Once the nail is hammered in, the fibers spring back toward their original position, applying pressure that keeps the nail in place. A **screw works differently.** None of its holding power comes from threads that may be embedded in the piece being fastened. The important action takes place in the material it's being fastened to. **Threads** dig in there and **pull** the screw head until the two **pieces are tight.** The underside of the **head** is one end of the **clamp;** the **threads** sunk in the





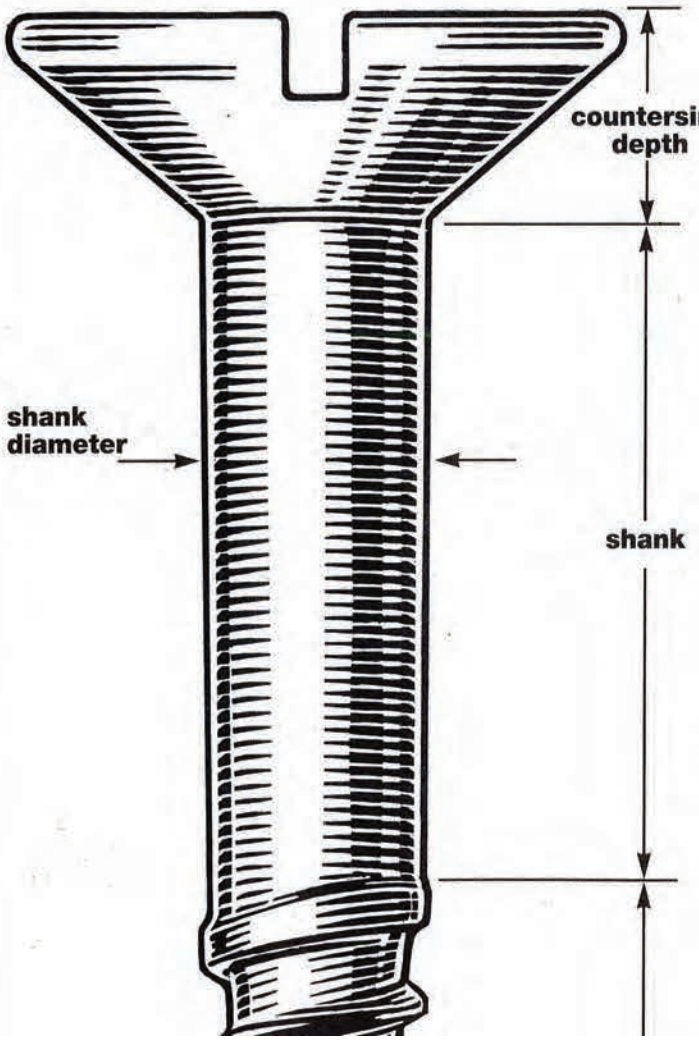
back piece are the other. Any **threads that engage** in the top piece can actually **interfere** with the clamping action, which is why **correctly sized** pilot holes are so important. Because threads in the back piece are so crucial, screws should be **long enough** so that two-thirds of their length will be there. For more **holding power,** try **longer** screws **before thicker** ones, because holding **power increases** more with **length** than with diameter. Nails hold best when driven at a slant in opposing directions. But no one would set up clamps at a slant. **Screws** should be **driven in straight.**

SCREWS

Presented by

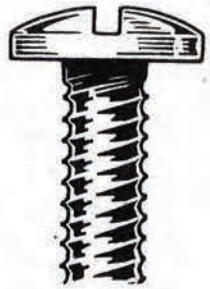
This Old Hou

A screw's length specifies how far in it will **drive. Countersinking** screws are measured from **top to tip; flush** screws, from **back of head to tip.** Length is given in inches. Screw **diameter** indicates **maximum width,** generally at **edge of threads.** It is specified in gauge numbers. No. 0 is 1/16-inch thick. Each additional gauge adds .013 (about 1/64) of an inch.



heads

Oval
Used where appearance counts. Back bevel allows most of head to be countersunk.



Round
Sits flush on surface. Used where countersinking is not practical or desired.

Pan
Wide head allows ing strength. Not v so usually used wh

Flat
Designed to be countersunk so top sits flush. For neat job, countersink must be predrilled.

Flat with nibs
Ribs on back of head bore countersink, even in difficult materials like hardwoods.

Trim he
Similar to finish bigger. Used wh head would lo

drives

Every screw needs a way to be twisted in and, usually, out. Sometimes a wrench fits over the entire head. More often, the head has a recess into which a screwdriver can be fitted. Slotted heads came first but work worst because flat screwdrivers slip easily. Phillips drives were an improvement but still allow slippage. (In fact, they were designed to prevent overtightening of screws on aluminum

Slotted
Useful now mostly on antiques, where other options would look out of place.

Screws come in a seemingly infinite variety of styles engineered to **accomplish specific tasks.** Which features are best for a particular application? **Here's a guide** to decoding **new and traditional screws.**

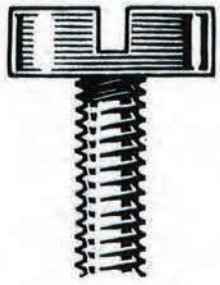
This chart does not include bolts and other fasteners that screw into nuts rather than into what's being fastened.

great clamp-
ry attractive,
ere not seen.

Truss
Similar to pan head, but lower profile makes it popular for furniture.

Integral washer
Wide head holds well even if shank hole is oversize to allow for adjustment.

Binding
Thicker head than pan allows deeper slot. Often used in electrical work for good contact.



Cheese
Thick head allows deeper slot for increased driving power.

Fillister
Advantages of cheese head, but with slightly rounded top for better appearance.

ad
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ere large
k ugly.

Bugle
Gentle curve on back allows head to sink itself into soft materials.

Wafer
Similar to bugle head, but wider and thicker. Good for soft materials.

Hexagonal
Wrench or driver grips entire head, allowing great torque. This one has built-in washer.

Break-off
Tamper resistant. Hex head is tightened with socket wrench, then snapped off.

Self-sealing
Built-in metal washer backed by neoprene layer seals against leaks.

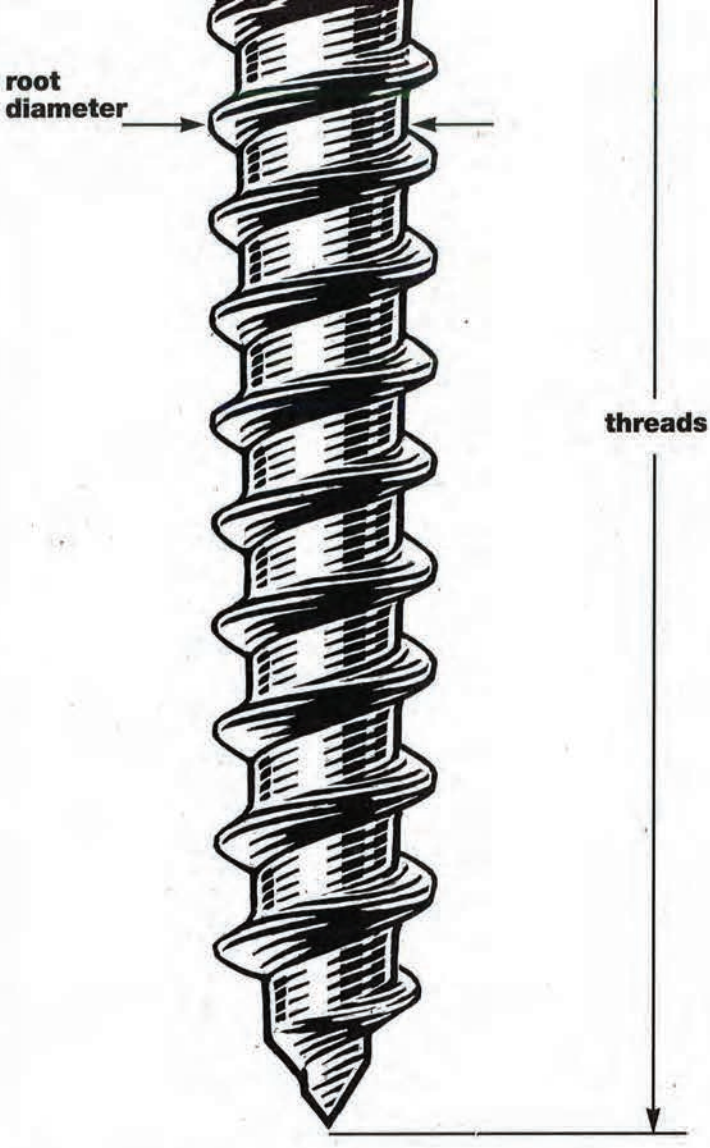
Phillips
Cross-drive recess has tapered, flat-bottomed slots. Named for 1935 inventor, Henry M. Phillips.

Frearson
Lesser-known cross-drive, with less tapered slots. Also called Reed & Prince and "Type II."

Square
Also known by name of its 1908 inventor, P.L. Robertson. Norm Abram's favorite drive.

Combination
Accepts screwdrivers with either Phillips or square tips.

Torx
Sunburst recess has no taper. Popular in industry because drivers don't slip.



aircraft.) Other designs give better control, sometimes in more ways than one: Tamper-resistant screws can't be removed without special screwdrivers that are often difficult to find.

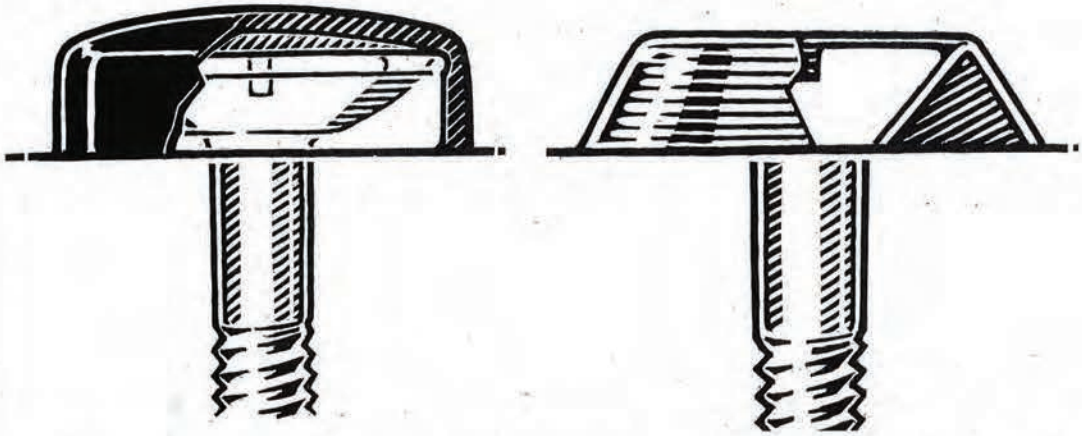
Clutch
Bow-tie recess is mostly found on mobile homes and in electric motors.

threads

When choosing a thread, pay most attention to what works best in the underl
low threads, found on traditional wood screws, are cut on a lathe. They work well only if proper p
because metal fibers aren't cut. Sharp, closely spaced threads are especially good for attaching
those in softwood and particleboard. Wide spacing allows screw to drive in fast. This example ha
metal, depending on depth and spacing of thread. 5 **Hi-Lo thread** In this patented double
for fastening into metal. But machine screws require a tapped hole (or a nut) because they canno

how to dress up a screw

One way to hide flat-head screws is to counterbore deeply, drive the screw, then glue in a wooden plug. Options below are more suited to self-driving screws; no drilling or countersinking is needed.



Patented Snap Caps, left, are held in place by a washer through which the screw is driven. Similar products snap onto square-recess screws. At right, a metal trim washer surrounds the screw.

points

1 **Gimlet point** This point, traditional
drives into thin metal or softwood without
design for wood has sharp tip to keep scr
eral threads so that screw cuts its own pilo
ing on the thickness of the metal. 6 **Wi**
the hole in the stud is sized properly. 7

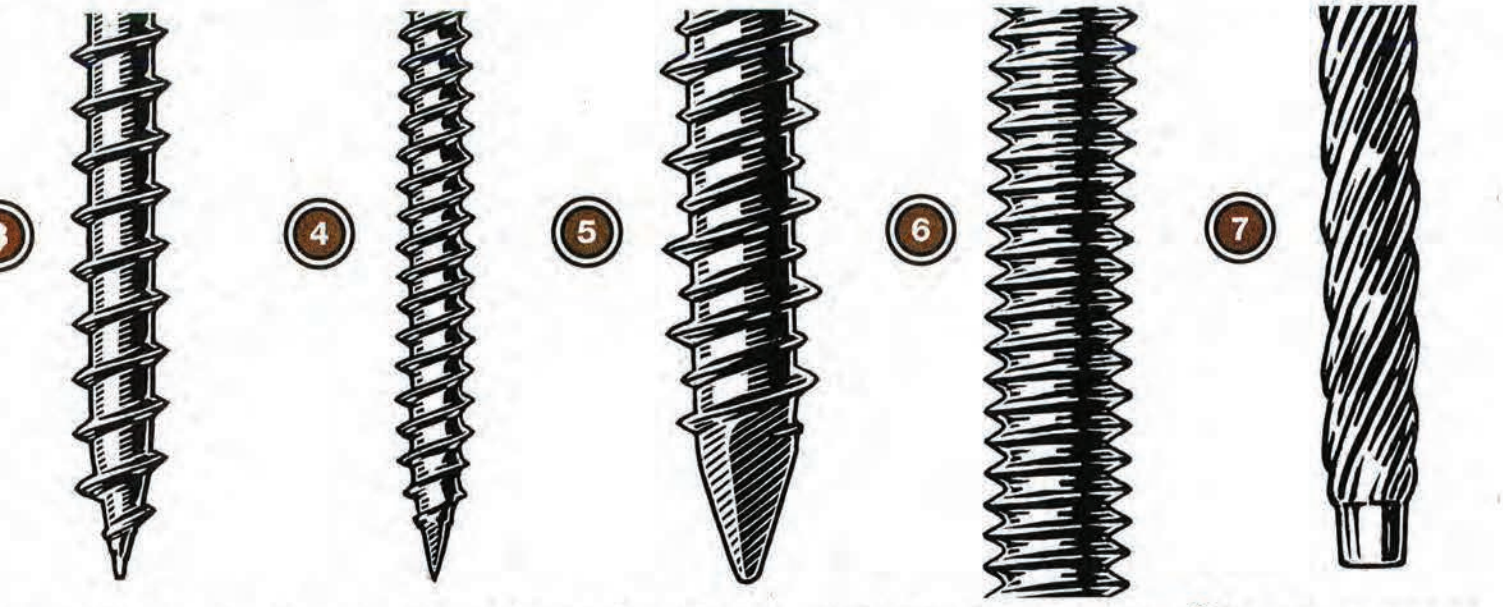
Hex recess
Found on headed and headless screws. Headless setscrews are adjusted with Allen wrenches.

Hexagonal
Wrench or driver grips entire head, allowing great torque.

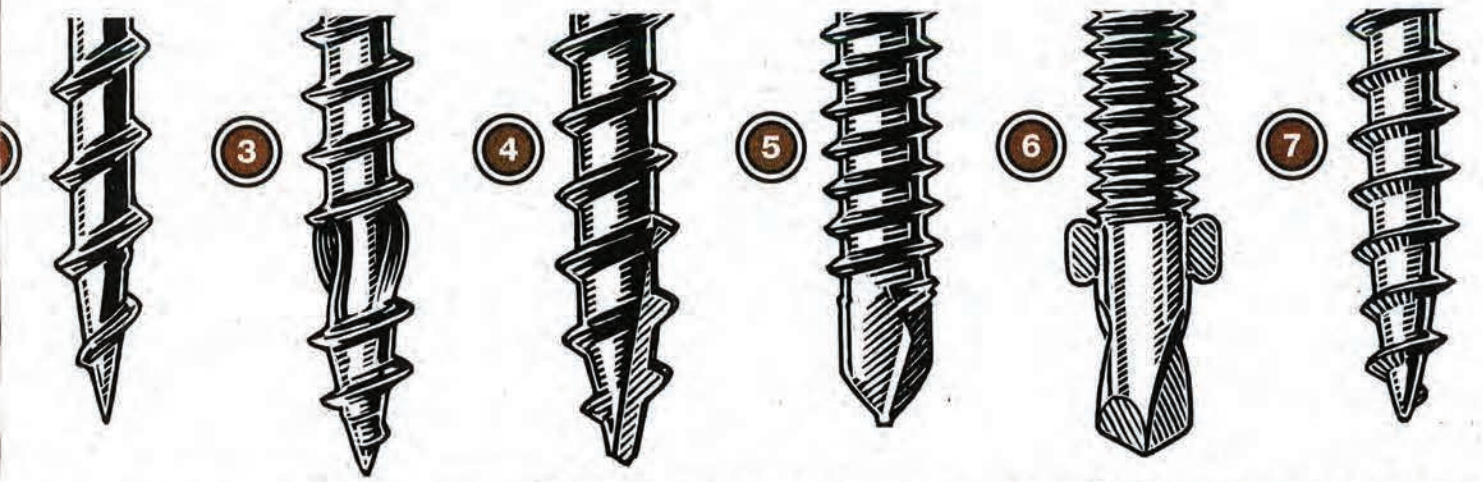
One-way
Tamper-resistant. Can be installed with regular screwdriver but removed only by special tool.

Pin-in-Head
Tamper-resistant design looks similar to Phillips drive, but pin blocks all but special tool.

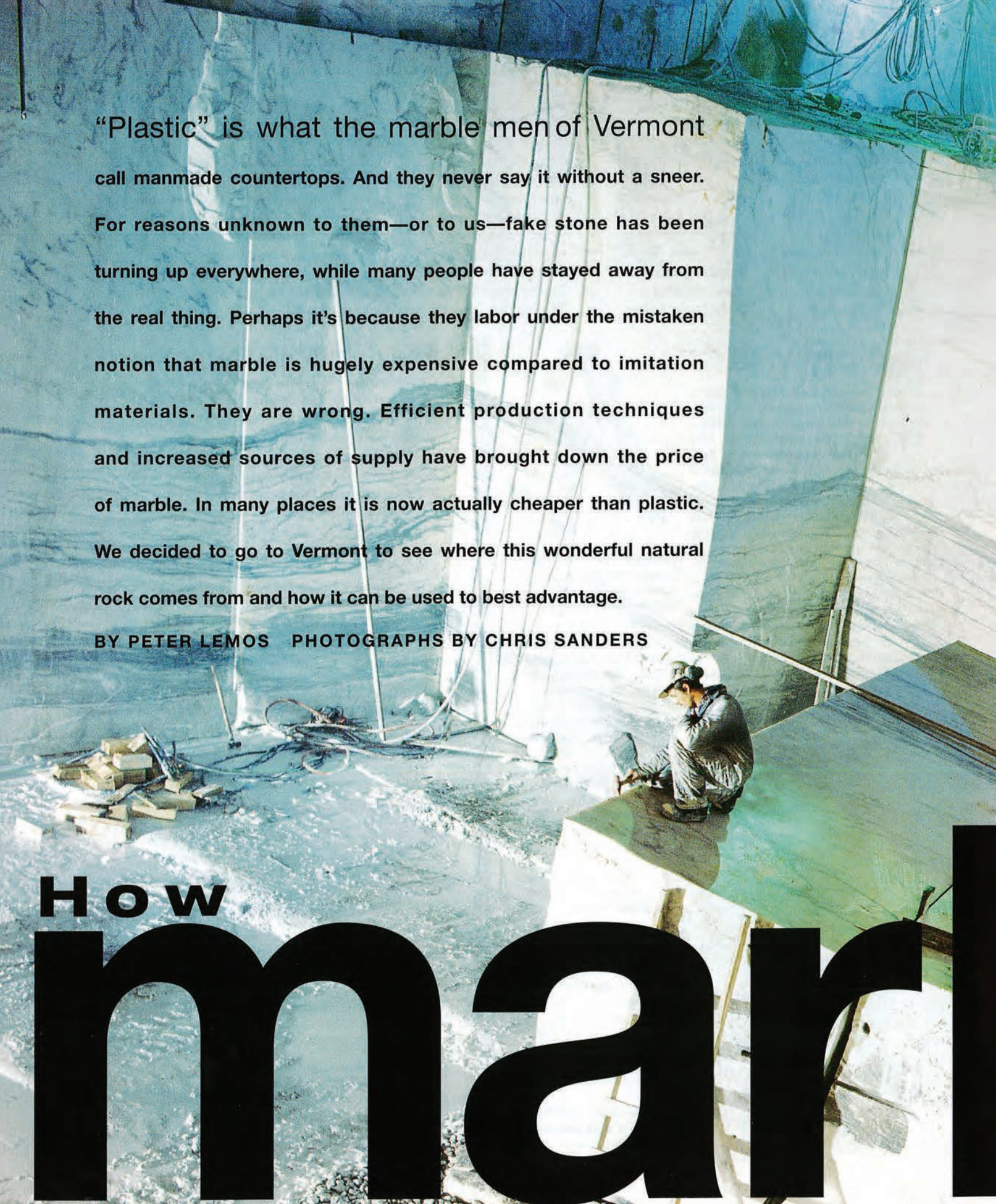
Drilled spanner
Tamper-resistant. Can be used with magnetic drivers that grip the whole head.



ing material, not what's being fastened to it. The goal is to maximize thread contact but minimize effort needed to turn the screw. 1 **Cut thread** These relatively shal-ilot holes have been drilled. 2 **Rolled thread (fine)** These threads are pressed into the blank, so they extend beyond the shank. No-waste manufacturing method actually creates stronger screws hings to thin metal because they allow more threads to be in contact. Also useful in hardwoods. 3 **Coarse thread** Deep, widely spaced threads are especially good for holding mushy fibers such as s a single thread, or lead. 4 **Double lead** Parallel threads work up the shank. These give the holding power of tightly spaced threads but require only half as many turns to be sunk home. For wood or thread design, one thread is deeper than the other for easier driving and better holding. Common on concrete screws. 6 **Machine screw** Fine, closely spaced threads hold better than other options t form mating threads. 7 **Drive screw** Steep angle of threads allows fast insertion, usually with a hammer. Some have slots for easy removal; smooth-headed versions can only be drilled out.



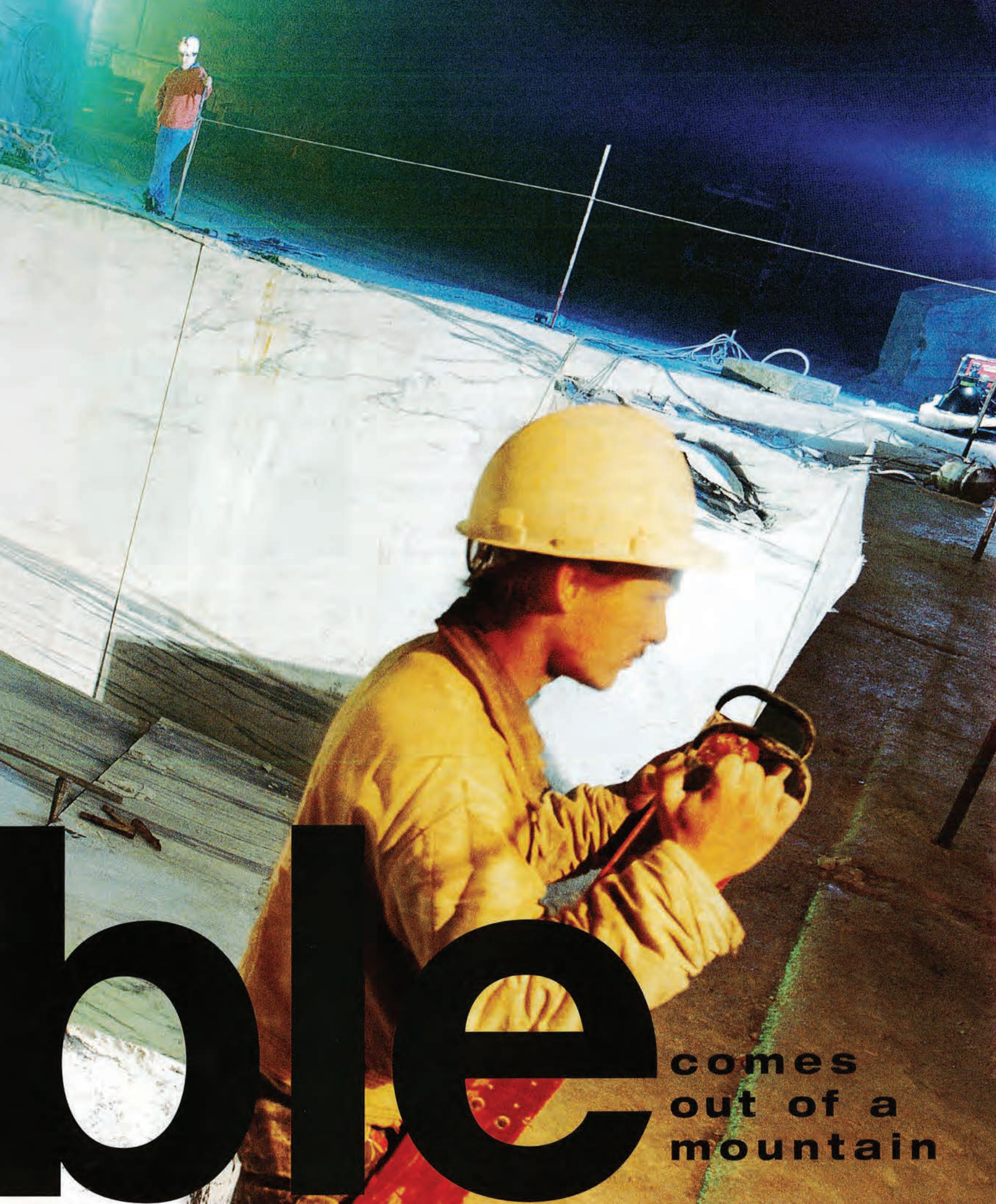
for wood screws, helps align screw with pilot hole. Screw can be forced into softwood without a pilot hole but with great risk of splitting the wood. 2 **Self-driving** Sharp tip on skinny screw usually a pilot hole. Tip doesn't actually cut, however, so a pilot hole is still needed near edges and in hardwood or thick metal. The most common tip for power-driven screws. 3 **Fastap** Patented self-drilling ew from wandering. Flutes ream out pilot hole to virtually eliminate splitting, even in hardwoods or near ends of boards. 4 **Auger point** Another self-drilling design; has sharp tooth cut into the first sev-ot hole and pushes away waste. 5 **Self-drilling, for metal** This tip and the threads that follow drill a pilot hole and form mating threads in metal. Various lengths of drilling flutes are available, depend-**nged Teks** This patented tip is designed to attach wood to metal studs. The wings just above the tip bore a relatively wide pilot hole through the wood, then break off when they hit the metal so that **Serrated** Teeth machined into lower threads help prevent screw from backing out, even after prolonged vibration. Useful with plywood, fiberglass, laminated wood veneers and composite materials.



How mar

"Plastic" is what the marble men of Vermont call manmade countertops. And they never say it without a sneer. For reasons unknown to them—or to us—fake stone has been turning up everywhere, while many people have stayed away from the real thing. Perhaps it's because they labor under the mistaken notion that marble is hugely expensive compared to imitation materials. They are wrong. Efficient production techniques and increased sources of supply have brought down the price of marble. In many places it is now actually cheaper than plastic. We decided to go to Vermont to see where this wonderful natural rock comes from and how it can be used to best advantage.

BY PETER LEMOS PHOTOGRAPHS BY CHRIS SANDERS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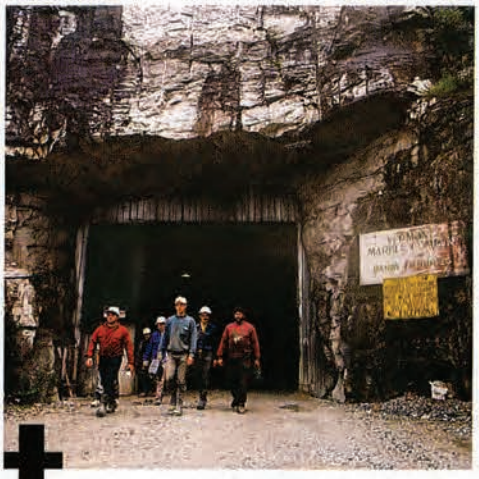
The Danby Quarry



The largest underground marble quarry in the country, the Danby Quarry covers 30 acres within the heart of Vermont's Dorset Mountain and has been in continuous operation since it opened in 1903. In that time it has been worked by generations of Danby men: the Mecheskis, the Merrows, the Stephenses and the Jaworskis, Alex and Joe, whose grandfather came here from the quarries of Poland and whose father worked here for 41 years before retiring in 1992.

"Most guys either love it or hate it down here," says manager Mike Blair, who has worked at Danby for 17 years. "If they make it through the first week they usually stay for years. I've brought some guys down here to start work and had to take them right out again. It's either in your blood or it isn't." There's plenty to make a man uneasy. "You are 500 feet underground," Blair says. "Once you enter that portal, the threat of death is continuous. Your life is in Mother Nature's hands." In reality, mishaps seldom occur. The rock is constantly monitored, and the site is inspected four times a year by the federal Mine Safety and Health Administration.

As you enter the Danby quarry, it immediately begins to slope downward at a 10-degree pitch, following the vein of marble. The stone is quarried by the "room and pillar" method, which leaves 40-by-40-foot piers every 70 feet for support. The result is a vast man-made cavern with dozens of cathedral-like rooms. But at the "bottom," or working face, where you are three-quarters of a mile into the mountain and 300 feet below the entrance, such lofty comparisons quickly fade. The air is thick with diesel fumes, the noise level is high and the floor is covered with white muck created from the abundant stone dust and the water used to cool the machinery.

LEFT: A crew of 22 works year-round from 7 am to 5 pm and half a day on Saturdays—until deer season, when the quarry shuts down for two weeks. BELOW: A blueprint shows the location of piers and outlines plans for future expansion. BOTTOM: A 35-foot forklift delivers freshly cut blocks to the storage yard for trucking to stone yards in the United States and Canada, or to Port Quebec for overseas shipping.

Marble is metamorphic rock, recrystallized by intense heat and pressure into a dense, heavy stone that is both beautiful and durable. The characteristic veining results from other minerals and rocks "melted" into the marble's crystalline structure during its eons-long transformation. Danby marble, because of its particular flat and interlocked structure, is prized both for its luminosity and its resistance to weathering. The quarry provided stone for many of the nation's great buildings, including the Supreme Court and the Jefferson Memorial, where the skylights are made of translucent Danby marble instead of glass.

WIRE PHOTOGRAPH BY DARRIN HADDAD

diamond wire cutting

The diamond wire saw, invented in the quarries of Europe in the 1960s and introduced here in 1986, has revolutionized production at Danby, replacing the traditional and laborious drilling and blasting method. The wire, which costs $35 per foot, is strung with small diamond-studded "pearls" and spring spacers. It can be worked into narrow saw

channels behind embedded marble and then connected to a computer-controlled motor that maintains constant pressure. Moving at 14,000 feet per minute, the water-cooled wire will slice through a 5-by-5-foot block in 15 minutes. After 5,000 square feet the pearls are restrung; after 20,000 square feet the entire wire is replaced.

falling a piece of marble

To separate a 15-ton block of marble from the rock it has called home for 450 million years, water bags connected to high-pressure hoses push the block away from the rock face, while a wire rope attached to a front-end loader pulls. Workers stay well clear until the job is done.

cutting marble

Milling shops like this one at Rutland Marble and Granite in Vermont use giant diamond-tipped saws to slice through quarry stone. After the block is aligned using a laser beam, this 11½-foot water-cooled saw, turning at 169 rpm, takes about an hour to cut through five feet of green Verde Antique marble. Domestic slabs come in ⅞-inch and 1¼-inch thicknesses (¾-inch is typical for imports). Lengths of 8 to 10 feet are standard; longer than 12 feet requires a custom quarry request, which can run into the thousands of dollars.

buying marble

When selecting unpolished marble, wet the surface of the slab with a sponge to reveal veining patterns and color. Large veins and other imperfections are part of the beauty. Dealers often send customers to the wholesale stone yard to select their slab; you should insist on it. Expect to pay about $500 to $750 for a 30-by-72-inch tabletop; the average installed price for a kitchen counter with backsplash is $100 per lineal foot, though prices vary greatly depending on the type of stone.

care and cleaning

Acid is the enemy of marble. It will etch any marble surface and remove the finish on polished stone. Use mild, pH-neutral cleaners like Murphy's Oil Soap or Ivory liquid for routine cleaning. Keep vinegar and citrus fruits and their juices away from marble countertops. "Always use a cutting board," cautions Jonathan Zanger of Westchester Marble and Granite, one of the nation's foremost wholesalers of natural stone, in Mount Vernon, New York. "Marble is very porous and stains easily. The good news is that whatever goes in will come out. It's like an open door." Remove water-borne stains with hydrogen peroxide. For tougher stains use a poultice available from stone dealers. To minimize absorption, Zanger recommends sealing marble with a nontoxic penetrating sealer like Miracle Sealant's Porous Plus or 511 Impregnator. Avoid sealers that just coat the surface and do not penetrate.

MARBLE PIECE PHOTOGRAPHS BY DARRIN HADDAD

edges

Thanks to the advent of diamond cutting tools, marble can be worked almost as easily as Corian. Among the many edge profiles available are:

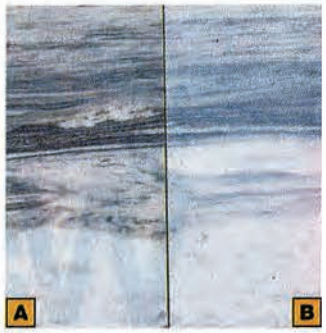
1. **straight edge;**
2. **quirk miter;**
3. **bullnose;**
4. **French or Dupont ogee;**
5. **¼ x ¼ bevel;**
6. **French ogee cap;**
7. **modified ogee.**

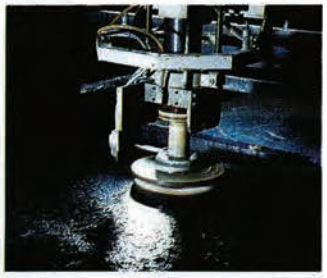
Edge profiles typically cost from $12 to $70 per lineal foot. A less expensive way to create a profile while adding thickness to a ¾-inch countertop is to laminate a narrow strip of ¾-inch marble along its bottom edge.

varieties and finishes

White marbles such as Danby Imperial, Colorado Yule, Carrara or travertine begin as limestone or calcite; black or green marbles are metamorphic basalt or forms of magnesium silicate called serpentine and olivine. Choosing one is largely a matter of aesthetic preference, although some professionals recommend staying away from white marbles in kitchens because of their propensity for staining. Silicate marbles, which are typically darker, are less reactive with acid, though bleaching is more obvious. Highly veined or variegated marbles conceal stains more easily.

Once you've settled on a type of marble, it's important to specify a finish. The vast majority of residential marble is polished. We prefer a honed finish (example B), which is less reflective, easier to maintain and looks softer than a polished surface (A). Honed marble is finished to a 180 to 600 grit, while polished marble may be finished to an 800 to 3,000 grit and then buffed with oxalic acid until it takes on a mirror-like sheen.





"Honing is the traditional finish for marble," says Martin Hemm of Carl Schilling Stone Works in Proctor, Vermont. "For some reason highly polished finishes became popular in the 1960s and '70s, but they don't look as good and fortunately are losing favor. Polishing makes no sense. It makes it difficult to see the natural luster of marble." Nor does polishing ensure durability; a honed finish resists stains just as well. And polished marble can require greater upkeep. If scratched or etched, it will need professional restoration to return it to its original gloss.

Since much marble arrives at the retailer already polished, you may not be asked to choose. Don't worry: If you want a honed finish, it is a simple matter to return the stone to the polishing bed (above) and tone down the shine.

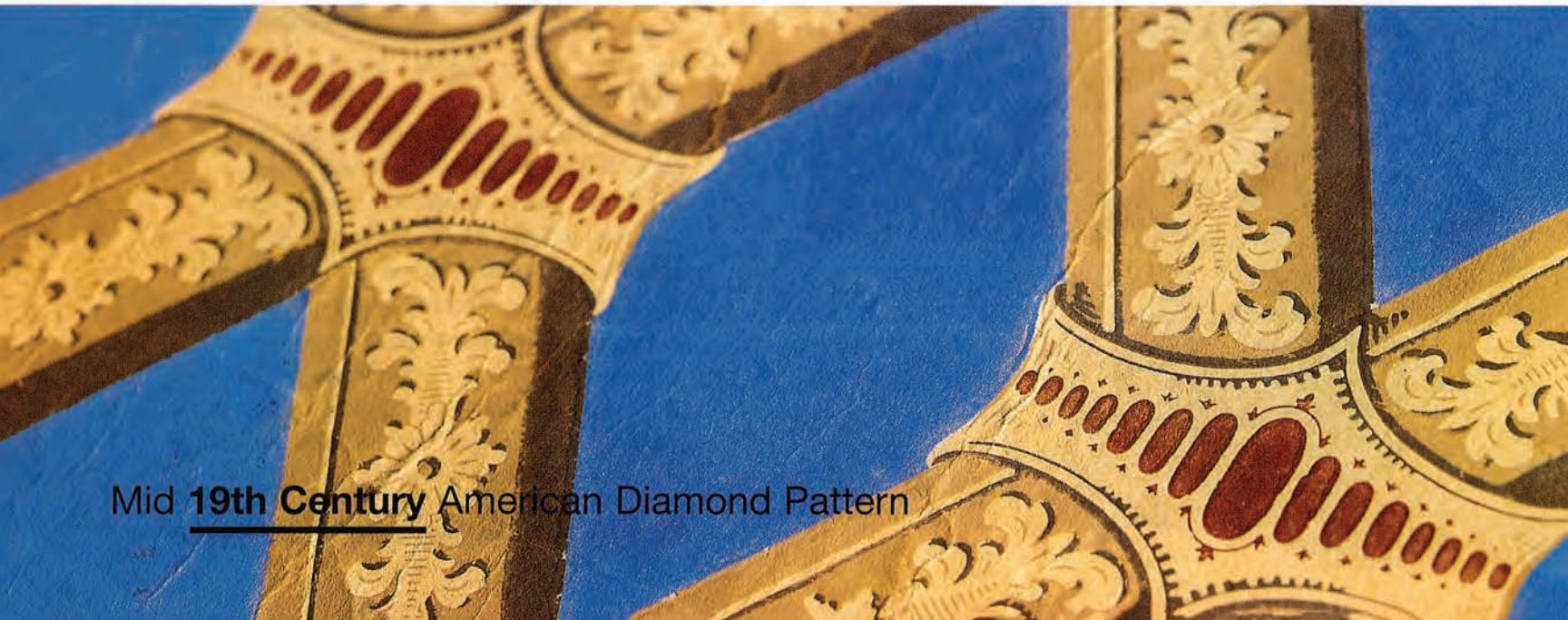
♦ *See Directory, on page 118, for details and sources*

Late **18th Century** French Neoclassical

Wallpaper History

Experts have discovered that American homes of the 18th and 19th centuries sported exuberantly patterned, **brilliantly colored papers** like the ones on these pages. Old-house owners decorating their walls today can call on that knowledge and make bolder choices than ever before.

BY STEPHANIE WOODARD PHOTOGRAPHS BY SIMON WATSON STILL LIFES BY DARRIN HADDAD



Mid **19th Century** American Diamond Pattern

Late **18th Century** American Pillar and Arch

LEFT: Last summer, wallpaper experts and old-house fans met at Eastfield Village in upstate New York to experiment with wallpaper-making techniques. RIGHT: They did it the old-fashioned way, preparing and block-printing paper by hand. FAR RIGHT: Today, wallpaper is often screen-printed at a factory.

Mid **19th Century** American Rococo

This fall, *This Old House* is renovating Kevin and Deborah Guinee's home in Salem, Massachusetts. Following up on evidence that their Federal-era "best parlor" was originally papered, they are picking out a reproduction wall covering for the room. The Guinees and other old-house owners are learning what curators from around the country have discovered: The founders of this nation did not inhabit plain, plaster-walled rooms with dark trim, as we long imagined. Rather, 18th- and 19th-century dwellings and public buildings were decorated with wallpaper in bright colors and no-holds-barred patterns.

The experts came to this conclusion after analyzing painted and plastered surfaces and examining period newspaper advertisements, custom orders, estate inventories and other documents. "The research took years," says Margaret Pritchard, curator of maps, prints and wallpapers at Colonial Williamsburg, where the bare walls in several houses are being covered. "It's all coming together now that we're hanging the papers. Each room is in a different color and pattern, and you can see what writers of the time meant when they described houses as looking like patchwork quilts."

With 900,000 visitors a year, Colonial Williamsburg will popularize the new thinking about old interiors. The evidence was, in fact, before our eyes for years—in buildings like the Phelps-Hatheway House in Suffield, Connecticut, for example, where gods and goddesses have frolicked across the wall cover-

At **Eastfield** Village, the experts got to test their theories about how wallpaper used to be made. The exact processes employed in the 18th and early 19th centuries are not known.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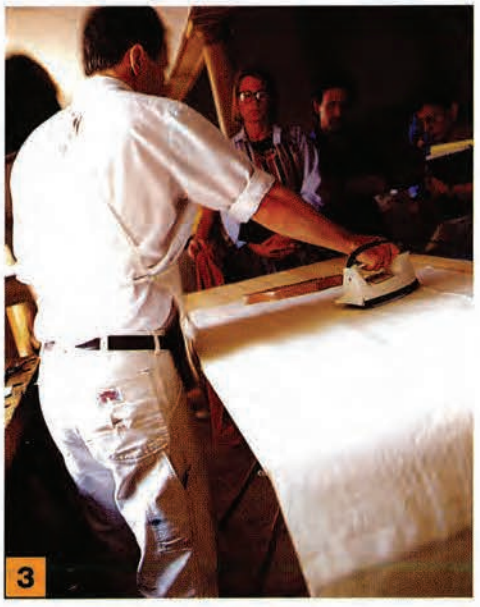
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ings since the 1790s. Papers like those, which have survived in excellent condition, are rare. More often, wallpaper was torn down or covered over every few years because soot from fireplaces and stoves dirtied the surfaces. Removing old papers and tacking or gluing up new ones was also a relatively inexpensive way to update a house, explains Richard Nylander, chief curator of the Society for the Preservation of New England Antiquities in Boston.

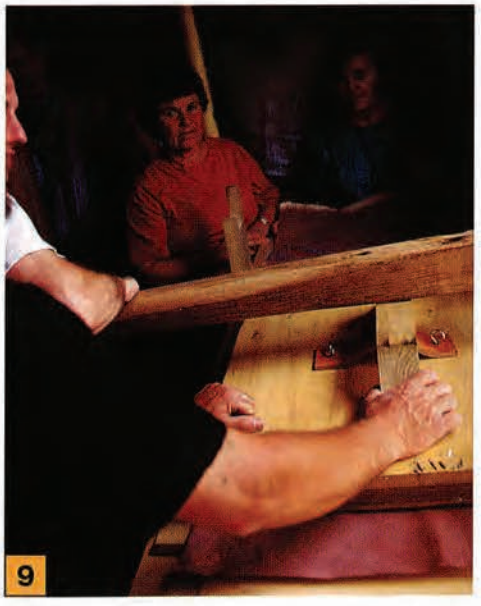
The transitory nature of wallpaper frees today's homeowners to choose patterns that are not just historically correct but also fun to live with. "Wallpaper is always imitating something. It's like a little joke within the house," says Robert Kelly of WRN Associates, a leading installer of historic papers in Lee, Massachusetts. And you have no shortage of options: The 1992 edition of *Wallpapers for Historic Buildings*, a guide to reproduction papers, has 1,300 entries—more than three times the number in the first edition, published nine years earlier.

So why not take inspiration from the sense of drama and whimsy early American householders enjoyed? After all, like the previous owners of your home, you can always cover the stuff over in a couple of years.

Dating old wall coverings can be difficult.

Even if you find layers of paper in your house, you cannot be sure you are looking at them in the order they were produced. Some rolls may have been purchased and put aside, only to be discovered and hung by a later resident.

Before the 19th-century invention of continuous-roll paper, designs were block-printed, hand-painted or stenciled on "joined" paper, which was created by gluing together sheets of handmade rag stock. **(1)** Wallpaper consultant Robert Kelly trims the sheets, **(2)** glues them together with wheat paste and **(3)** dries the glue with an electric iron. **(4)** Polly Forcier of MB Historic Decor, a supplier of period stencils in Norwich, Vermont, brushes the joined papers with a distemper (water-based) paint that serves as a "ground," or background color. **(5)** William Flynt, architectural conservator of Historic Deerfield in Massachusetts, "festoons" the wet lengths, hanging them up to dry.



(6) Pigment is swabbed on the inking tray at the start of the printing process. **(7)** The surface of the wooden printing block, with its intricate carved design. **(8)** Treve Rosoman, a curator with English Heritage, inks the block. **(9)** The block is stamped onto paper laid over the printing press, modeled after an 1825 French version. **(10)** The final product—nice try, but a far cry from the crisp lines of the original (below). Not surprising, says Eastfield Village director Don Carpentier: "Wallpaper making was an urban industry, not a village craft that can be duplicated in the backyard."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Before **1785**

England dominated the early wallpaper industry. Paper had been used there to decorate walls since the 1500s; by the mid-17th century, English "paper stainers" were renowned all over Europe. One hundred years later, wallpaper was popular in the American colonies as well. Colonial rooms were often built with battens around the edges so papers could be readily tacked up. **Examples 1**, **2** and **5** are American-made papers; **3** and **4** are English. English papers were often flocked to imitate velvet and other luxurious fabrics. The "repeat," or basic pattern unit that makes up the overall design, may look small here but in many cases is imposing, extending 20 inches or more. The paper at the top of page 97 is also of this period; it is an American depiction of France handing the Declaration of Independence to Britain on behalf of the United States, costumed as an Indian maiden.

From **1785 to 1840**

After the Revolution, citizens of the new United States could buy from whomever they pleased, and they embraced the offerings of their recent ally, France. Gloriously detailed designs with vividly realistic figures, spectacular painterly techniques and brilliant colors flooded the market. "The French produced sophisticated, three-dimensional effects that are not fully understood to this day," says Joanne Kosuda Warner, assistant curator of wall coverings at the Cooper-Hewitt National Design Museum in New York City. By 1829, Zuber & Cie, a leading French maker, had 100 representatives from Maine to New Orleans, reports historic-wallpaper expert Richard Nylander. American manufacturers advertised their own designs as well as inexpensive knockoffs of French goods. **Papers 6**, **8** and **9** are French made; **7** and **10** are American.

After **1840**

The mid-19th century saw many "revival" styles—note the Gothic Revival pattern of **example 12**. Machine printing brought down the price of wall coverings and made them affordable for the growing middle class. During the final decades of the century, adherents of the English Aesthetic Movement warned that the "sham" realism of the French style corrupted all who beheld it: A wall is a flat surface, not a mythological scene or Gothic cathedral, they declared. Shading and perspective were out; stylized forms took their place. The work of English artist William Morris, **example 14**, is some of the most famous of this genre. **Papers 11** and **13** are American; **12** is from France; **15** is an embossed imitation-leather covering imported from Japan.

WYTHE HOUSE PHOTOS COURTESY COLONIAL WILLIAMSBURG

Preserving Old Wallpaper

Working a step ahead of carpenters about to repair the walls of the Elmendorph Inn in Red Hook, New York, curator Barbara Bielenberg began to panic. She was making little progress in scraping off a "sandwich" of wallpaper layers in the parlor of the 1760 tavern. In desperation she rented a steamer and down they came, ready to be archived.

The papers include an 1830s black-on-tan design styled after a copper engraving (A); it covers an 1820s blue floral pattern (B), which was accented by a French border paper (C) applied at the same time.

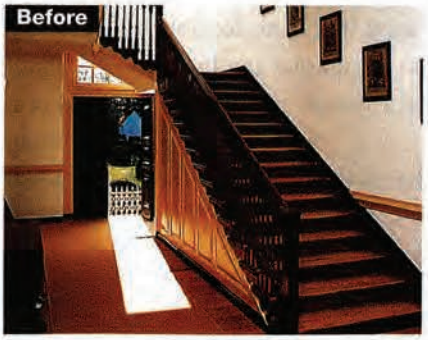
It's hard to know how best to remove layers of old wallpaper, says consultant Robert Kelly. Water can reactivate some old glues, and using chemical solvents may destroy pigments. "I once soaked a 27-layer sandwich and discovered 100 years of design history," recalls curator Richard Nylander. "One mistake, and all that could have disappeared."

If you think you've got something valuable, show it to a museum curator before you do anything, suggests C.R. Jones of the New York State Historical Association, or find a paper conservator through the American Institute for Conservation in Washington, D.C. (202-452-9545). Be prepared to spend a lot, though, if you decide to analyze, remove, restore and reinstall your treasure.

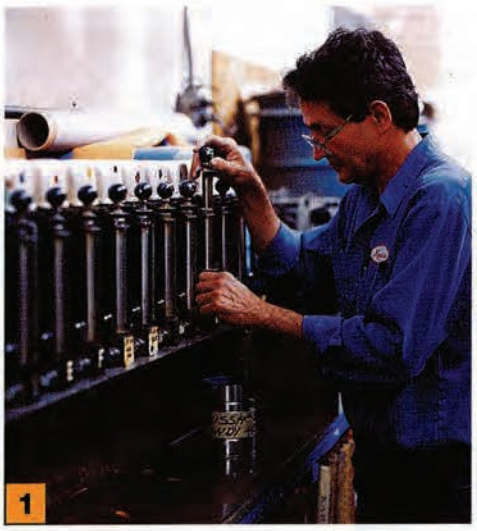
Another option is to leave it in place as a historic document. "Even if you live in a house your whole life, you are just a temporary custodian of it," says John Mesick, of Mesick Cohen Wilson Baker Architects in Albany, New York. "Changes you make may be irreversible."

Revolution at Colonial Williamsburg

Convinced that riotously beautiful wallpaper abounded in pre-Revolutionary America, Colonial Williamsburg is reinterpreting several of its houses. Below is the entry hall of the George Wythe house. John Perry Wallpaper & Co., a century-old London firm, carved new wooden blocks to print the papers, which are styled after those found in Virginia at the time. Once a hand process, the carving is now done with a laser cutter guided by computer.



A visit to a **factory** shows reproduction wallpaper being screen-printed by hand.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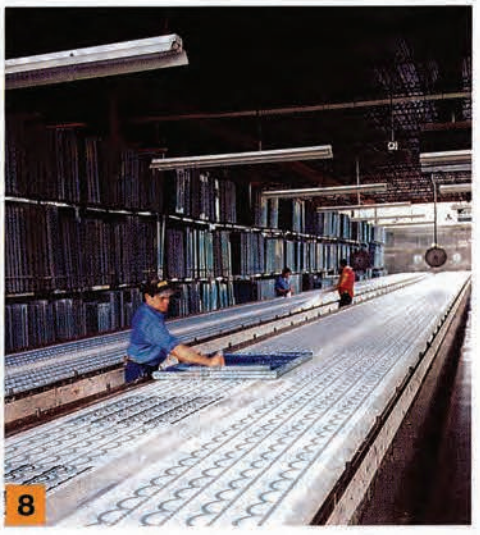
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Choosing Wallpaper

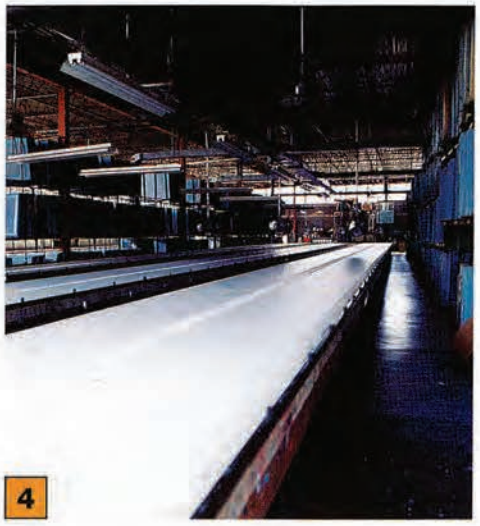
Wallpaper is ephemeral. You can follow your heart and pick whatever complements your lifestyle, house and furniture, regardless of historical accuracy. Then, if your taste changes or you decide to seek authenticity, you can replace the wall coverings later on.

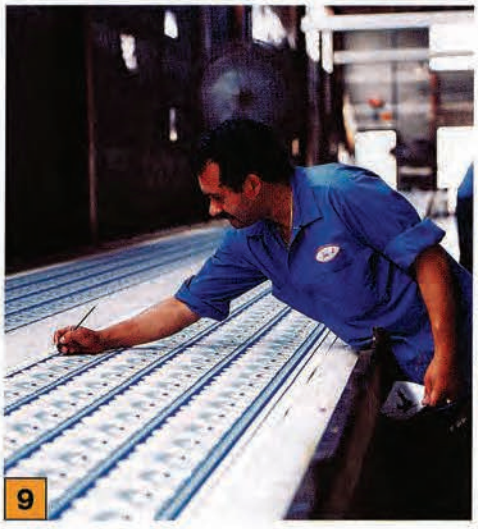
If you choose to put up a paper that matches the period of your home, it's important to understand that it is impossible to buy an exact copy of an antique original because many of the old paints, papers and manufacturing processes are no longer available.

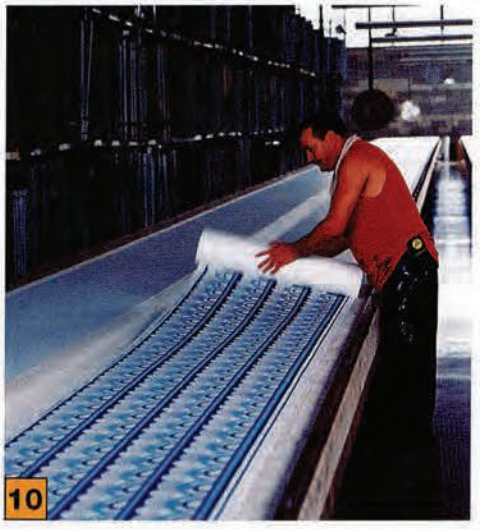
You can choose a reproduction (a copy that is as accurate as possible, given modern materials) or an adaptation (an interpretation of an old wallpaper pattern or a design taken from an item such as a plate or painting).

For example, you can purchase Brunschwig & Fils screen-printed reproductions of the 1790 block prints from the Phelps-Hatheway House in the "document" (original) colors or in alternate "colorways"; or you can buy adaptations of these designs. If historical accuracy is your goal, you come closest with a reproduction in the document colors.

Deborah and Kevin Guinee are in the process of choosing reproduction wallpaper for their Federal-era parlor. "We're happy to consider a screen print, even though the parlor would have originally been covered with a block print," says project







Screen Reproductions, a Carlstadt, New Jersey, wallpaper manufacturer, produces many reproduction papers. To do so, it employs a silk-screen process. Hand screening, widely used in the United States to make reproduction wallpapers, deposits the thick whorls of paint typical of block printing yet is less costly than the older process, which survives only in Europe. Machine printing, perfected during the 19th century, usually results in a slick, flat look. It is the cheapest method and the most commonly used for consumer goods.

Here, workers at Screen Reproductions print a paper called "Baxley Border."

(1) Working by eye, a color mixer combines pigments. **(2)** He creates swatches matched to **(3)** a sample of the wallpaper being reproduced. **(4)** A length of blank paper is laid out on a long table. **(5)** A printer "leapfrogs" down the table, setting down a stencil-like screen at spaced intervals and squeegeeing pigment across it. By the time he reaches the end of the table, overhead fans have dried the ink, and he returns to the beginning to fill in the intervals he has skipped. **(6)** Guideposts ensure that the pattern colors "register," or match up. **(7, 8)** The succeeding colors are laid down, using the same "leapfrog" method. **(9)** A worker touches up minor flaws by hand. **(10)** The finished wallpaper is rolled, ready to be shipped to the customer.

architect Pamela Hawkes of Ann Beha Associates in Boston, Massachusetts. "If this house were a museum, we would be concerned about the precise texture of the surface, but in a private dwelling, cost is a consideration. A screen print will look correct when it's on the wall and in the context of the room and its furnishings."

Hand-screened paper generally costs $40 to $60 for a standard 56-square-foot roll of a simple pattern, such as a two-color stripe, and up to $150 for more complex multicolor patterns, according to Richard L. Weil Jr., manager of Waterhouse Wallhangings, the Boston firm that will supply the Guinees' paper. Ornate hand-screened papers and block prints may set you back a few hundred dollars per roll. (One maker quotes a price of $1,000 a roll for hand-blocked, flocked paper.)

Custom departments of most manufacturers can alter stock items in minor ways—changing the color of one screen, for example—for as little as $8 to $10 extra per roll. They can also re-create antique papers from scratch, using a scrap you have found in your home, let's say.

The latter is an expensive, time-consuming process. Expect to work with the designer and printer every step of the way, reviewing the tracings of the original pattern, selecting the colors and approving the first "strike-offs," or test prints. "We recently created papers for a home on the coast of Maine that the family had owned since 1800," Weil says. "It cost almost $9,000 to create the designs and about $50 a roll to produce them."

Machine prints generally cost between $20 and $40 per roll. However, if the pattern you decide on is a machine print, you must purchase it in the colors that are commercially available. The production setup is so complex, Weil points out, that to customize it the manufacturer will require a minimum order of as many as 750 rolls.

◆ *See Directory,* on page 118, *for details and sources*

Window Anatomy

SASH
The framework that holds the glass. Consists of stiles (vertical members), rails (horizontal members) and muntins. Most sash in this country is either single- or double-hung (slides up and down in a jamb) or casement (side-hung on hinges). The word sash is used to denote both singular and plural.

MUNTINS
Narrow, rabbeted strips of wood that support the glass panes within a sash frame. Not to be confused with mullions, the vertical elements that separate side-by-side windows.

FRAME
The wooden structure that houses and supports the sash.

JAMB
The vertical part of the frame within which the sash slides or rests.

PANE
The glass or glazing in the sash. Also called a light.

SILL
The lower exterior member of a window frame; beveled outward to shed water.

Window Talk...Translated

To a window expert, the old Federal-style windows on the Salem house are "plank-frame with single-hung, six-over-six, plain-rail sash." Translation: *Plank-frame*—the window frame is made of thick wood members, mortised and tenoned and pegged together, then nailed to the outside of the wood sheathing. (Windows nowadays are mounted between the studs.) *Single-hung*—only the bottom sash moves. *Six-over-six*—there are six panes of glass in both the top and bottom sash. *Plain-rail*—the sash slide directly against each other. In later windows, the sash slide in separate tracks.

SAVING OLD WINDOWS

REPUTTY

REGLAZE

REPAINT

REPAIR

By Thomas Baker

The eye-pleasing shadows and profiles of old sash, with the jewel-like reflections of its old glass, are a big reason traditional houses appeal to us. Next to the look of an old wood window, most modern, "low-maintenance" windows fall far short. Yet in our eagerness to lower heating bills and live in draft-free comfort, we often heedlessly consign old windows to the dump, even though storm windows and weather-stripping might fix the problems. By throwing out a window, we are removing a key element of a home, one that can tell us about the craftsman who assembled it, the owner's economic status and social aspirations and the materials and technologies of a bygone era. At 124 Federal Street, the current *This Old House* project in Salem, Massachusetts, the home inspector said the windows were "past their useful life." Master carpenter Norm Abram was convinced they should be saved. "The old sash on this house are amazing," he says. "Just look at the condition of the wood. After 230 years, it's still in great shape. I wonder if today's windows, made with fast-growth wood, will hold up as long, even though they're treated with preservatives." On the following pages, Norm and the crew demonstrate ways to save the old windows, from simple repairs and reglazing (which, done and maintained properly, should last for 20 years) to the full-scale rebuilding of a sill.

PHOTOGRAPHS BY DAVID BARRY

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How to Reglaze a Sash

Of the three components in a window sash—the wood, the glass and the glazing compound (or putty) that holds the glass in place—the compound is the weak link. In time it hardens and cracks, opening a pathway for water. When that happens, about every 20 years, it's time to reputty and reglaze.

Norm reglazed and reputtied the windows of his grandmother's boarding-house when he was a youngster. He has strong memories of those summer days and the tangy smell of linseed putty on his hands. His most important discovery about reglazing: "There are no shortcuts. You have to take your time."

On the long-neglected windows in Salem, peeling paint indicated that water was getting in behind the putty. On some panes, the putty had cracked and curled; even where the putty looked good, Norm could slip his knife blade between putty and glass.

Norm doesn't patch putty. "The old compound is bound to fail sooner than the new stuff; better to have it all be the same age instead of trying to make a patch." That means removing the sash from the window. **(1)** First Norm takes out the stops, the vertical pieces of wood that confine the sash within the jamb. For stops nailed to the jamb, it's a simple matter to slip in a putty knife and gently pry the stop free, working from the bottom up. On these Federal-style windows, the stops are attached to folding interior shutters. Norm takes out shutters and stops together. In addition, the sash has been painted and caulked shut. With a carbide-tipped scraper and a thin putty knife, he removes the caulk and cracks the paint film from around the perimeter of the sash to free it.

Norm reworks sash on a table whenever possible."It's easier, and I'm less likely to damage the glass." **(2)** He sands the flat areas of the sash with a belt sander. A disposable respirator and a vacuum pickup with a HEPA filter minimize exposure to lead dust or to the asbestos that was used in glazing compound before 1977. **(3)** With a well-sharpened paint scraper, he scrapes the paint from the top edge of the muntins, which makes it easier to distinguish wood from putty as the putty is chipped out. **(4)** Removing putty with a putty knife requires care and concentration, particularly on sash with muntins and glass this delicate. Some craftsmen soften the compound with a heat gun, but, says Norm, "When there's lead paint, heat guns generate toxic fumes, and there's a greater likelihood of burning the wood or breaking the glass."

Once the exterior putty is off, Norm pries out the metal glazing points that hold the glass to the wood. He gently pushes out the glass, saving it for later, then scrapes off the putty remaining in the rabbet, the recess holding each pane. **(5)** The wood

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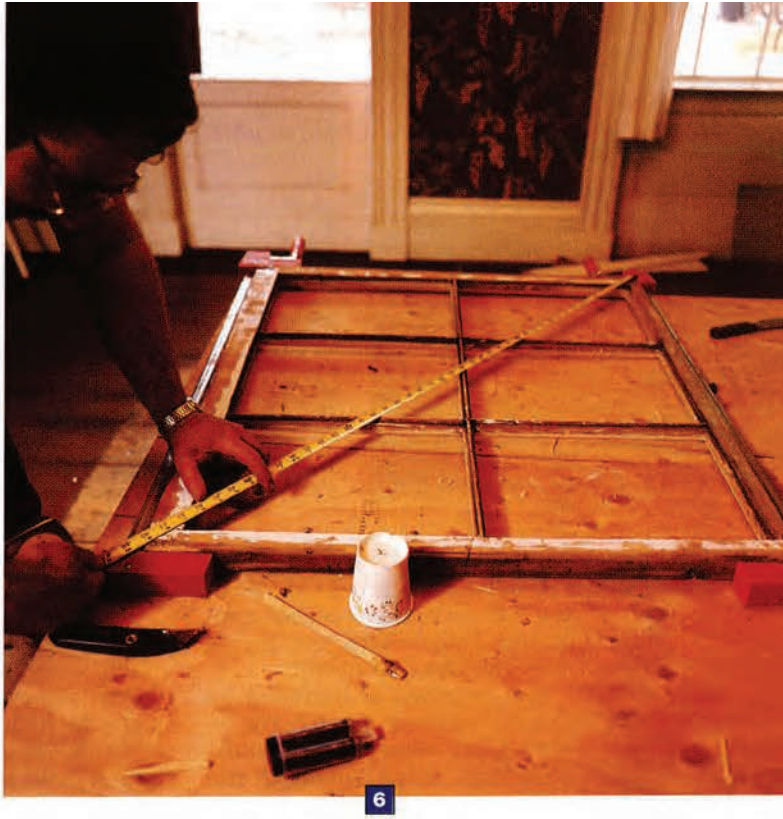

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itself is in good shape. Dovetailed, pegged mortise-and-tenon joints reveal the fine craftsmanship required in the days before reliable adhesives. Without the glass in place, though, the sash is as wobbly as a newborn fawn. Norm drills out the pegs, opens and cleans the joints and brushes on some quick-setting epoxy before reassembling the pieces. **(6)** With the sash clamped in place, he checks that both diagonal measurements are the same, indicating the sash is square. **(7)** All rabbets are scraped clean and sanded with a detail sander. Norm then paints an oil-based primer on the wood, inside and out. **(8)** Priming the rabbets keeps oil from leaching out of the glazing compound.

Norm reinstalls the sash. To avoid denting the putty, he won't clean the glass until the sash is painted.

Norm kneads a handful of glazing compound, making it tacky and elastic; he keeps a wad warm in his palm during the rest of the reglazing. **(9)** First he presses a thin layer of putty into the rabbet. **(10)** Then he gently wiggles each pane into the putty, making sure there are no voids and the glass doesn't touch wood. **(11)** With his putty knife, he pushes new glazing points across the glass and halfway into the wood. Each pane gets six points: two on each side (1½ inches from the corner) and one at top and bottom.

"Now comes the trickiest part," Norm says. "Tooling the putty." With his thumb, he presses a second, thicker layer of putty against the rabbet and around the edge of the glass. **(12)** Starting at the corner, he pulls the putty knife over the glazing compound in one firm stroke. To maintain a consistent angle, he keeps one corner of the knife on the glass, in line with the edge of the rabbet, and rests the end of the blade on the wood. If the knife pulls out the putty, either the knife is dirty or the putty needs warming; remove the putty and try again. With practice, you too can put a neat crease in the corner with a single stroke. "The less you play with it, the better," he says.

He uses a warm wad of putty to pick up excess left on the glass without denting the beveled putty. On the interior side, he trims away any squeeze-out between glass and muntin with his putty knife. Then he reinstalls the sash in the frame and replaces the stops. Oil paint can be applied the next day (latex paint won't adhere until the compound has dried for a couple of weeks). The last step: Norm tells the painter to make sure that the edge of the paint overlaps the glass slightly, providing an added barrier against water infiltration.

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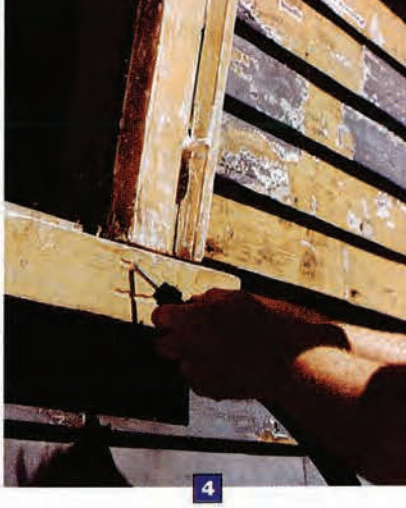


Epoxy Sill Repair

Exterior sills and casings bear the brunt of weather with no more protection than a coat of paint. Little wonder they are the first to suffer the effects of decay.

After two centuries of battering by rain, ice, snow and heat, the old sills on the Salem house were in remarkably good condition, a testament to the excellent qualities of the old-growth white cedar trees that were used in the 18th century. Even so, evidence of paint failure and probes of the wood indicated that water was making inroads, laying down pathways for rot.

Rather than go through the effort of replacing the sills, with wood almost certainly of lesser quality, *This Old House* brought in John Stahl of Stahl Restorations Inc., a company specializing in wood window repair. Stahl uses Window Care Systems, a proprietary epoxying technique developed in the Netherlands. He turned to this system when his repairs using epoxy to harden decayed wood began to fail within a few years. Unlike most epoxies, the Dutch product remains flexible after curing.

(1) Before beginning any work, Stahl first assesses the wood's moisture content with a moisture meter. Epoxy cannot adhere well to wood with a moisture content higher than 18 percent, and even if it could be made to stick, the trapped moisture under its impermeable coat could wreak havoc. **(2)** A heat gun rated at 1,100 degrees Fahrenheit strips all the paint and helps dry out the wood. **(3)** Stahl routs out any decayed wood with a flexible-shaft router that looks, sounds and works like a giant dentist's drill. **(4)** He works the bit into checks (cracks in the surface of the wood), joints, exposed end grain and anywhere the wood shows signs of decay. A higher-pitched motor whine tells Stahl when the bit reaches sound, solid wood, which doesn't hold excess moisture. The rationale for all this routing is that a decayed substrate, even one soaked with epoxy consolidants, will only produce a weak, temporary repair.

Once again, Stahl probes with his moisture meter to make sure the wood is dry enough, then he sands the surface with a belt sander. **(5)** Next he brushes on a thin epoxy primer formulated to penetrate the wood and ensure a good bond with a second coat of epoxy. **(6)** Before the primer cures, within 20 minutes or so, tubes of hardener and resin are dispensed in the proper ratio from a side-by-side gun. **(7)** When mixed together, this thick epoxy paste fills the routed gaps and grooves without sagging. No additional fillers are required. **(8)** Stahl also epoxies the top of the sill. After the epoxy cures—in about 24 hours—he sands the repair to its original level, until some wood shows through, then paints. The sill now looks brand new, and wood of irreplaceable quality has been saved.

Wood and epoxy both need a protective coat of paint once the repair is complete.

It took Stahl two hours over two days to repair this sill, at a cost of $166. For homeowners who want to do the work themselves, a similar repair kit will be available in December 1995.

Old Glass—Irreplaceable Artifact

No discussion of old windows is complete without mention of the glass that went into them. Like an old, handcrafted wooden sash, old glass—with its wavy modulations, its seeds, "blisters," lines, "vesicles" and other imperfections—is a valuable artifact in its own right, one that deserves to be preserved.

Glass is made by heating a mixture of silica sand, crushed limestone, soda ash and feldspar to about 1,700 degrees Fahrenheit. Until the early part of the 20th century, all the glass for windows was made by hand—and mouth—through the prodigious efforts of artisans skilled in the manipulation of this brittle material.

From the early 17th century right up to the mid-1800s, windows were made with **crown glass.** The glassmaker spun a ball of molten glass on the end of a pontil rod until it formed into a disc, or crown, about 3 to 5 feet in diameter. Crown glass was the high-quality glass of its time but had severe drawbacks: Only a limited number of panes could be cut from a single crown, so lights of this period tended to be small; only the most wealthy could afford large panes.

Mouth-blown cylinder glass, long an inferior alternative to crown glass, became the window glass of choice in the mid-19th century, when improved techniques enabled panes to be made bigger, faster and more cheaply. Larger glass sheets meant windows needed fewer muntins, allowing the many permutations found in Victorian windows.

Cylinder glass was fabricated by a three-man team—a "gatherer," a "blower" and a "snapper." The gatherer first collected the molten glass, or "metal," into a 24-pound lump, called a gather, at the end of a 6-foot-long, 24-pound iron pipe. Then the blower would take over, twirling and blowing into the viscous gather while swinging it over a pit, or "swing hole," until it became a thin-walled cylindrical bubble about 1 foot in diameter and up to 7 feet long. When it reached the desired length, the bubble's end was cut or blown open, and the cylinder was set horizontally on a stand, or "horse," to cool. The snapper then cut the glass off the pipe and scored ("snapped") the cylinder lengthwise. The cut cylinder was reheated in a furnace, where it was prodded, rubbed and pushed with a wet alderwood flattener until it formed into a rectangular sheet. After it was annealed (cooled) for nearly an hour, the sheet was moved to the cutting room. Together, these three men were able to make nine cylinders per hour in an eight-hour day.

Compressed air and machinery replaced lungs and hand-craftsmanship in 1905, when factories began making **machine-blown cylinder glass,** using a technique that created towering glass cylinders up to 40 feet tall and 2 feet in diameter. Cylinder glass began to be replaced in the 1920s by **drawn glass,** produced from sheets instead of cylinders, and **plate glass,** a poured and polished glass made primarily for automobiles. In 1958, **float glass**—so called because the glass sheets are flowed out on a bed of molten tin—introduced a hitherto impossible distortion-free and defect-free uniformity. Now, with virtually all window glass being manufactured with the float-glass method, the distinctive flaws of old glass are almost irreplaceable. When you consider what it took to produce old glass, casually throwing it away seems a shame.

The curved striations in this old pane are the telltale signature of crown glass.

SALVAGING OLD GLASS

Norm replaced the broken panes in the Salem house with Restoration Glass from the S.A. Bendheim Co. This modern, mouth-blown cylinder glass has the same imperfections as old glass. Such new "old glass" is beautiful , but at $15 per pane, it's also expensive. One alternative is to salvage glass from old windows that are being tossed out. Tom Silva took the glass from some old storm windows moldering in the basement of the Salem house and had it cut to fit the new sash for the kitchen. You'll find old window glass at landfills or on the street during bulky trash pickup days.

Mouth-blown window glass is still made in Germany. Here, a blower elongates a cylinder of molten glass over the swing hole.

PHOTO COURTESY S.A. BENDHEIM CO. INC.

GUIDE TO SALEM WINDOWS

As one of the oldest cities in the United States, Salem, founded in 1626, has houses from every major architectural period in the country, with windows to match.

EARLY COLONIAL

17th century

Casement sash (hinged on the side, swings out). Lead strips, called caming, support tiny diamond-shape panes, or quarrels.

Narbonne House (18th-century addition)
71 Essex Street

Pickman House (reproduction), 1660
20 Liberty Street

Derby House,1762
168 Derby Street

GEORGIAN

Early to mid 18th century

Double- or single-hung sash moves up and down. Rectangular panes, wide muntins.

Thompson/West Double House, 1845
38-40 Chestnut Street

FEDERAL

Late 18th, early 19th century

Single, double or triple-hung sash; narrow muntins; larger rectangular panes.

Rea House, 1835
20 Chestnut Street

Lye-Tapley Shoe Shop, 1830
Peabody Essex Museum

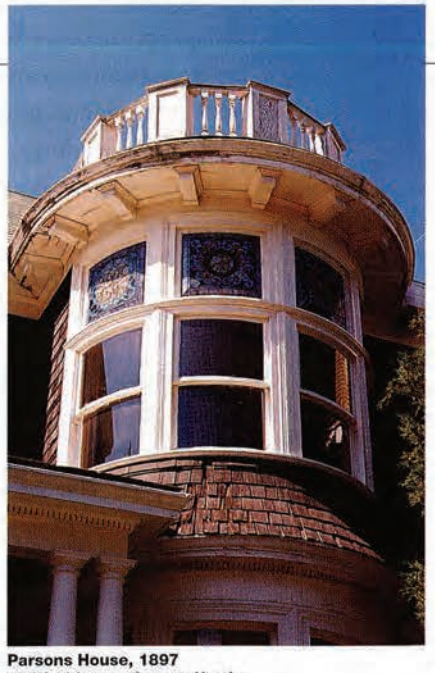
VICTORIAN

Early to late 19th century

Double-hung sash with pulley-and-weight mechanisms. Fewer muntins, larger panes, sometimes curved to fit bowfronts. Muntin divisions manipulated to match a particular style.

Bouchard House, 1916
7 Hancock Street

Brooks House, 1851
260 Lafayette Street



Parsons House, 1897
25 Washington Square North

ARTS AND CRAFTS

Early 20th century

A revolt against Victorian excess, returning to simple shapes and patterns. Square panes, square muntins.

56 Ocean Avenue, 1908

HOW TO GAUGE A WINDOW'S AGE

Determining whether a window is original to a house is a tricky business. So we asked Walter Phelps, whose Brattleboro, Vermont, company duplicates historic sash and windows, to come to Salem and tell us what he sees when he looks at a window. Phelps confirmed the old windows of the Salem house were "quintessential Federal style," and likely original to the house. The clues? Narrow **muntins**, for one thing. Barely half an inch wide, they hardly interrupt the six panes of glass in the sash. The 10-by-14-inch **pane size** is another indication of a Federal house—in this case, one with an affluent owner. Old glass came in standard sizes dictated by the way glass was manufactured; larger sizes are indicative of an owner's wealth. Earlier Georgian-period windows tend to have many smaller rectangular panes—sometimes as many as 12 per sash—held in place with wide, shallow muntins.

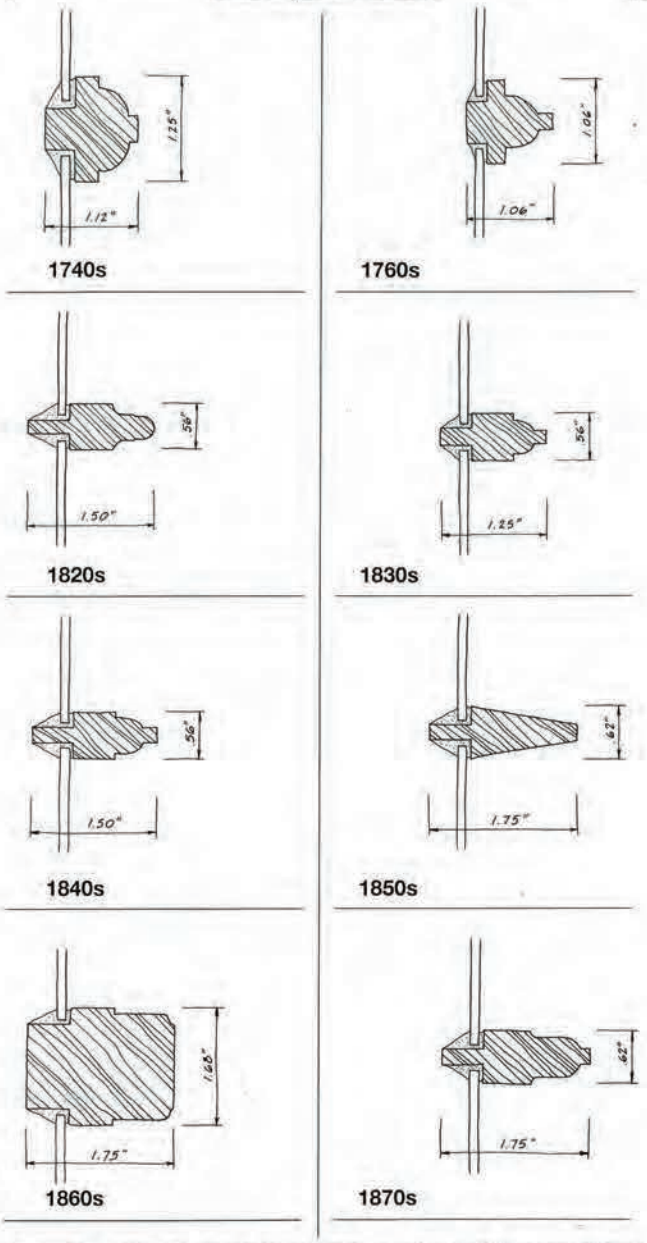
At the same time, the Salem windows don't have features common in later windows, such as **parting beads**—vertical strips of wood in the frame to keep the upper and lower sashes in separate tracks. The lower sash of the Salem house simply slides between the stop and the upper sash. Also, **window frames** in the Victorian era were boards nailed together and fitted within the wall. The Federal windows in Salem have thick mortised-and-tenoned frames nailed to the outside sheathing. Later windows typically had **weights and pulleys** to counterbalance the top and bottom sash, and **sash locks**. On the Salem house, a simple clip keeps the lower sash open or locked. (The upper sash are fixed in place.) Advances in 19th-century glassmaking allowed the use of much larger panes and fewer muntins than during the Federal period. But pane size alone isn't a reliable indicator of a window's age. In the Victorian era, the proliferation of pattern books and sash factories made window design more a function of fashion than something limited by the available technology.

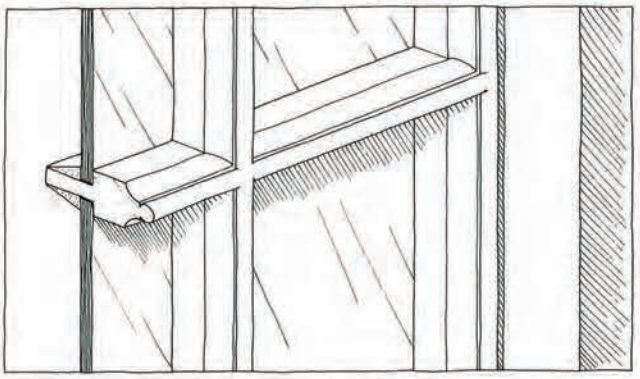
Putnam-Balch House, 1871
329 Essex Street

Phelps cautions against using any one detail to determine window vintage. "You need hard evidence: paint samples, construction techniques, glazing dimensions, house deeds and the like," he says. With these clues (and others), a window's provenance becomes more certain, as does the history of the house itself.

historic muntin profiles

Fashion and technology dictated how window makers dressed up their creations.





On the Salem windows, a delicate bead-and-cove profile, or "sticking," was planed into muntins, stiles and rails as way to add visual interest to the inside of the sash.

MUNTIN PROFILES COURTESY NATIONAL BUILDING MUSEUM
ILLUSTRATIONS BY JOHN MURPHY

♦ *See Directory,* on page 118, *for details and sources*

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Directory

a listing of goods and services

Extras *pp. 22–27*

p. 22—Dates to remember: Restoration '95 San Francisco: Full conference package preregistered, $225; on-site, $300; *For information, call 508-664-8066; to register, fax 508-664-5822 (no phone registration).* **The National Building Museum:** Exhibition tours are offered free daily at 1:30 pm; *401 F St. NW, Washington DC, 20001; 202-272-2448.* **National Association of Home Builders, Remodelers Council:** *1201 15th St. NW, 4th Floor, Washington, DC 20005; 800-368-5242, Ext. 216.* **John C. Campbell Folk School:** *Rt. 1, Box 14A, Brasstown, NC 28902-9603; 800-365-5724.* **Multifunction tools: Gerber Multi-Plier:** #55800, $72; *Fiskars Inc., Gerber Legendary Blades Division, 14200 S.W. 72nd Ave., Portland, OR 97281; 800-950-6161.* **S.O.G. Power Plier:** #S38, $74.95; *S.O.G. Specialty Knives, Box 1024, Edmonds, WA 98020; 206-771-6230.* **Leatherman Super Tool:** #63010101 (with leather case), $70, #63010201 (with nylon case), $70; *Leatherman Tool Group, Inc., 12106 N. Ainsworth Circle, Box 20595, Portland, OR 97294; 800-847-8665.*

p. 23—Lead paint: For copies of the pamphlets "Protect Your Family From Lead in Your Home" or "Reducing Lead Hazards When Remodeling Your Home": *National Lead Information Clearinghouse (NLIC); 800-424-5323, or TDD 800-526-5456 (for the hearing impaired). Contact the EPA on-line at http://www.epa.gov.*

p. 24—Wood dust: Book on dangers of wood dust and formaldehyde: *International Agency for Research on Cancer, No. 62,* 1995, 400 pp., $72 (plus $3 shipping and handling); *World Health Publications, 49 Sheridan Ave., Albany, NY 12210; 518-436-9686.* **Turtle Bay giveaway house:** For information or to charge tickets to a VISA card: *800-887-8532.* **Kit bag:** #06004 GateMouth, $39.99, and #06007 GateMouth Jr., $24.99; *Portable Products, 58 E. Plato Blvd., St. Paul, MN 55107-1809; 800-688-2677.*

p. 25—Soot remover sponge: Paint USA Soot & Dirt Remover, #42R, approx. $4.98; *Bloch/New England, Box 296, Worcester, MA 01603; 800-344-2171 or 508-754-3204.* **Plastic twine:** Flat Twine plastic wrap, #ST11, approx. $5 for a 2"x178' roll; *Nifty Products, 4 Jocama Blvd., Old Bridge, NJ 08857; 800-631-2172.* **Clearwave water softener:** #CW1, approx., $160; *The Field Controls Co., 2308 Airport Rd., Kinston, NC 28501; 919-522-3031.* **Nailsets:** Spring-powered hand tools; *Noxon Inc., 2921 N. University Rd., Spokane, WA 99206; 800-356-6966.* **Landscape lighting:** FiberScape System components; *Fiberstars Inc., 2883 Bayview Dr., Fremont, CA 94538; 800-327-7877.*

p. 26—Paint savers: #52480 Pourit, $1.99, #71656 Storeit, $1.79 for two; *D.A.L.E.S. Corp., 1402 Jackson St., Toledo, OH 43624; 800-545-0573.* **Flexible torch:** BernzOmatic #ST900, $39, and #OM2750 torch kit, $299; *BernzOmatic, 1 Bernzomatic Dr., Medina, NY 14103; 800-654-9011.* **Polyurethane glues:** Excel, #10036750, $18.65 for 750 ml; *AmBel Corp., Box 819, Cottonport, LA 71327; 800-779-3935.* Gorilla Glue, $19.95 for 18 oz; *The Gorilla Group, Box 42532, Santa Barbara, CA 93140; 800-966-3458.* **Protective eyewear:** Uvex Astrospec 3000 Limited Edition, #YC-25836, $9.80 per pair; Uvex Excelsior, Double Lenses, Aviator Style, #YC-16651, $5.90 per pair; Lab Safety Supply Reusable Visitor Specs, #YC-14739B, $2.15 per pair; Visorgogs, #YC-12912, $6.75 per pair; Aden Umbra Safety Glasses, #YC-25877, $6.95 per pair; Uvex Astro OTG 3001, #YC-24741, $8.05 per pair; *Lab Safety Supply, Box 1368, Janesville, WI 53547-1368; 800-356-0783.*

p. 27—Bird and rodent repellents: J'z Electronic Bird Feeder, $119; *J'z Inc., Box 2177, Centreville, VA 22020; 703-830-2473;* Look-Alive! Screech Owl, #58766, $96.46; *Rice Lake Products Inc., 100 27th St. NE, Minot, ND 58702; 800-998-7450.* **Green Plug:** $26 to $39; *Green Technologies Inc., 5490 Spine Rd., Boulder, CO 80301; 800-600-1100.* **Sharpening book:** *The Complete Guide to Sharpening,* by Leonard Lee, 1995, 240 pp., $34.95; *The Taunton Press, 63 South Main St., Box 5506, Newtown, CT 06470-5506; 800-888-8286.*

Reciprocating Saw *pp. 28–37*

Variable-speed reciprocating saw: #9737, $290; *Porter-Cable, Box 2468, Jackson, TN 38302; 800-321-9443 or 901-668-8600 for distributors.* **Blades: 1.** Milwaukee #48-00-1161, $22.30 for ten; *Milwaukee Electric Tool Co., 13135 W. Lisbon Rd., Brookfield, WI 53005; 800-274-9804.* **2.** Metco #48-00-1131 [discontinued]. A similar blade is Better Tools' "Bore-Hawg" #10202, about $7.99 for two; *Better Tools Inc., 206 River Ridge Circle, Burnsville, MN 55337; 800-798-6657.* **3.** Milwaukee #48-00-1064, $8.95 for ten. **4.** Milwaukee #48-00-1062, $8.95 for ten. **5.** Lenox #S656R, $3.59 each; *American Saw & Mfg. Co., 301 Chestnut St., East Longmeadow, MA 01028; 800-628-8810 or 413-525-3961.* **6.** Lenox #S810R, $3.87 each. **7.** Milwaukee #48-00-1041, $13.65 for five. **8.** Milwaukee #48-00-1052, $16.50 for eleven. **9.** Milwaukee #48-01-1420, $17.25 each. **10.** Lenox #S156R, $5.63 each.

For more information: For another article on what to look for in a reciprocating saw and how to buy one, see "Reciprocating Saw Update" in the October 1995 issue of *The Journal of Light Construction; RR#2, Box 146, Richmond, VT 05477; 800-552-1951.*

directory

a listing of goods and services

Choosing a Toilet *pp. 38–41*

Conventional toilets, fittings and parts: American Standard, *1 Centennial Avenue, Box 6820, Piscataway, NJ 08855-6820; 800-524-9797.* Gerber Plumbing Fixtures, *4600 W. Touhy Ave., Chicago, IL 60646; 708-675-6570.* Hunter Plumbing Products, *1775 La Costa Meadows Dr., San Marcos, CA 92069; 800-486-8371.* Kohler, *444 Highland Dr., Kohler, WI 53044; 800-456-4537.* Sloan Valve, *10500 Seymour Ave., Franklin Park, IL 60131-1259; 708-671-4300.* Toto Kiki, *415 W. Taft Ave., Orange, CA 92665; 800-877-1541.*

Toilets for extreme conditions: Clivus Multrum; *Clivus Multrum Inc., 104 Mt. Auburn St., Cambridge, MA 02138; 800-425-4887.* Incinolet; *Research Products/Blankenship, 2639 Andjon Dr., Dallas, TX 75220; 800-527-5551.* Microflush; *Microphor, 452 East Hill Rd., Box 1460, Willits, CA 95490; 800-642-7674.* Sun-Mar; *5035 N. Service Rd., Unit C-2, C9-10, Burlington, Ontario, Canada L7L 5V2; 800-461-2461.* Ultra-Flush; *35 Citron Ct., Concord, Ontario, Canada L4K 2S7; 905-738-0055.*

For further information: "Low-Flow Toilets," Article # 9994, $7.75; *Consumer Reports; 800-766-9988. Installing & Repairing Plumbing Fixtures,* by Peter Hemp, 1994, 184 pp., $19.95; *The Taunton Press, 63 S. Main St., Box 5506, Newtown, CT 06470-5506; 800-888-8286. The Straight Poop,* by Peter Hemp, 1986, 176 pp., $11.95; *Ten Speed Press, Box 7123, Berkeley, CA 94707; 800-841-2665. The Toilet Papers,* by Sim Van der Ryn, 1995, 127 pp., $10.95; *Ecological Design Press, Ecological Design Institute, 10 Libertyship Way, Suite 185, Sausalito, CA 94965; 415-332-5806. Basic Plumbing,* 1995, 96 pp., $9.99; *Sunset Books, 81 Willow Rd., Menlo Park, CA 94025; 800-634-3095.*

Getting It Straight *pp. 43–45*

Levels: Cowley Automatic Level: #CL 200, $225; *Sonin Inc., Milltown Office Park, Route 22, Suite A202, Brewster, NY 10509; 800-223-7511.* **Laser Vision 6.6:** #54033, 18-in. length, $421.99 (also available in non-laser video-level lengths of 10, 13, 24 and 48 in.); *Zircon Corp. 1580 Dell Ave., Campbell, CA 95008; 800-245-9265.* **Water level by Versa-Level:** $49.95; *Price Brothers Tool Co., Box 1133, Novato, CA 94948; 800-334-8270.* **On Line Lazer Level:** #0400, approx. $179; *Cuppson Inc., 6506 Headly Court, Levittown, PA 19057; 215-945-0444.* **Laser Beacon:** #42-000, around $1,400; *Stanley Tools, 600 Myrtle Street, New Britain, CT 06053; 800-262-2161.* **Glo Lime Line Level:** #585, $2.50 for two; *Johnson Level & Tool Mfg. Co. Inc., 6333 West Donges Bay Road, Mequon, WI 53092; 414-242-1161.* **Magnetic Torpedo Level:** #991-9, $11.49; *Empire Level Mfg. Corp., W229 N1420 Westwood Dr., Waukesha, WI 53186; 800-558-0722.*

Our thanks to: Bill O'Hare, product manager, *Macklanburg-Duncan* (manufacturer of the SmartDot laser level, the Mahogany American line of levels and the SmartLevel 200 series of digital electronic levels); *Box 25188, Oklahoma City, OK 73125; 800-762-7853 for SmartDot & SmartLevel; for other levels, 800-654-8454.* Kira Ratmansky, media co-ordinator, *Zircon Corp.*

Chimney Fix-up *pp. 47–49*

Roof anchor kit: #L-4168A includes harness, lifeline, reusable roof anchor, $321, #L-4168B comes without reusable roof anchor, $278.40; *DBI/SALA, 3965 Tepin Ave., Redwing, MN 55066; 612-388-8282 or 800-328-6146.* **Angle grinder:** #6140 Sander Grinder, 5.5 amp, $176; *Milwaukee Electric Tool Co., 13135 W. Lisbon Rd., Brookfield, WI 53005; 800-274-9804.* **4-in. diamond blade:** #DW4700, $67.20; *Dewalt Industrial Tools, 701 E. Joppa Rd., Towson, MD 21286; 800-433-9258.* **15-in. tuckpointing rake:** #1934, $9; *Dasco Pro, 2215 Kishwaukee St., Rockford, IL 61104; 800-327-2690.* **¾-in. round jointer:** #1935, $3.73; *Dasco Pro.* **Type N masonry cement:** Iron Clad, $5.50 for 70-lb. bag; *Glens Falls Cement Co., Box 440, Glens Fall, NY 12801; 518-792-1137.* **Chimney bracket:** #CB, $250; *Vanguard Mfg., Box 247, New Ipswich, NH 03071; 800-624-5000.* **Roof membrane:** Tough-Guard, $40 for 36-ft. roll, $70 for 72-ft. roll; *Georgia Pacific, 133 Peachtree St., NE, 20th fl., Box 105605, Atlanta, GA 30303; 404-652-5871.* **Metal brake:** Pro III Port-O-Bender, approx. $1,207; *Tapco International Corp., 45657 Port St., Plymouth, MI 48170; 800-521-7567.* **16-oz. copper:** 36-in. x 8-ft. roll, $2.50/sq. ft; *McGregor Heating & Air Conditioning, 7 Railroad Ave., Bedford, MA 01730; 617-271-0106.* **EPDM rubber roofing and splice adhesive:** #P1671 contact cement; *Roofing Products International, 5120 Beck Dr., Elkhart, IN 46516; 800-628-2957.* **10-in. lead flashing:** $4.16 per sq. ft. for 1/16-in. thickness; $8 per sq. ft. for ¼-in. thickness; *G.A. Avril Co., White Metal Products Division, Box 12050, 2108 Eagle Ct., Cincinnati, OH 45212; 800-331-9173.*

For further information: *The Old House Journal Guide to Restoration,* Patricia Poore, ed., 1992, 400 pp., $39.95; *Dutton/Penguin Books USA., 120 Woodbine St., Bergenfield, NJ 07621; 800-253-6476.* "Preservation Brief #2, Repointing Mortar Joints in Historic Brick Buildings," Robert C. Mack, AIA, (GPO Stock #024-005-01026-2), 1980, 8 pp.; *Preservation Assistance Division, National Park Service, Box 37127, Suite 200, Washington, DC 20013; 202-343-9573.* **Masonry:** *How to Care for Old and Historic Brick and Stone,* by Mark London, 1988, 208 pp., $12.95; *John Wiley & Sons, 1 Wiley Dr., Somerset, NJ 08875; 800-225-5945.*

Our thanks to: Alan Kline, Lynn Ladder. For supplying roof anchor kit, Lorraine Schnabel, architectural conservator, *John Milner Associates, 1216 Arch St., Philadelphia, PA 19107.*

directory

a listing of goods and services

A Clean, Well-Lighted Place *pp. 50–55*

Table saw: 10-in. Delta Unisaw with 52-in. Unifence, 3-hp, 230-volt, #36-820, $1,599; *Delta International Machinery, 246 Alpha Dr., Pittsburgh, PA 15238; 800-224-7278.* **Jointer:** 6-in. Delta #DJ-15, #37-154, $1,496. **Surface planer:** 13-in. Delta, #22-661 with stand, 2-hp, 230-volt, $1,544. **Radial saw:** 12-in. Delta, #33-890, 1.5-hp, 230-volt, $1,903. **Drill press:** 16.5-in. Delta, #17-900, 0.75-hp, 115-volt, $470. **Band saw:** 14-in. Delta, #28-283 with enclosed stand, $996. **Sanding center:** Delta #31-280, 1.5-hp with 6x48-in. abrasive belt, 12-in. abrasive disk, power take-off for sanding accessories, $923. **Random-orbit sander:** 6-in. variable-speed Porter-Cable, #7336, approximately $239 (optional dust hood and hose kit, #73333, $30.95); *Porter-Cable, Box 2468, Jackson, TN 38302; 800-321-9443.* **Cyclone dust collector:** Delta #50-903; **Installation and customizing of equipment and ducting components:** *Air Handling Systems, 5 Lunar Dr., Woodbridge, CT 06525; 800-367-3828.* **Cyclonic central vacuum cleaning system:** 13.5-gallon Vacuflo, #260; *H-P Products, Inc., 512 Gorgas St., Louisville, OH 44641; 800-822-8356.* **Portable shop vacuum:** 10-gal. Fein Vac I (dust-extractor) #9-20-13, $745; *Fein Power Tools, 3019 W. Carson St., Pittsburgh, PA 15204; 800-441-9878.* **Rubber sanding mats:** *Vermont American, Box 340, Lincolnton, NC 28093; 800-626-2834.*

How to Buy a Wreck *pp. 56–57*

For more information: The General Services Administration's Consumer Information Catalogue offers several useful booklets: "Rehabbing a Home with HUD's 203(k)," #347B, 50 cents; "HUD's Home Buying Guide," #635B, free; "Mortgage Guide," #128B, $1.25; and "Home Inspection," #337B, 50 cents; *Consumer Information Center, Attn: R. Woods, Pueblo, CO 81009; 719-948-3334.* Catalog information can be downloaded free on-line: *http://www.gsa.gov/staff/pa/cic/cic.htm*

Our thanks to: Ken Crandall, chief architect, Single-Family Development Division, HUD, Washington, DC; John Leith-Tetrault, director, Office of Financial Services, Community Partners, National Trust, Washington, DC.

Bathroom Renovation *pp. 64–71*

Tub sealer: SP-01 Scratch Protection, brushable or sprayable protective coating, $35 per gal.; *Surface Protective Products Int'l. Inc., 1205 Karl Court, Suite 116, Wauconda, IL 60084; 800-789-6633.* **Tiles:** MX white 6x6-in. glazed wall tile decoratives; seashore hand-painted wall tiles from Spain, $5.25 per tile; sea surf border on white, 3x6-in., and sailboats on white, 6x6-in. wall tile, $20.20 per tile; HP matte white 5¼x5¼-in. field tile, $8.82; *Country Floors Inc., 15 E. 16th St., New York, NY 10003; 212-627-8300.* **Wall grout:** Hydroment multipurpose acrylic latex admixture, #425, 1 gal., $17.58; *Bostik, 211 Boston Street, Middleton, MA 01949; 800-726-7845.* Non-sanded, mildew-resistant, white dry tile grout, #WDG5, approx. $4.50 for 5-lb. mix; *Custom Building Products, 13001 Seal Beach Blvd., Seal Beach, CA 90740; 800-272-8786.* **Tile spacers:** ⅛-in. #LG and 1/16-in. #LG, around $4 for bag of 300; *Walton Tool Co. Inc., 650 W. 16th Street, Long Beach, CA 90813; 800-421-7562.* **Silicone caulk:** construction tripolymer sealant; *Geocel Corporation, Box 398, Elkhart, IN 46515; 800-348-7615.* **Electronic water-pressure regulator:** #A-2, $105; *Watts Industries, 815 Chestnut St., North Andover, MA 01845; 508-688-1811.* **Closet shelving:** 12-in. super slide linen, about $1.25 per foot; *Closetmaid, Clairson International, 720 S.W. 17th St., Box 4400, Ocala, FL 34474; 800-227-8319.* **Bathtub:** Kohler Villager with 4-in. shelf, #K-714, $362.05 to $452.55; **Toilet:** Kohler Couture Lite, low-flo, #K-714, $273.35 to $408.75. **Sink faucet:** Kohler Paladar, CP (chrome), #K-14512, $145. **Tub faucet:** Kohler Taboret, #K-8224, $254.40 to $325.50. *Kohler, 444 Highland Dr., Kohler, WI 53044; 800-456-4537.* **Makita 3⅜-in. Cordless Cutter:** #4190D, $212; *Makita U.S.A., 14930 Northam St., La Mirada, CA 90638; 800-462-5482.* **Halogen light fixtures:** *Seagull Lighting Products, 301 Washington Street, Riverside, NJ 08075; 800-347-5483.*

Evergreens *pp. 72–77*

Our thanks to: Sue Martin, Erik Neumann; *National Arboretum, 3501 New York Ave. NE, Washington, DC 20002; 202-245-4564.* Pete Girard, *Girard Nursery, Box 428, 6839 North Ridge E., Geneva, OH 44041; 216-466-2881.* Mary Jo Scott, *Lake County Nursery, Route 84, P.O. Box 122, Perry, OH 44081; 216-259-5571.*

For further information: *Living Fences,* by Ogden Tanner, 1995, 128 pp., $19.95; *Chapter's Publishing Ltd., 2031 Shelburne Rd., Shelburne, VT 05482; 800-892-0220.*
Taylor's Guide to Shrubs, by Norman Taylor, 1987, 965 pp., $19.95; *Houghton Mifflin Co., 222 Berkeley St., Boston, MA 02116; 800-225-1464.*
Shrubs in the Landscape, by Joseph Hudak, 1984 (out of print); *McGraw-Hill Inc.*
A Garden of Conifers, by Robert A. Obrizak, rev. ed., 1994, 117 pp., $24.95; *Capability's Books Inc., 2379 Hwy. 46, Deer Park, WI 54007; 800-247-8154.*

directory

goods and services

Build the Perfect Bookcase *pp. 78–81*

Cabinetmaker: Freddy Encalada, *Ebano Woodworks, 28 Goodhue St., Salem, MA 01970; 508-745-4204.* **Architects:** George Warner and Lisa Cunningham; *Warner & Cunningham Inc.; 617-566-1644.* **Shelf-span calculations:** Michael P. Wolcott, Ph.D., *Wood Materials and Engineering Laboratory, Civil Engineering, Washington State University, Pullman, WA 99164.* **General contractor:** *S&H Construction Inc., 52 Bellis Circle, Cambridge, MA 02140; 617-876-8286.* **Mail-order libraries:** Hard maple drawers, *Eagle Woodworking, 1130 E St., Tewksbury, MA 01876; 800-628-4849.* Beech and birch plywood drawers, *Valendrawers, Box 1169, Lexington, NC 27293; 800-334-4825.* Cabinet boxes, *Cab Parts, 716 Arrowest Rd., Grand Junction, CO 81505; 303-241-7682; Accent Manufacturing, 1585-B Mabury Rd., San Jose, CA 95133; 408-926-3667.*
For more information: "MDF from Start to Finish," 44 pp., $9; *National Particleboard Association, 18928 Premiere Court, Gaithersburg, MD 20879; 301-670-0604.*

What's That Siding Hiding? *pp. 82–85*

For more information: *Broadway Historic Area Association, 852 19th St., Rock Island, IL 61201; 309-786-1969. City of Rock Island, Planning and Redevelopment Division, Historic Preservation, 1528 3rd Ave., Rock Island, IL 61201; 309-793-3442.* Preservation Brief #8: "Aluminum and Vinyl Siding on Historic Buildings," by John H. Myers, rev., 1984 (Gary Hume) 7 pp.; *Preservation Assistance Division, National Park Service, Box 37127, Suite 200, Washington DC 20013; 202-343-9573.*

directory

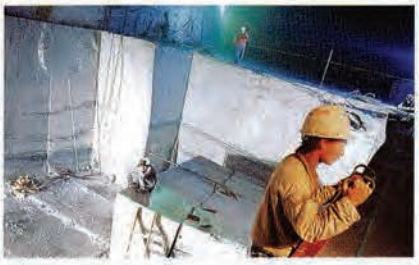
a listing of goods and services

The Screw *pp. 86–89*

For more information: "The Heritage of Mechanical Fasteners," 1991, 33 pp., $10; *Industrial Fasteners Institute, 1717 East Ninth St., Suite 1105, Cleveland, OH 44114; 216-241-1482.*

Our thanks to: Jim Ray, president, *McFeely's Square Drive Screws, 1620 Wythe Road, Box 3, Lynchburg, VA 24505-0003; 800-443-7937.* Mike Goldberg, vice president and general manager, *Stillwater Fasteners, Box 128, East Freetown, MA 02717; 508-763-8044.* Pat Monahan, marketing manager, and Chuck Williams, director of marketing, *Elco Industries, Inc., 1111 Samuelson Road, Box 7009, Rockford, IL 61125-7009; 815-397-5155.* Charles J. Wilson, director of engineering and management services, *Industrial Fasteners Institute.* Mike Barber, president, *Faspac Inc., 13909 N.W. 3rd Court, Vancouver, WA 98685; 800-847-4714.* William McMillen, supervisor of restoration, *Historic Richmond Town, 441 Clarke Ave., Staten Island, NY 10306-1198; 718-351-1611.*

How Marble Comes Out of a Mountain *pp. 90–95*



Marble from the Danby Quarry available through: *Carl Schilling Stoneworks, 62 Main Street, Proctor, VT 05765; 802-459-2200. Rutland Marble & Granite Co., Box 807, Castleton, VT 05735; 802-468-5636.*

Sealants: 511 Impregnator for polished stone, $95 per gal., and 511 Porous Plus for absorbent stone, $225 per gal. *Miracle Sealants, 12806 Schabarum Ave., Building A, Irwindale, CA 91706; 800-350-1901.*

For more information: "Care & Cleaning for Natural Stone Surfaces," 1995, 16 pp., free. *Marble Institute of America, 30 Eden Alley, Suite 201, Columbus, OH 43215; 614-228-6194. This Old House Kitchens: A Guide to Design and Renovation* (pp. 233–239), by Steve Thomas and Philip Langdon, 273 pp., $24.95. *Little, Brown & Co., 1271 Avenue of the Americas, New York, NY 10020; 800-759-0190.* Vermont Marble Exhibit, open Mon.-Sat., 9 am-4 pm. *62 Main St., Proctor, VT 05765; 802-459-2300.*

Our thanks to: Jonathan Zanger, president; *Westchester Marble & Granite/Walker & Zanger, 31 Warren Place, Mount Vernon, NY 10550; 914-667-1600, 800-634-0866.*

Wallpaper History *pp. 96–103*

Reproduction papers: Historic wallpapers courtesy of the Society for Preservation of New England Antiquities, (SPNEA); *141 Cambridge St., Boston, MA 02114; 617-227-3956;* for the Society's reproduction collection, contact: *Brunschwig & Fils, 979 Third Ave., New York, NY 10022; 212-838-7878.* Phelps-Hatheway papers: *Brunschwig & Fils.* Colonial Williamsburg papers: *F. Schumacher & Company, 939 Third Ave., New York, NY 10022; 212-415-3900.* Waterhouse Wallhangings papers: *99 Paul Sullivan Way, Boston, MA 02118; 617-423-7688.* Baxley Border: *Sellers & Josephson, 86 Route 4 East, Englewood, NJ 07631; 201-567-1353.*

Collections: The most easily accessible and largest collection in the United States; *Cooper-Hewitt National Design Museum, 2 E. 91 St., New York, NY 10128; 212-860-6896.* SPNEA has the second largest collection in the country (documented in *Wallpaper in New England*, see below). To find small collections around the country, many of which offer reproductions, contact your local historical society or buy the 1995 Directory issue of *Wallpaper Reproduction News,* $30/year for a quarterly subscription, $5 for directory; *WRN Associates, Box 187, Lee, MA 01238; 413-243-3489.*

For further reading: *Wallpapers for Historic Buildings* by Richard C. Nylander, 1992, 264 pp., $19.95; *John Wiley & Sons, 1 Wiley Dr., Somerset, NJ 08875; 800-225-5945, or order directly from SPNEA. The Papered Wall,* Lesley Hoskins, ed., 1994, 256 pp., $49.50; *Harry N. Abrams Inc., 100 Fifth Ave., New York, NY 10011; 800-345-1359, 212-206-7715. Wallpaper in America,* Catherine Lynn, 1980, 533 pp., $45.00; *W.W. Norton & Company Inc., c/o National Book Company, 800 Keystone Industrial Park, Scranton, PA 18512; 800-233-4830. Wallpaper in New England,* by Richard Nylander, Elizabeth Redmond and Penny J. Sander, 1986, 283 pp., $26.95; *SPNEA.*

Workshops: *Eastfield Village, Box 539, Nassau, New York 12123; 518-766-2422.*

Our thanks to: Richard Nylander, chief curator, *the Society for Preservation of New England Antiquities.* Judy Straeten, archivist, *Brunschwig & Fils.* Karin Peterson, associate director and curator, *Antiquarian and Landmarks Society, 394 Main St., Hartford, CT 06103; 203-247-8996.*

directory

a listing of goods and services

Saving Old Windows *pp. 104–111*

Triangular head scraper: #448, $12.20; *Sandvik Saws & Tools, Box 2036, Scranton, PA 18501; 800-828-9893.* **Profile sander:** #444, approx. $157; **Belt sander:** #352, $302; *Porter-Cable, Box 2468, 4825 Highway 45 North, Jackson, TN 38302; 800-321-9443.* **Glazing points:** Diamond head, ¼-in. #08-111, $8 for box of 4,000; ½-in. #08-211, $8.80 for box of 4,000; *Fletcher-Terry Co., 65 Spring Lane, Farmington, CT 06032; 800-843-3826.* **Glazing compound:** DAP 33, #12120, price and model # depending on size; *DAP Inc., Box 277, Dayton, OH 45401; 800-327-3339.* **Old glass:** Light Restoration Glass, 10x14-in., $14.95 per sq. ft.; *S.A. Bendheim Co. Inc., 61 Willett St., Passaic, NJ 07055; 800-221-7379.* **Heat gun:** HG1100, 1,100-degree F max., $114; *Makita U.S.A., 14930 Northam St., La Mirada, CA 90638; 800-462-5482.* **Sill repair epoxy and tools:** Window Care Systems c/o *Repair Care Systems USA, 59 Meadow Rd., Rutherford, NJ 07070; 800-655-9919.*

For further reading: *Repairing Old and Historic Windows,* New York Landmarks Conservancy, 1992, 208 pp., $24.95; *John Wiley & Sons, 1 Wiley Dr., Somerset, NJ 08875; 800-225-5945. The Window Handbook,* Charles E. Fisher III, ed., 1986, 140 pp., $32; *Historic Education Foundation, Box 77160, Washington, DC 20013; 202-828-0096. The Window Workbook,* 1986, 368 pp., $48.25; *Historic Preservation Education Foundation, Box 77160, Washington, DC 20013; 202-828-0096.* "The Repair of Historic Wooden Windows" by John H. Myers, 1981, 8 pp., Preservation Brief #9; *Preservation Assistance Division, National Park Service, Box 37127, Suite 200, Washington, DC 20013; 202-343-9573.*

Our thanks to: Richard O'Connor, historian, *Historic American Building Survey, Historic American Engineering Record, National Park Service, Box 37127, Washington, DC 20013.* Andrea Gilmore, regional director, *Building Conservation Associates, 66 Church St., Dedham, MA 02026;* Donald Jayson, senior vice president, *S.A. Bendheim Co., Inc.* Debra Hilbert, *Historic Salem, Box 865, Salem, MA 01970; 508-745-0799.* Robert Saarnio, curator of early American architecture, *Peabody Essex Museum, East India Sq., Salem, MA 01970; 508-744-3390.* Walter Phelps, *Walter E. Phelps Co., Box 453 RR5, Brattleboro, VT 05301; 802-257-4314.* Carolyn Goldstein, curator, *National Building Museum, 401 F St., N.W., Washington, DC 20001; 202-272-2448.* Henry Moss, chairman, Historic Resources Committee, *Boston Society of Architects, 52 Broad St., Boston, MA 02109; 617-951-1433.*

Save This Old House *p. 124*

Our thanks to: Magi Williams, historic preservation planner, *City of St. Joseph, 11th & Frederick Avenues, St. Joseph, MO 64501.* Steve Mitchell, acting assistant program director, *Missouri Dept. of Natural Resources, Box 176, Jefferson City, MO 65102.* Clem Przybylski, *ERA1 McClair Realtors, 3915 Beck Rd., St. Joseph, MO 64506.*

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save this old house

PRICE
$30,000

LOCATION
1102 Felix Street, St. Joseph, Missouri

This 4-bedroom, 3,500-square-foot brick house, located on a 50-by-125-foot lot in St. Joseph's Museum Hill Historic District, was being used for apartments until a recent fire ripped a hole in the roof and caused smoke and water damage to the second floor. The house, an Italianate Victorian built about 1880, has its original wood floors and staircase. The neoclassical porch was added in 1912. Any exterior renovations require the approval of the local landmarks commission.

CONTACT
McClain Realty–ERA
3915 Beck Road
St. Joseph, MO 64506
800-536-3721

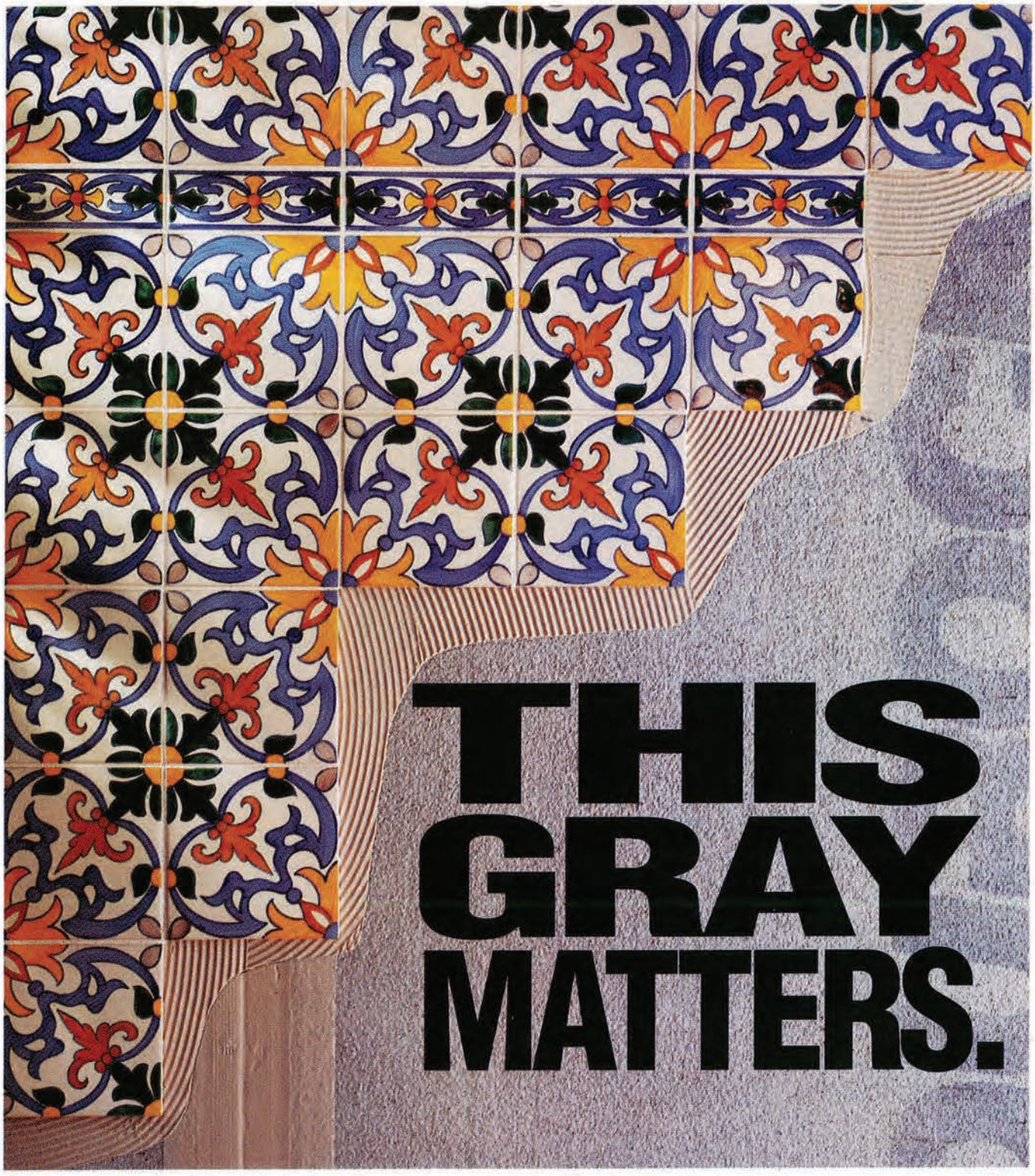
If you know of a house that should be saved and have evidence of its original condition, please write to us at:
Save This Old House
20 West 43rd Street
New York, NY 10036

TODAY

Some of the house's original Victorian features are still in place. TOP: The massive wooden staircase. ABOVE: The oak and tile fireplace.

1984

TOP PHOTOGRAPHS BY ROB DANIELS; BOTTOM COURTESY THE HISTORIC PRESERVATION DEPT., DEPT. OF NATURAL RESOURCES, STATE OF MISSOURI



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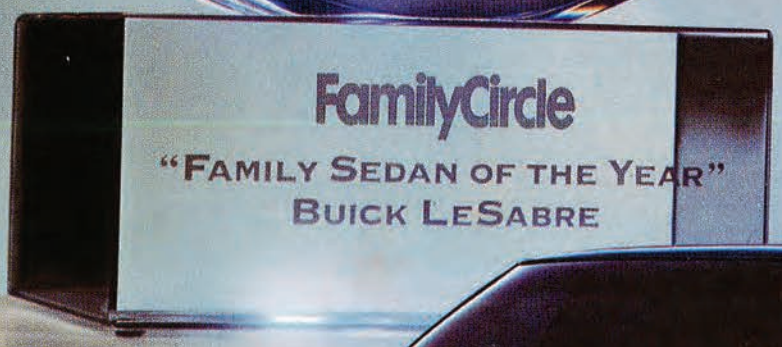

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