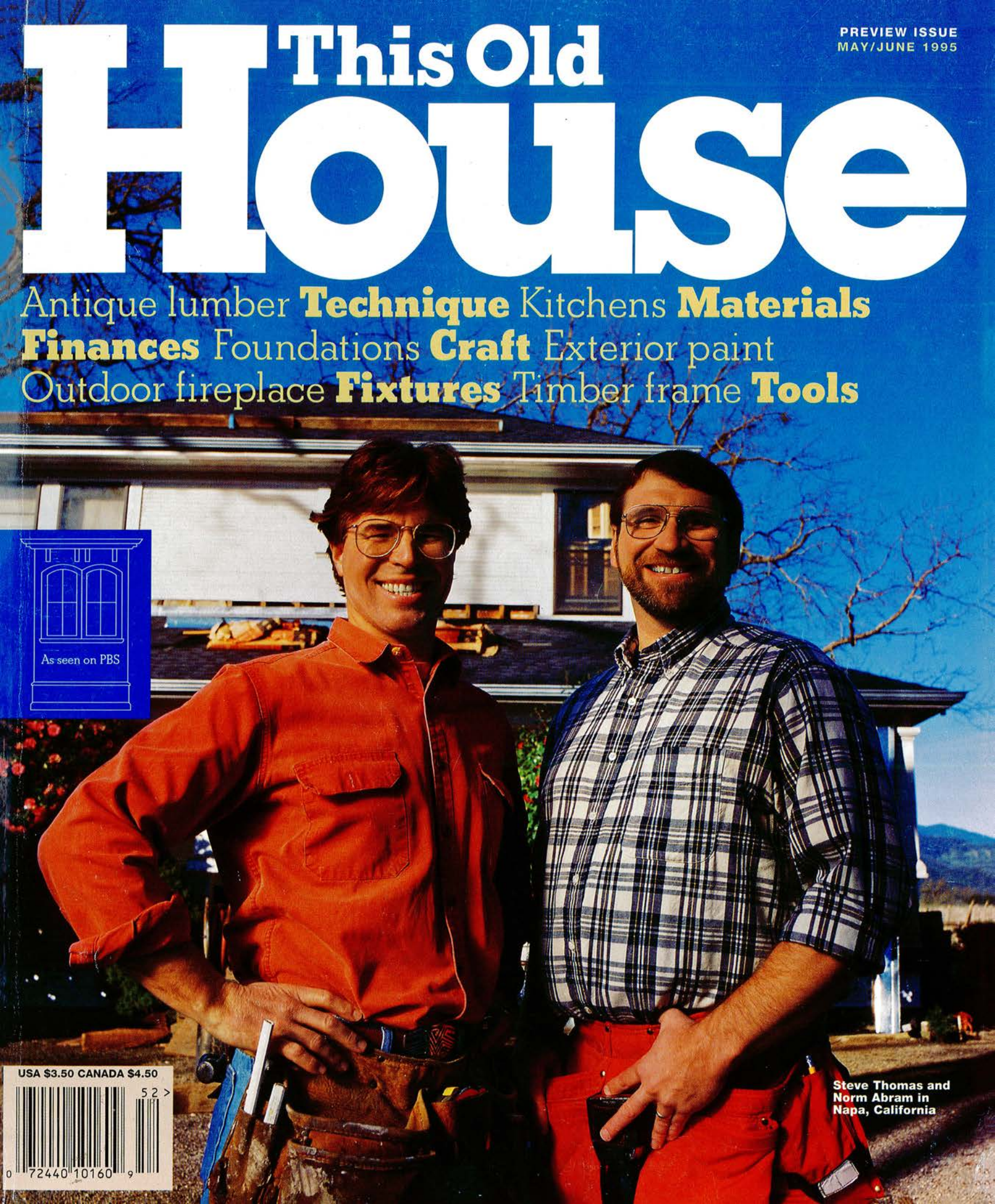
PREVIEW ISSUE
MAY/JUNE 1995

This Old House

Antique lumber **Technique** Kitchens **Materials**
Finances Foundations **Craft** Exterior paint
Outdoor fireplace **Fixtures** Timber frame **Tools**



Steve Thomas and Norm Abram in Napa, California

USA $3.50 CANADA $4.50
52 >
0 72440 10160 9

The Center is now

Not only was it developed at one of the most advanced vehicle research and development facilities in the world, but each Chrysler Concorde is in itself something of a mobile design center. We suggest you begin with a walk around the grounds. Note the wind-cheating profile of innovative cab-forward design–longer wheelbase, wider track, aggressively raked windshield. As you step in, observe that cab-forward also enlarges the rear doors for easier entry and exit. Once inside the spacious interior, take a hands-on tour of ergonomically placed controls on the instrument panel, seats, doors and ceiling. (Don't miss the dual front seat air bags;† they're standard.) Unseen but effective nonetheless, a spectrum of noise-buffering components is at the ready to

Chrysler's Portofino concept car was the first incarnation of cab-forward engineering.

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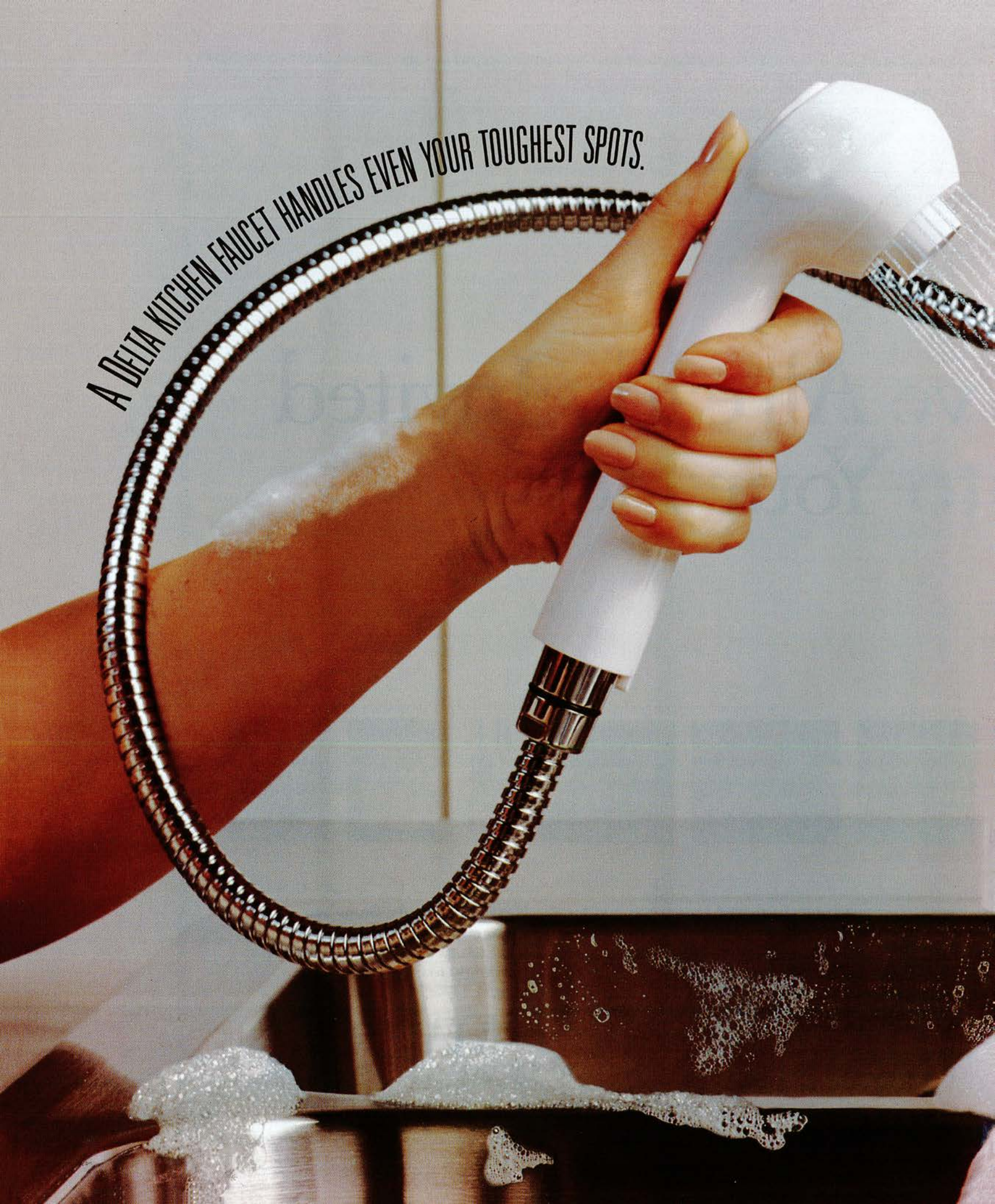
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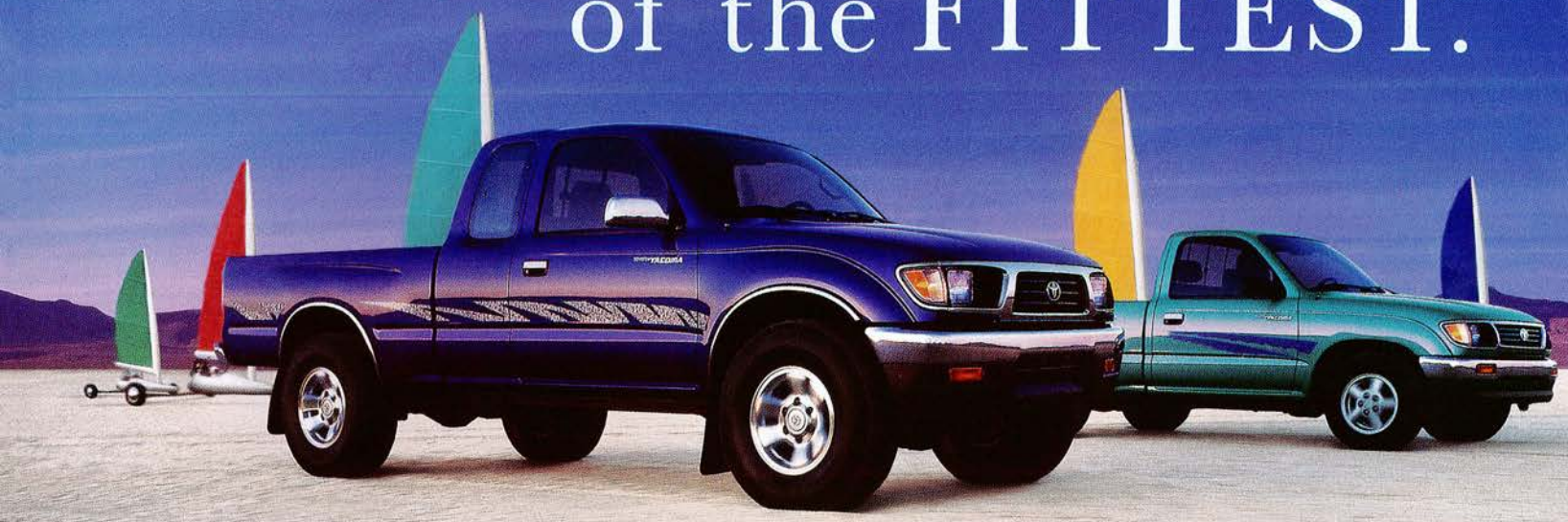

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*USAC-certified acceleration tests, w/ and w/o 1,000-lb. payload of Tacoma 4x2 2.4L 5-speed vs. similarly equipped Chevy S-10 and Ford Ranger standard V6s. **USAC-certified acceleration tests. Tacoma 4x4 3.4L Xtracab automatic vs. similarly equipped Ford Ranger and Chevy S-10 4x4s with optional V6s. ***USAC-certified braking tests. Tacoma 4x2 2.4L 5-speed standard cab and 4x4 Xtracab automatic models vs. similarly equipped Chevy S-10s and Ford Rangers. †To help avoid serious injury, always wear your seatbelt. Driver-side air bag is a supplemental restraint only. ††Towing comparison vs. Ford Ranger and Chevy S-10.

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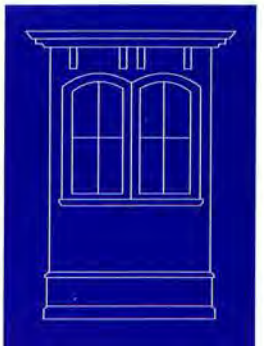
Cover photograph by William Mercer Mcleod

MAN IS A TOOL-USING ANIMAL. WITHOUT TOOLS HE IS NOTHING. WITH TOOLS HE IS ALL.
Thomas Carlyle



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UPPER PHOTOGRAPH BY DAN BORRIS, LOWER PHOTOGRAPH BY DARRIN HADDAD

PLEASE BE CAREFUL: Home renovation and construction is often dangerous. Anyone who works with power tools, in unfinished buildings and up on roofs puts himself or herself in some kind of danger. We try to promote safe work habits in our articles. But what is safe for an experienced construction professional in some circumstances may not be safe for you. Be sure you know what constitutes safe practice if you try anything you learn here (or elsewhere). Ensure your own safety, and that of anyone you're working with, before you begin working.

You were bound for the Rockies. **Backpack.**

Thoreau. **Places to go.**

This lasted until late-autumn *Colorado* led to marriage.

at 10,000 feet. A left at Denver your own terrain.

And a home. **Nice.**

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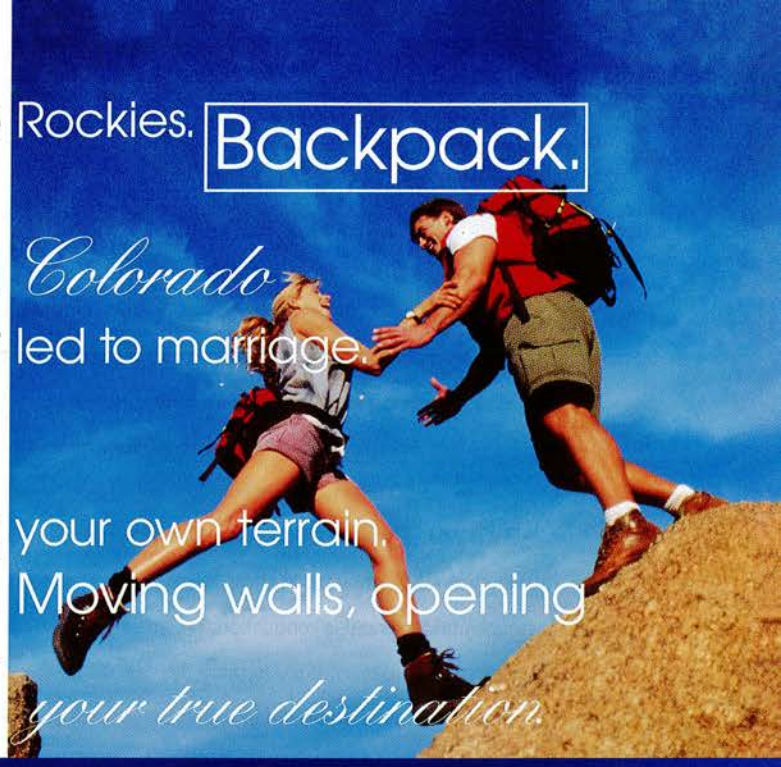

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contributors

MAY/JUNE

1 **MARK FEIRER** (author, "Circular Saws") joined the staff of *Fine Homebuilding* magazine, later becoming its editor, after years of work in construction. He has written three books and an upcoming CD-ROM on remodeling. His training began in a small custom cabinet shop and progressed to residential construction before he turned to editing. He's now a contributing editor at Reader's Digest General Books and lives in a perfectly good house in Connecticut that he's taking apart anyway.

2 **MICHEAL P. McLAUGHLIN** (photographer, "Salvaging Antique Lumber") grew up in Providence, Rhode Island, in a series of houses under endless renovation. He has taken portraits of people in every occupation: dairy farmers, lighthouse keepers, hunting-dog breeders, painters and sculptors. A personal project for several years has been photographing roadside buildings throughout the South. He now lives in a loft above a bakery in Brooklyn, New York.

3 **JOHN S. SALADYGA** (author, "Exterior Painting" and "Treated Wood") is a writer for the home section of *Newsday*. He lives in East Setauket, New York, in a 1964 split-level home he's been restoring for the past seven years. He got his start helping his family renovate a six-unit frame house in Brooklyn, New York. After deciding to take a break from the newspaper world several years ago, John worked for three years as a contractor renovating Victorian homes in Nyack, New York.

4 **PETER BOSCH** (photographer, "Exterior Painting"), along with his wife and sons, is in the process of restoring a 1907 former country home in the Catskill Mountains. During the week, he works as a freelance photographer in New York City and Europe.

5 **KEN DRUSE** (author, "Long-Lived Trees") writes about gardening and landscape design. His work has been featured on WGBH-TV's "The Victory Garden." His most recent book is *The Natural Habitat Garden* (Clarkson N. Potter, 1994). He lives and gardens in and around an 1873 brownstone townhouse in Brooklyn, New York.

6 **PETER LEMOS** (author, "Locksets") works at "antiquing" a postwar Cape Cod–style house on the coast of Maine between writing projects; it's the latest in a series of whole-house renovations. In an effort to create charm where there was none, he has replaced 15 hollow-core 1950s doors with traditional six-panel pine doors, drilling and fitting each one.

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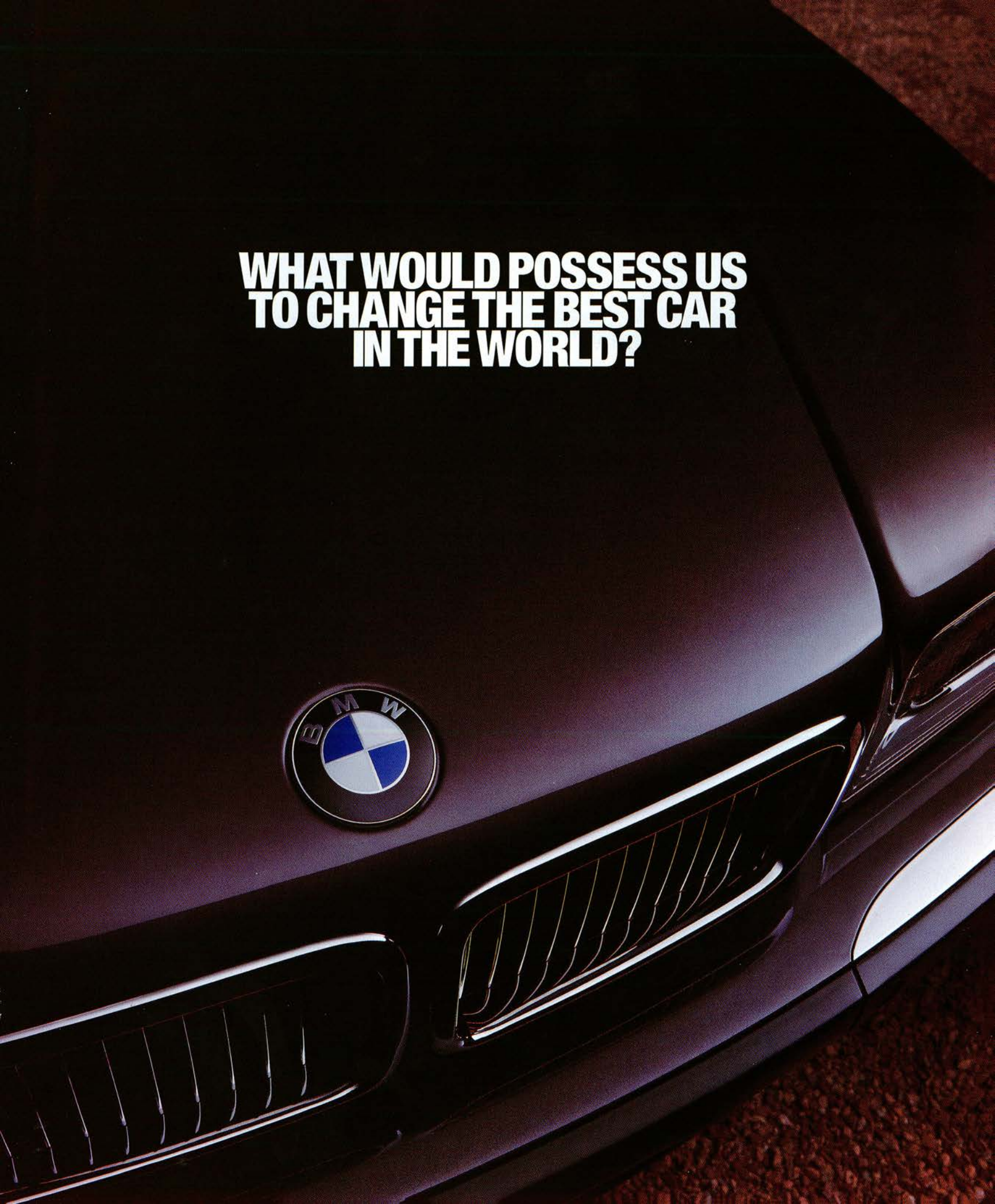
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*Car and Driver, November 1990. **See your dealer for details on these programs. Some exclusions apply. †Service provided by Cross Country Motor Club, Inc., Boston, MA, 02155 except in California, where services are provided by Cross Country Motor Club of California, Inc., Boston, MA. Benefits may vary to conform with the laws of your state.

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Peoria
WTVP-TV,
Sat. 12:30 pm

Quincy
WQEC-TV,
Thu. 10:00 pm

INDIANA

Bloomington
WTIU-TV,
Mon. 5:00 pm
Thu. 11:30 pm
Sat. 1:30 pm

Evansville
WNIN-TV,
Sat. 12:30 pm
and 6:00 pm
Sun. 4:30 pm

Fort Wayne
WFWA-TV,
Sat. 10:00 am

Indianapolis
WFYI-TV,
Sat. 10:00 am
Sun. 7:00 pm

Merrillville
WYIN-TV,
Sun. 3:30 pm

Muncie
WIPB-TV,
Thu. 8:00 pm
Sun. 4:30 pm

South Bend
WNIT-TV,
Mon. 10:30 am
Sat. 2:00 pm

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

IOWA

Council Bluffs
KBIN-TV,
Fri. 6:30 pm
Sat. 1:30 pm

Davenport
KQCT-TV,
Tue. 7:00 pm

Des Moines
KDIN-TV,
Fri. 6:30 pm
Sat. 1:30 pm

Fort Dodge
KTIN-TV,
Fri. 6:30 pm
Sat. 1:30 pm

Iowa City
KIIN-TV,
Fri. 6:30 pm
Sat. 1:30 pm

Mason City
KYIN-TV,
Fri. 6:30 pm
Sat. 1:30 pm

Red Oak
KHIN-TV,
Fri. 6:30 pm
Sat. 1:30 pm

Sioux City
KSIN-TV,
Fri. 6:30 pm
Sat. 1:30 pm

Waterloo
KRIN-TV,
Fri. 6:30 pm
Sat. 1:30 pm

STEVE THOMAS

May 2 in Norwich, CT
Eastern Connecticut Community
Foundation's Annual Meeting

September 14 in Calgary, Alberta, Canada
Calgary Fall Home Show

September 18 in La Plume, PA
Public Lecture at Keystone Junior College

KANSAS

Bunker Hill
KOOD-TV,
Thu. 7:00 pm
Sat. 12:30 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

Ashland
WKAS-TV,
Sun. 5:00 pm

Bowling Green
WKGB-TV,
Sun. 4:00 pm

Bowling Green
WKYU-TV,
Tue. 1:00 pm
and 6:30 pm

Covington
WCVN-TV,
Sun. 5:00 pm

Elizabethtown
WKZT-TV,
Sun. 5:00 pm

Hazard
WKHA-TV,
Sun. 5:00 pm

Lexington
WKLE-TV,
Sun. 5:00 pm

Louisville
WKMJ-TV,
Sun. 5:00 pm

Louisville
WKPC-TV,
Wed. 1:30 pm
Sat. 1:30 pm

Madisonville
WKMA-TV,
Sun. 4:00 pm

Morehead
WKMR-TV,
Sun. 5:00 pm

Murray
WKMU-TV,
Sun. 4:00 pm

Owensboro
WKOH-TV,
Sun. 4:00 pm

Owenton
WKON-TV,
Sun. 5:00 pm

Paducah
WKPD-TV,
Sun. 4:00 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,
Sat. 1:30 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

Boston
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. 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

Bermidji
KAWE-TV,
Sat. 12:30 pm

Brainerd
KAWB-TV,
Sat. 12:30 pm

Duluth
WDSE-TV,
Sat. 6:30 pm
Sun. 9:30 am

St. Paul/
Minneapolis
KTCA-TV,
Wed. 7:30 pm
Sat. 9:30 am, 10 am
and 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

Oxford
WMAV-TV,
Sat. 7:00 pm

Meridian
WMAW-TV,
Sat. 7:00 pm

Mississippi State
WMAB-TV,
Sat. 7:00 pm

MISSOURI
Joplin
KOZJ-TV,
Sat. 12:30 pm

Kansas City
KCPT-TV,
Thu. 7:00 pm
Sat. 12:30 pm

Sedalia
KMOS-TV,
Sat. 12:30 pm

Springfield
KOZK-TV,
Sat. 12:30 pm

St. Louis
KETC-TV,
Wed. 12:30 pm
Sat. 6:30 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

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 am

Portales
KENW-TV,
Sat. 3:30 pm

NEW YORK
Binghamton
WSKG-TV,
Sat. 1:30 pm

Buffalo
WNED-TV,
Sat. 10:45 am

Buffalo
WNEQ-TV,
Sun. 7:00 pm

Garden City
WLIW-TV,
Sat. 10:30 am

New York
WNET -TV,
Sat. 6:00 pm
and 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

NO. 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

Charlotte
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

NORM ABRAM

May 31, in Santa Monica, CA
Barnes & Noble

June 2, in Kirkland, WA
Price-Costco Warehouse

June 7, in Edina, MN
Barnes & Noble

June 8, in Overland Park, KS
Borders Bookshop

June 9, in St. Louis, MO
Library, LTD

June 15, in Boston, MA
Waterstone's

June 16, in Trumbull, CT
Waldenbooks

August 13-14, in Chicago, IL
The Hardware Show

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

Alliance
WNEO-TV,
Sat 10:30 am, 5 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

*times and dates may vary; check your local listings

television listings

where and when to see This Old House

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. & Sun. 1:00 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 pm

Tulsa
KOED-TV,
Sat. 9:30 am and
12:30 pm, Sun. 3 pm

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

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,
Thu. 8:00 pm
Sat. 6:00 pm

College Park
WPSX-TV,
Sat. 5:00 pm
Sun. 4:30 pm

Erie
WQLN-TV,
Sat. 6:30 pm

Harrisburg
WITF-TV,
Thu. 8:00 pm
Sat. 6:00 pm

Philadelphia
WHYY-TV,
Sat. 11:00 am
and 6:00 pm
Sun. 8:00 pm

Pittsburgh
WQED-TV,
Sat. 4:30 pm
and 6:30 pm

Pittsburgh
WQEX-TV,
Wed. 8:30 pm

Pittston
WVIA-TV,
Thu. 8:00 pm
Sat. 5:00 pm
and 5:30 pm

RHODE ISLAND
Providence
WSBE-TV,
Tue. 8:30 pm
Sat. 1:30 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. 4:00 pm

Brookings
KESD-TV,
Sat. 4:00 pm

Eagle Butte
KPSD-TV,
Sat. 3:00 pm

Lowry
KQSD-TV,
Sat. 4:00 pm

Martin
KZSD-TV,
Sat. 3:00 pm

Pierre
KTSD-TV,
Sat. 4:00 pm

Rapid City
KBHE-TV,
Sat. 3:00 pm

Vermillion
KUSD-TV, Sat. 4 pm

TENNESSEE
Chattanooga
WTCI-TV,
Sat. 1:30 pm

Cookeville
WCTE-TV,
Sat. 12:30 pm

Knoxville
WKOP-TV,
Sat. 1:30 pm

Knoxville
WSJK-TV,
Sat. 12:30 pm

Lexington
WLJT-TV,
Thu. 9:30 pm
Sat. 12:30 pm

Memphis
WKNO-TV,
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/Ft. 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. 11:00 am
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, noon

Salt Lake City
KUED-TV,
Sat. 8 am and 5 pm

VERMONT
Burlington
WETK-TV,
Thu. 8:00 pm
Sat. 11:00 am

Rutland
WVER-TV,
Thu. 8 pm, Sat. 11 am

St. Johnsbury
WVTB-TV,
Thu. 8 pm, Sat. 11 am

Windsor
WVTA-TV,
Thu. 8 pm, Sat. 11 am

VIRGINIA
Charlottesville
WHTJ-TV,
Sat. 8:30 am

Harrisonburg
WVPT-TV,
Sat. 1:30 pm
and 4:30 pm

Marion
WMSY-TV,
Sat. 1:30 pm

Norfolk
WHRO-TV
Thu. 8:00 pm
Sat. 8:30 am, 2 pm

Norton
WSBN-TV,
Sat. 1:30 pm

Richmond
WCVE-TV,
Sat. 8:30 am

Richmond
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,
Wed. 7:30 am
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. 12:30 pm

Huntington
WPBY-TV,
Sat. 1:30 pm

Morgantown
WNPB-TV,
Sat. 7:00 pm

WISCONSIN
Green Bay
WPNE-TV,
Sun. 4:00 pm

La Crosse
WHLA-TV,
Sun. 4:00 pm

Madison
WHA-TV,
Sun. 4:00 pm

Menomonie
WHWC-TV,
Sun. 4:00 pm

Milwaukee
WMVS-TV,
Thu. 7:30 pm
Sat. 8:00 am
and 6:00 pm

Park Falls
WLEF-TV,
Sun. 4:00 pm

Wausau
WHRM-TV,
Sun. 4:00 pm

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

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Woulda, coulda, shoulda.

Woulda done it differently. Coulda chosen windows more carefully. Shoulda gone with Andersen.® Anyone who's ever had to live with leaky, drafty, or warped windows is all too familiar with the feelings of regret and disappointment.

Fortunately, there's an easy way to avoid them. Choose Andersen® Windows. No one understands more than us how critical your windows are to the enjoyment of your home. And no one goes to more painstaking lengths to craft windows that you can feel good about. All of our designs are subjected to exhausting tests for durability, weathertightness and performance over time. Once built, we hold them to exacting specifications. For instance, millwork and measurements cannot be off by more than .005 of an inch. On the exterior, our Perma-Shield® system protects against the weather, and won't chip, peel or corrode. And best of all, we stand behind our windows, with a 20-year written warranty on all glass.

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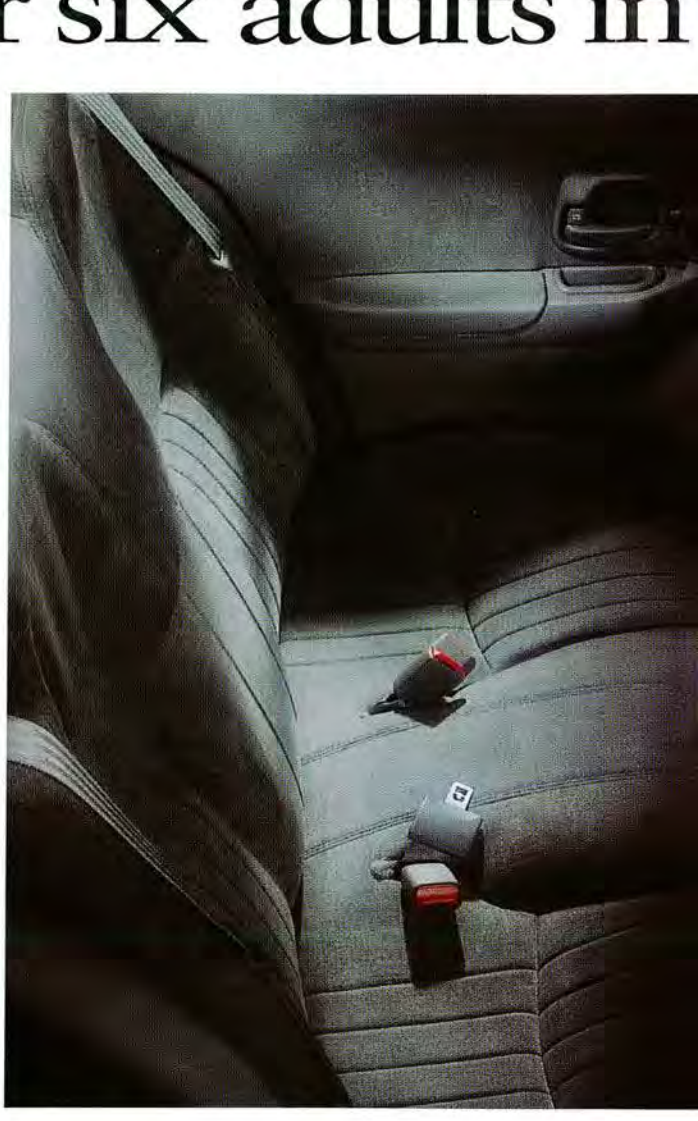
With so many standard fe
still room for six adults in



Long before we began creating the all new 1995 Chevy Lumina, we asked thousands of people what they were really looking for in a new mid-size sedan. Turns out what they wanted more than anything was, well, everything. So the new Lumina comes with a range of standard equipment that, not too long ago, would have been thought impossible for a car in its price range.

At the top of the list is a sophisticated 4-speed automatic. Combined with a new fuel-injected, 160-horsepower V6 engine, it delivers power to the front wheels as quickly as your right foot can ask it to. So you'll be comfortable with all that power, a quick-cooling air conditioning system with CFC-free refrigerant also comes as standard equipment.

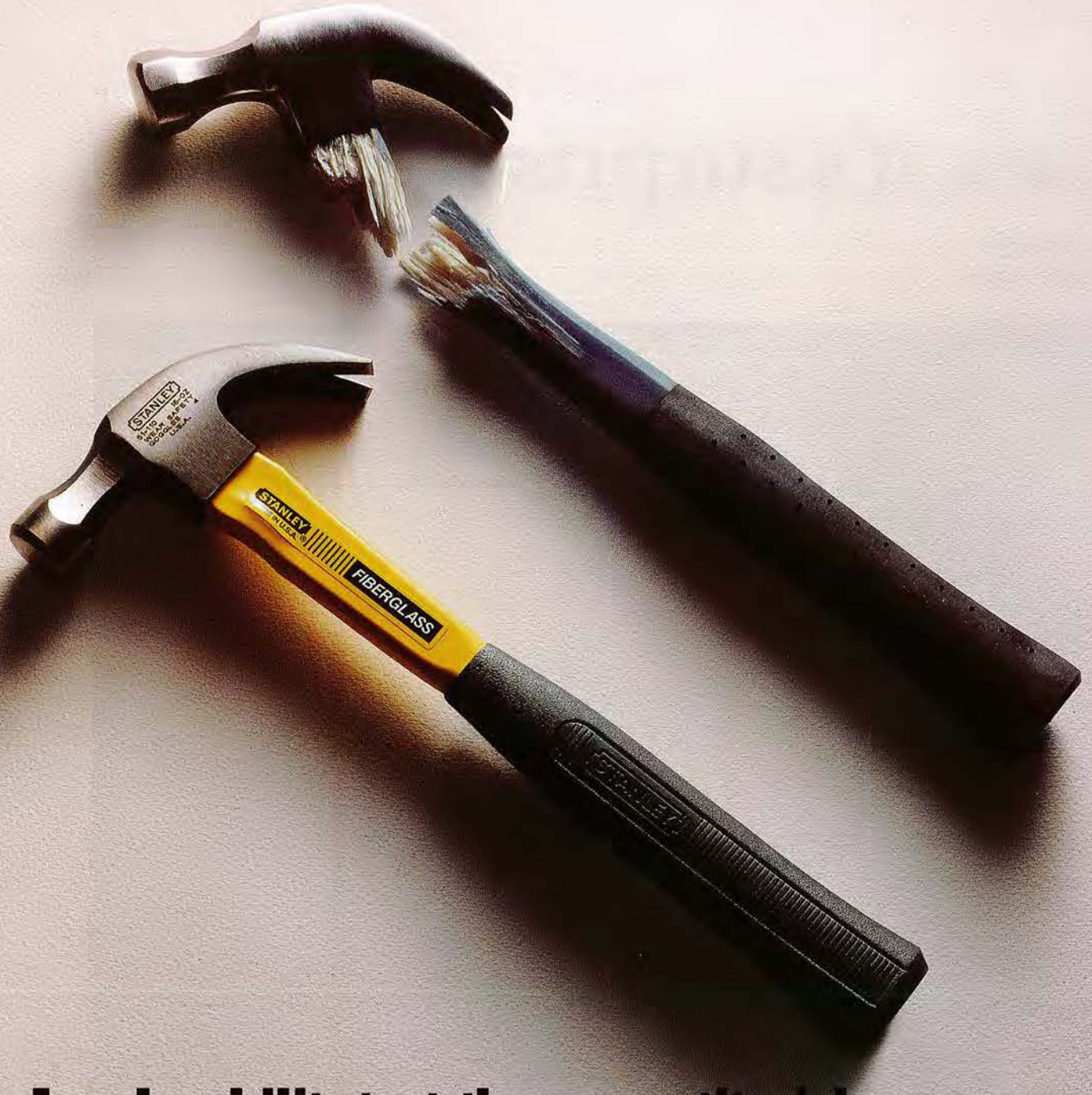
We also added power door locks. Vanity mirrors for both driver and passenger (lighted

atures, it's surprising there's there.

on the passenger side). Theater lighting that slowly dims after you enter the car. Intermittent wipers, dual sport mirrors, and even an adjustable steering column are standard, too.

And the whole beautiful package is protected by a theft-deterrent system. Because as you've just learned, there's a lot of valuable stuff inside. See the new Lumina at your neighborhood Chevy dealer. Ask to take a test drive. And bring a friend. Or five.

ALL NEW LUMINA GENUINE CHEVROLET™



In a durability test, the competitor's hammer lasted 60 seconds. If you happen to need one for longer than that, buy a Stanley hammer.

This picture tells the story better than any words can. In our overstrike tests, the Stanley hammer outlasted the competitor's brand by a 4 to 1 ratio.*

You see, after years of research (and a whole lot of sleepless nights) our engineering department concluded that jacketed, solid-core fiberglass is more durable than the compression-molded variety some of our competitors use to make their hammers.

That's the Stanley philosophy. Don't quit working until your product is perfect. You'll find this kind of dogged determination across the board at Stanley. In everything we make. Like a garage door insulated to reduce noise. Or a closet organizer made with steel planks instead of wire so it doesn't wrinkle your clothes.

It's innovative thinking like this that's kept us ahead of the competition for more than 150 years. At Stanley we're not happy simply churning out products. We're only happy when our products are better than anyone else's.

STANLEY
helps you do things right.®

*Overstrike test conducted by striking hammer handle against metal object. © 1994 The Stanley Works.

In the 16 years This Old House *has been on the air, the show has received thousands of questions. Finally, we have a place to answer them. If you have a house-related query, write:*
This Old House
20 West 43rd Street
New York, NY 10036
or e-mail:
letters@toh.timeinc.com

Additions and Extras

Photographs by Darrin Haddad

tube sale

If you light a basement or garage with four-foot fluorescents, stock up on replacement bulbs now. Cool white 40-watt fluorescents, common 99-cent specials, cannot be made or imported after October 31. The National Energy Policy Act of 1992 allows four-foot fluorescents only if they use less energy or emit better quality light. Manufacturers now offer bulbs that do both, but they're pricey—which is why most lighting experts we consulted expect 34-watt "energy-saver" cool whites to become the norm. They're cheap (about $1.50) and simple.

But the energy-savers won't work in many old fixtures—or in many being sold today. When we went shopping this spring, sales clerks assured us all their fixtures would accept energy-savers. When we tried them out, two bulbs glowed only at the ends. Others flickered so much a clerk felt ill. A third set of bulbs became too hot to touch. Lighting experts confirmed our results.

The problem is with the ballast, a box inside the fixture that adjusts the current. Only ballasts labeled "high power factor" can take the energy-savers. "Normal power factor" ballasts—the ones in most inexpensive workshop lights—cannot. To see which kind you have, disconnect the fixture, twist out the bulbs and remove the cover. If your ballast says nothing about power factor but lists only 40-watt bulbs, that's all it will take.

It's worth checking now. If your ballasts require 40-watt bulbs, you'll know that when it's time to replace, you can: 1) spend $20 on a high power factor ballast so you can use the cheap 34-watt bulbs; 2) buy expensive color-corrected 40-watt replacements; 3) spend $20 on an electronic ballast and then buy the skinny, one-inch bulbs known as T-8s.

Or, 4), avoid the whole mess. Stock up on 99-centers now. They're supposed to last for 20,000 hours, so a few dollars should give you light for years to come. No, it's not the most energy-efficient option. Unless, of course, it's your energy we're considering.

I'd like to build a garden house, any suggestions?

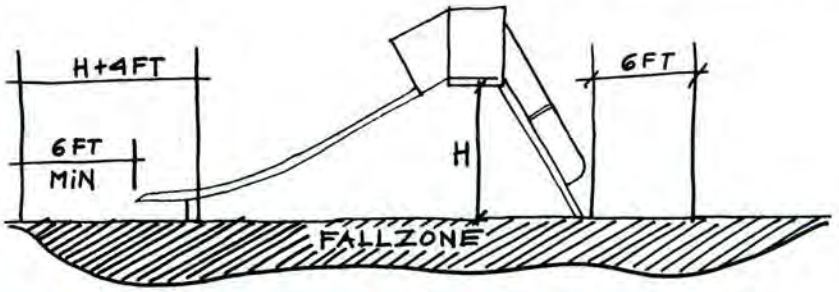
The nicest kits we've seen are from Heritage Garden Houses, of Lansing, Michigan (517-372-3385). But they're pricey: The one at left is $11,000. Want to design your own? Read Lester Walker's *Tiny Houses* (Overlook Press: $29.95).

Are triangle-face hammers a gimmick?

Ted Floyd, a carpenter in California, doesn't think so. He developed the triangular face to better fit into tight spots and to pound close to corners. His finish and framing hammers also have a magnetized T-shaped recess in the cheeks that can hold a nail during a first sideways strike while one hand keeps wood or drywall in place. Their claws have a thinner "V", to pull small nails more easily. They come in five sizes, from 10 ounces to 30 ounces. The 18-ounce, shown here, costs $32.95; call 800-645-2434. They're very handsome. Do they work? Steve Thomas says he has one but usually reaches for a regular hammer instead. One drawback is that if your aim is even slightly off, you can leave a sharp dent in your work.

Norm says, "Measure **twice**, cut once."

HOUSE PHOTOGRAPH BY RANDY BAPTISTE



Can I put a backyard playset on grass?

No. You need to cushion wherever a head can hit, and grass is too hard—especially after the kids compact it into pavement. At public playgrounds, the U.S. Consumer Product Safety Commission recommends a cushioned "fall zone" 6 feet beyond most equipment. Swings should have more—twice the height in front and back, plus 6 feet on either side. (To get the free "Handbook for Public Playground Safety," write to the CPSC, Washington, DC 20207.) Even those who scrimp on the area of cushioning should follow recommendations for depth, which the commission determined by dropping a metal "head" full of instruments. How much will it cost? Rubber mats are expensive—$10 a square foot installed. That leaves loose fill. A 6-inch blanket of bulk sand or pea gravel costs about 50 cents a square foot, plus delivery charges, at our sources. Several playground designers recommended hardwood chips, previously available only in bulk but going on sale this spring in 3-cubic-foot bags from Fibar Systems (800-342-2721); the price works out to about $1 per square foot for a 6-inch layer. For his part, the head of the CPSC's testing program says he'd use mulch from his local landfill. "It's free." Use your common sense, too. Keep equipment low—under 5 feet if possible. And consider advice from Candice Stein, a landscape designer in San Jose, California. Because cushioning compacts where it's needed most, she suggests digging a hole 2 feet deep at the end of slides or other key spots, and filling it with cushioning.

MATERIAL	UNCOMPRESSED DEPTH 6"	9"	12"	COMPRESSED DEPTH 9"	
SAND	5*	5*	6*	4*	GOOD FOR PLAY BUT CAN ATTRACT CATS. MAY COMPACT, REDUCING CUSHIONING
PEA GRAVEL	6*	7*	10*	6*	DOES NOT COMPACT OR ROT BUT AWFUL TO WALK ON. NEAR LAWN CAN BE KICKED OUT AS MISSILE BY MOWER
SHREDDED WOOD	6*	10*	11*	7*	KNITS INTO FIRM SURFACE, STAYS PUT. NEEDS OCCASIONAL TOPPING OFF
MULCH	7*	10*	11*	10*	FREE IN MANY COMMUNITIES. MUST BE REPLENISHED AS IT DECOMPOSES

*Numbers are heights (in feet) from which a fall onto the given depth of material would not be fatal.

Covering the play area with 2-inch-thick RUBBER MATS, common in public playgrounds, will probably cost more than buying a playset.

PRODUCT RECALL

Makita USA Inc. is recalling about 130,000 of its five-inch random orbit finish sanders after 10 reports that the metal fan inside had fractured during use. Twice, people were hurt when pieces broke through the motor cover. The recall applies to model B05000, sold nationwide from April 1992 to June 1994, for about $125. An "N" stamped before the serial number indicates the sander already has been repaired. Others should be returned to the nearest Makita service center for repair. Look in the phone book or call the company at 714-522-8088.

Do any of the "green" paint strippers work?

We've tried two that were quite effective: Woodfinisher's Pride and Citristrip. Both are based on n-methyl-2-pyrrolidone (NMP) which is nonflammable and produces fewer toxic vapors. (Citri-

strip also contains d-limonene, a citrus-scented solvent; it actually smells *nice*.) They're not cheap, and they take much longer to work than traditional strippers. But we recommend them since the old, methylene chloride strippers offer speed at the expense of health: They're both carcinogenic and narcotic. Citristrip: 810-340-0400. Woodfinisher's: 901-775-0100.

ILLUSTRATION BY MANON ZINZELL

WE DIDN'T BUILD IT AS A LOW-PRICED MITER SAW. WE BUILT IT AS A DELTA.

You're looking at the lowest-priced 10" Power Miter Saw we make. Packed with all the stamina and precision you'd expect to find in a more expensive saw. At a glance you can see more features than you're paying for. So what's the catch?

No catch. It's just that we have miter saws down to a science. We've built more configurations of power miter saws than anyone. So you benefit from efficiencies in design and cost of manufacturing that allow us to build professional quality saws at a less-than-professional price.

This one weighs only 28 pounds, so you can take it right to the job. Crosscuts a 2x6 or 4x4 at 90°. Miters a 2x4, flat or on edge, in a single pass at 45°. A rigid cast iron head support ensures accuracy. D-handle design with a trigger switch gives you positive on-off control. Electric blade brake automatically stops the blade when you let go. However, we should probably warn you: This isn't a saw you'll want to let go of, once you get your hands on it.

For the name of the nearest dealer, home center or hardware store carrying Delta tools, call Delta International Machinery Corp., 800-438-2486. In Canada, 519-836-2840.

Delta funds these national PBS programs.

The New Yankee Workshop with Norm Abram.

The American Woodshop with Scott Phillips.

THE POWER OF THE PROS

DELTA
WOODWORKING MACHINERY
A Pentair Company

Where do I find recycled building materials?

Choose to Reuse, by Nikki and David Goldbeck, is a fat new book (480 pages) listing suppliers of used materials across the country. It costs $18.95 from Ceres Press, P.O. Box 87, Woodstock, NY 12498; 914-679-5573. It tipped us to Urban Ore in Berkeley, which has been so successful selling items destined for the dump that it is gearing up to offer franchises. With an inventory that produced revenues of $1.4 million last year, it's certain to have something you can use. We picked up a leaded glass window, a (new) brass faucet, a balluster and a post support, all at prices well below retail.

If you have a computer and modem, try the National Materials Exchange Network, a free bulletin board service. The emphasis is on industrial byproducts (want a few vats of acid?), but wood, metal and other construction materials are there too. Organizer Bob Smee said he sees great potential for exchanges of building materials, especially since listings can be sorted by area code. Call 509-466-1532 for information. The World Wide Web address is http://www.earthcycle.com/nmen; modem users without Internet access can call the bulletin board number, 509-466-1019.

CAN I CLEAN OLD, STAINED BATHROOM FLOOR TILE?

Leonard Silvestri, a tile expert at Jack Corcoran Marble, guesses you have unglazed ceramic tiles, which were commonly laid in bathrooms years ago. Try a scouring powder like Ajax or Comet with a little water and a non-woven abrasive pad like the ones 3M makes. If that method shows promise, the polishing will go faster with a right-angle sander, available in rental stores, fitted with an abrasive pad and your scouring-powder-and-water mix. Wear a good face mask, ear plugs, and goggles, and plug the tool into the bathroom's GFCI (the socket with the red light or button). Also, cover every crack with plastic sheeting; you're going to generate a lot of porcelain dust. All this scrubbing may still not remove 100 years of wear, in which case you can always say your floor has "character."

"A good architect can improve the looks of an **old house** merely by discussing the cost of a new one." ***Anon.***

What stops dry rot in beams?

Dry rot is decay caused by fungi (specifically, basidiomycetes), which can grow only with moisture. Norm says you should vent the space under your floor; if there's a dirt floor beneath, cover it completely with a sheet of 6-mil polyethylene. If beams are already damaged, apply several coats of an epoxy consolidant to the surface, as we did to the rotten sill in Wayland, Massachusetts. Or, you can inject epoxy into ¼-inch or ⅜-inch diameter holes drilled into the beam. The epoxy will penetrate dry, rot-softened wood to form a moisture-proof barrier that helps restore some of the wood's strength. Pay particular attention to the ends of the beam.

Can you recommend a garden planner book?

We've found most garden design books to be little more than pretty pictures with no advice on recreating them. But *John Brookes Garden Design Workbook: A Practical Step-by-Step Course* is just what its subtitle promises. Its theory is that virtually any house has some underlying, unifying grid that determines such things as window and door placement. Figure that out and you'll be able to design patios, walkways and other features in pleasing proportion. A series of marked-up overlays imposed on photographs of houses and their yards shows just how to do it. There may well be other good ways of designing a garden, but this one struck us as eminently *usable*. Newly published by Dorling Kindersley (the company also responsible for the splendid Eyewitness Visual Dictionaries series), it costs $15.95 and includes the best parts of the classic *John Brookes Garden Book,* published by Macmillan and still available for $40.

BOOK PHOTOGRAPH BY MONICA BUCK

We have used concrete pavers, which can be laid over a shallow sand bed. They come in dozens of shapes, patterns and colors; call the Concrete Paver Institute (703-713-1900) for information. Pavers are designed to interlock, so they don't need mortar, and also can be ripped up and patched easily.

What's the best material for a path through my yard?

We also like brick paths, but they can be time-consuming to lay straight. If you can overlook the name, Patio Pal (619-449-5050) is an inexpensive plastic grid system that holds bricks in place; it also helps to keep weeds at bay.

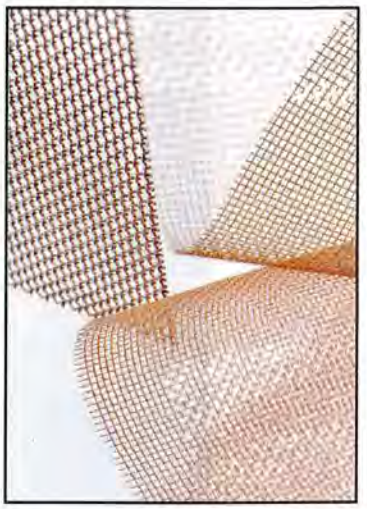
If you'd rather have a grassy path, we recently came across a device called Grasspave (800-233-1510). It's a flexible grid of recycled plastic rings; lay it in the ground, fill it with mulch, sand and fertilizer, and grow grass in it. The rings prevent compacting of the soil. We spoke to one gentleman who installed it alongside his driveway last spring and he said his grass survived "even where the wife backs up and misses."

Do you want them in *your* kitchen?

Of course, the question we get asked most at *This Old House* is: "When can you come and work on my house?" Here's the answer:

We work on just two homes each year. The summer project, from late spring until Christmas, must be in or near Boston (so we can drive home at night). The winter project (New Year's Day through St. Patrick's Day) must be in a balmy locale, so we can work outdoors. (Previous locations include the Napa Valley—balmy, but the wettest winter in years—Santa Fe, Miami and Hawaii.) We like houses that are historically or architecturally unique. We look for a style we haven't dealt with before—or at least recently. We just finished a colonial and an early 20th-century house, for example, so we are now looking for a federal house. The homeowner must have a large enough budget to finance the work we deem necessary. That's right. *This Old House* doesn't pay for the project—the homeowner does. (Some materials will be donated, but the homeowner must pay gift tax on their value.) We prefer to use a contractor and an architect of our choice. And the homeowner must endure not only the mess of renovation, but the crew and equipment that come with a TV show. Bonus points: We like homeowners who will invest sweat equity, as well as cash, in the project. Write to: *This Old House,* 125 Western Ave., Boston, MA 02134.

STEVE AND NORM PHOTOGRAPH BY WILLIAM MERCER MCLEOD



Help! Salt air is corroding my aluminum screens.

Fiberglass screening (the stuff that comes in most new window screens and doors) is the cheapest solution; it runs about 25 cents a square foot and is impervious to almost anything. It's also matte black and fairly ugly. If you're willing to pay 8 to10 times more, copper, bronze, brass or stainless steel screening are excellent, corrosion-resistant options. (Nickel, monel or titanium screens are also available, if price is no object.) Copper is the softest and will, like brass and bronze, acquire a verdigris patina in time. Stainless is the strongest and most costly, and it stays shiny indefinitely. Bronze, the cheapest, shines like gold when new. All have a metallic "flash," which keeps people from running into them accidentally, and they look good. (We have used bronze screening instead of tempered glass panels to childproof a glass-paneled interior door.) The typical mesh size for insect screening is 18 x 14 (18 holes per horizontal inch by 14 holes vertically) with .009 or .011 gauge wire. If a screen must resist bumps from dogs or kids, you can order square mesh (e.g. 14 x 14 or 16 x 16) with thicker wire (and a bigger mesh size) for better durability. Don't put copper, bronze or brass on aluminum doors; galvanic corrosion will eat at the door.

*Always wear your safety belt. **Based on an average of consumer-reported problems at three months ownership in a survey of Ford and competitive models designed and built in North America.

*The top-selling sport utility with standard dual air bags.**

All-new Control Trac 4-wheel drive provides instant traction control automatically.

It Already Offered The Whole Kit And Caboodle. So Now, We've Added The Whole Shebang.

New standard 4-wheel anti-lock disc brakes for surer, safer stops.

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Comfortable new interior has more room than any top-selling compact sport utility.

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Security and comfort come from new adjustable-height front belts.

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THE BEST NEVER REST

DO YOU LIKE SCREWDRIVERS WITH INTERCHANGEABLE TIPS? Steve does: "Better than carrying around a bunch of screwdrivers." We like the hefty, cushioned handles from Latshaw Tools. The top-of-the-line, $17 to $20 model shown here has a magnetized shaft and ratchet action. Call 800-833-3125 for suppliers.

How do I sand in tight corners?

This Old House director Russ Morash recommends the Fein triangle sander (shown), which he used to refinish the wood windows in his house. "It's the kind of tool you'll wonder how you ever did without," he says. We edge-sanded over 60 feet of white oak flooring with this German-made tool and it never once bogged down. Best of all, it doesn't generate much dust. The Fein, which lists for $295 (800-441-9878), can be equipped with a variety of accessories—including a scraper, a wood/metal/fiberglass saw blade (this is the one Russ used to trim cedar shingles and that orthopedists use to remove casts) and a carbide grout saw blade—all interchangeable with a few turns of a hex nut.

There are several cheaper detail sanders on the market. After trying them all, we found only the Bosch B7000 and B7001 came close to the Fein's performance. The Bosch sanders have no fancy accessories, and they vibrate a bit more than the Fein, but they are quieter, lighter and cost about half as much. We liked their click-and-turn pads; no need to hunt for a hex wrench. The B7001, new this year, has variable speeds, a big plus for detail work. It lists for $156 (312-286-7330), which means less than $100 at discount.

The Fein is a worthwhile investment if you have big jobs and a tight schedule. For those on a budget with less demanding work, either Bosch tool is a big improvement over fingers and sandpaper.

And taxes

If you took a home mortgage interest deduction on April 15, pay attention to this fall's Congressional debates on reducing the interest deduction cap. The Congressional Budget Office calculates that reducing the cap to $300,000 (it's currently $1 million) would raise $34.8 billion over five years. The limit would affect just a tiny percentage of homeowners. Including you?

What's the best material for finials and other decorations on outdoor fence posts?

Pressure-Treated Pine $4.29 | **Vinyl $7.00** | **Redwood $12.50** | **Iroko Hardwood $47.00 (incl. post cap)** | **Hemlock $6.25** | **High-density Polyurethane $1.40** | **Cast Iron $8.50** | **Mahogany $18.00**

FINIALS COME IN A wide range of materials, shapes and prices. We picked a group of 4-inch "cannonballs" to illustrate the point. Interestingly, there's little correlation between price and quality. Among the most expensive we found were some made of poplar, touted in a catalog for outdoor use, even though this wood has virtually no rot resistance. When we called to order the hemlock finial, we were assured it was treated to resist rot; after we saw it and rechecked, we were told it was not. Our choice from this group: the $12.50 redwood. It's a reasonable price, nicely made and less likely to split than the treated pine.

EASY RETAINING WALLS?

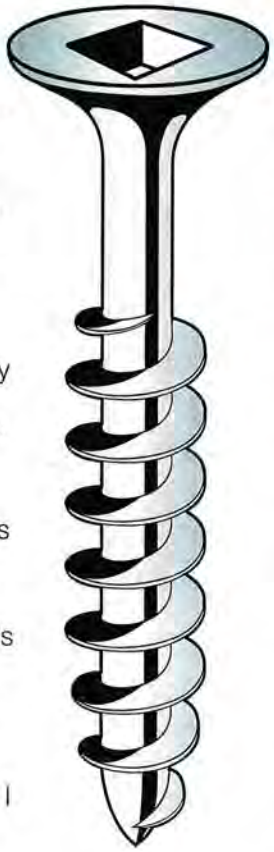
We have seen modular, interlocking concrete blocks used to make retaining walls and steps in Europe, and have found one company making them in the U.S.: Versa-Lok, of St. Paul, Minnesota (800-770-4525). Installed on a shallow bed of gravel, each block fits into a groove on the one below; mylar-fiberglass pins provide extra security. They are designed so the press of soil behind the wall strengthens the bond between the blocks. No mortar is used; just concrete adhesive to add caps if you wish.

Retrofit insulation?

Viewers who saw our series on the Maitland house in Acton loved the non-CFC foam we sprayed between the studs and ask if it can be used behind existing walls. The answer is no. It expands so fast your walls would pop off the studs. But Icynene, the company that made our foam, also makes Pour Foam (416-890-7325). It can be pumped through half-inch holes (one pair in each bay between each pair of studs) that can be spackled over when the job's done. Steve says, "Whatever you use, hire a contractor who specializes in retrofit installations." We also recommend you ask for a thermograph (infrared photograph) of the house afterward to show if gaps remain.

Steve Thomas says, "A nail is only as **strong** as where it is placed."

SQUARE-DRIVE SCREWS, which get their name from the square, tapered recess in the head right where you'd expect to find a slot or a Phillips star, have been around since 1908. They were invented by a Canadian, P.L. Robertson, to overcome "cam out" (when a screw-drive bit loses its grip), and are now more available. Norm recommends them for woodworking projects: "They feel more positive, and have less slippage. I think they could dominate the industry in 15 years."



ILLUSTRAION COURTESY OF MCFEELY'S SQUARE DRIVE SCREWS

SUMMER VACATIONS

■ **Help build homes for families** with Habitat for Humanity. At two "blitz" events this summer, about a dozen houses will go up in under a week. June 30 in Oakland, California, and August 6 in Detroit, Michigan. Less intense "work camps" take place throughout the summer. Call 912-924-6935 for details.

■ **Furniture restoration, tinsmithing, plastering, early American wallpapers and historic painting,** taught in a private "museum village" in upstate New York. Meals cooked in an 18th-century oven; participants sleep on rope beds with straw and feather ticks. Eastfield Village, 518-766-2422. Five-day courses, $395–425; one-day workshops, $135. Lodging free if you bring ten 10-inch *white* candles.

■ **Log, stone and solar construction,** in the Potomac Highlands of Virginia. Bear Mountain Outdoor School, 703-468-2700. Three- to six-day program, $250–$650, includes lodging, meals.

■ **Home construction and renovation basics,** with emphasis on smart design, plus workshops in cabinet-making, landscape construction and specific building techniques, in the Mad River Valley of Vermont. Yestermorrow Design/Build School, 802-496-5545. One-week courses, mostly $800, plus $275 for food and lodging; not quite double for two-week courses; $200 for two-day mini-courses.

■ **Turn-of-the-century metalworking** at a foundry and water-powered machine shop in California's Mother Lode country, June 2-4. Historic Knight & Co., 209-267-5543. $350.

■ **Timber framing in Maine.** Beginners design, cut and raise a frame in five days. Fox Maple School of Traditional Building, 207-935-3720. $475.

■ **Housebuilding,** with morning lectures and afternoon hands-on at a custom home being built in the Berkshire Hills of western Massachusetts. Heartwood School, 413-623-6677. Three-week course, $950, includes lunches; one-week timber framing, cabinet-making, home design, renovation, carpentry for women, $450.

■ **Fine woodworking on the Maine coast,** with hand tools and machines like those in homes and small workshops. Center for Furniture Craftsmanship, 207-594-5611. One-week workshops, $400; two-week, $730; housing starts at $160 a week; $40 registration.

■ **Museum-quality restoration training** at Thomas Jefferson's Poplar Forest , June 12-24. Apply only by writing before May 8 to Travis C. McDonald, Jefferson's Poplar Forest, P.O. Box 419, Forest, VA. 24551. Costs $250; dormitory rooms for $15 a day.

■ **Furniture making,** understanding wood, machine maintenance and jigs, in rural Indiana "amongst corn, soybeans and basketball goals." Marc Adams School of Woodworking, 317-535-4013. One-week classes, about $500; weekend workshops, $250.

■ **Fine woodworking in western Massachusetts,** at One Cottage Street School of Fine Woodworking, 413-527-8480. Five-day classes, from intro to steam bending, $300. Two-day workshops, including tuning antique hand tools, $175.

See Directory, on page 134, for lists and addresses

Weather Edge Ledgestone

Water Wash Stepping Stones

Cobblefield

Quoins with full-thickness brick

Split Face

Pro-Fit Ledgestone

If you think you can't afford stone, think again. *Think Cultured Stone. It looks right, it feels right, and it comes in more than 50 colors and textures. On a wall, it weighs about a quarter as much as natural stone—one reason why it ends up a fraction of the cost. Call 1-800-644-4487 for the name of your nearest dealer. Then see and touch.* Cultured Stone®

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Treated Wood

Is it dangerous? And what are the alternatives?

BY JOHN S. SALADYGA **PHOTOGRAPHS BY DARRIN HADDAD**

Paint is the simplest "treatment" for wood, but it must be properly applied. This fir baluster was not painted before installation; the raw wood acted as a wick, sucking up moisture.

We love wood; so do bugs and bacteria. Treated with preservatives, wood can last 30 to 40 years or even longer. Untreated, decay-prone wood can rot in a year. Builders use treated wood in foundations, garden structures, docks, swing sets—any place wood meets ground or water. In the last few years, questions have been raised about the effect of treated wood on health and the environment. The U.S. Environmental Protection Agency has issued warnings about some preservatives, and gives limited approval to compounds of arsenic, used in almost all treated wood. But at a time when common garden pesticides are blamed for rising cancer rates, it is worth looking at alternatives: naturally resistant woods and man-made lumber.

materials

TREATED WITH WHAT?

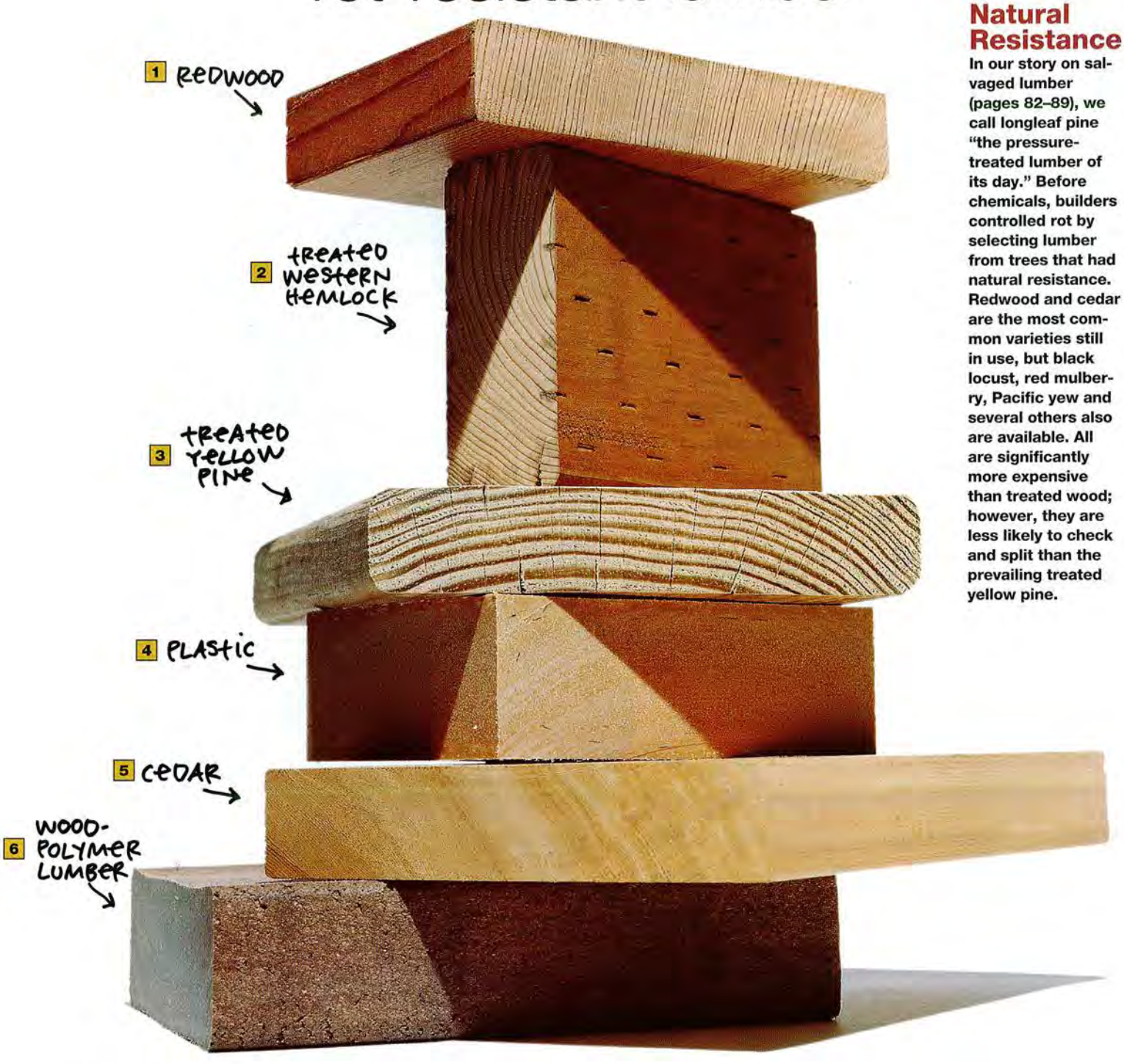
The most widely used preservative in residential lumber is chromated copper arsenate (CCA). Ammoniacal copper arsenate (ACA) and ammoniacal copper zinc arsenate (ACZA) are applied on a smaller scale, primarily to wood species found in western states. EPA studies of health risks associated with compounds of arsenic found short-term illness following intense exposure, and a few cases of acute poisoning caused by failure to use precautions in handling the wood.

Ammoniacal copper quat (ACQ) is a new product developed as an alternative for users wary of the arsenates. Considered less toxic than arsenical solutions, ACQ is subject to fewer EPA regulations; however, it has not undergone long-term testing.

Borate and copper naphthenate solutions are commonly sold for home application to untreated wood, or for treating cut ends of treated wood. Both are considered safe if commonsense precautions are observed.

Two older preservatives, pentachlorophenol and creosote, have been ruled too toxic for interior use. Norm Abram says he "wouldn't recommend using them at all, indoors or outdoors."

materials
rot-resistant lumber



Natural Resistance

In our story on salvaged lumber (pages 82–89), we call longleaf pine "the pressure-treated lumber of its day." Before chemicals, builders controlled rot by selecting lumber from trees that had natural resistance. Redwood and cedar are the most common varieties still in use, but black locust, red mulberry, Pacific yew and several others also are available. All are significantly more expensive than treated wood; however, they are less likely to check and split than the prevailing treated yellow pine.

THE WOODS

1. *Redwood has natural insect and decay resistance, old-growth more so than second-growth. It is the most expensive outdoor wood in most parts of the country.*

2. *Western hemlock, a CCA-treated species often used in western states, does not accept preservatives easily, so cuts are made in it to enable the chemicals to penetrate. Price and longevity are comparable to other CCA-treated woods.*

3. *CCA-treated southern yellow pine is the least expensive type of treated wood and by far the most widely used.*

4. *Plastic lumber from reused milk containers costs 60 to 70 percent more than treated wood.*

5. *Cedar, also naturally insect- and decay-resistant, costs 20 to 30 percent more than treated wood.*

6. *Trex (wood-polymer composite), a blend of sawdust and recycled plastic, accepts paint or stain. It is currently the only composite lumber for outdoor use. Trex 2x4s cost $1/foot.*

alternatives in use

The Teatown Lake Reservation, a nature preserve in Ossining, New York, combined treated wood and plastic lumber in a 700-foot-long boardwalk. The pilings and rail supports are Trimax fiberglass-reinforced plastic. The load-bearing stringers and the railing are CCA-treated southern yellow pine from Georgia-Pacific; the decking and top rail are Mobil Chemical's Trex composite lumber.

PLASTICS Recycled plastics, generally high-density polyethylene from discarded milk containers, now stand in for wood in many applications. But the industry is so young that uniform test procedures and manufacturing standards are just being developed. As a result, the quality and performance of much of the plastic lumber on the market ranges from uncertain to questionable. It comes in many colors and standard lumber dimensions, and can be tooled like wood. You can use power tools on it, but carbide-tipped saw blades, router bits and drills are recommended because of its density; we also recommend using special fasteners. Among the drawbacks is the price: more than half again as much as treated wood. Plastic lumber is heavier than dry wood of the same size. It is not considered a structural material and should not be used in load-bearing applications. Around the house, it is limited for now to deck and dock boards, railings, fences and landscape ties.

Buying and Using Treated Wood

If you plan to purchase lumber treated with CCA, ACA or ACZA, select high grades; premium wood cracks and splits less. Note the preservative retention level (stamped on the wood or a tag)—the preservative, by weight per cubic foot, that remains after treatment. A level of .40, rated for ground contact, means there is almost one-half pound of preservative per cubic foot of wood. Be wary of wood marked "treated to refusal"; the refusal zone of some species is just below the surface, leaving the inner wood unprotected.

Read the EPA's consumer information sheet (posted at the lumber yard). Its commonsense instructions: avoid contact with food or drinking water; don't burn wood; avoid inhaling dust; work outside; wash hands before eating or smoking.

Treated wood is shipped direct from treatment to lumber yards; preservatives may still be leaching from the surface. When you purchase the lumber, make sure it is dry. Wear gloves when stacking or carrying treated lumber (but not when using power tools). After construction, wait two or three weeks and apply two coats of water-repellent sealer with UV inhibitors—more on cut ends. Stains and paints can be applied over sealer, but let the wood dry at least three months and try to keep it out of the sun. Prime before painting. Water repellent sealer lasts about a year, a penetrating oil stain three to five years and a good paint job six or more.

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Circular Saw

Norm Abram teaches us how to use a common power tool. **BY MARK FEIRER**

PHOTOGRAPHS BY CARLTON DAVIS

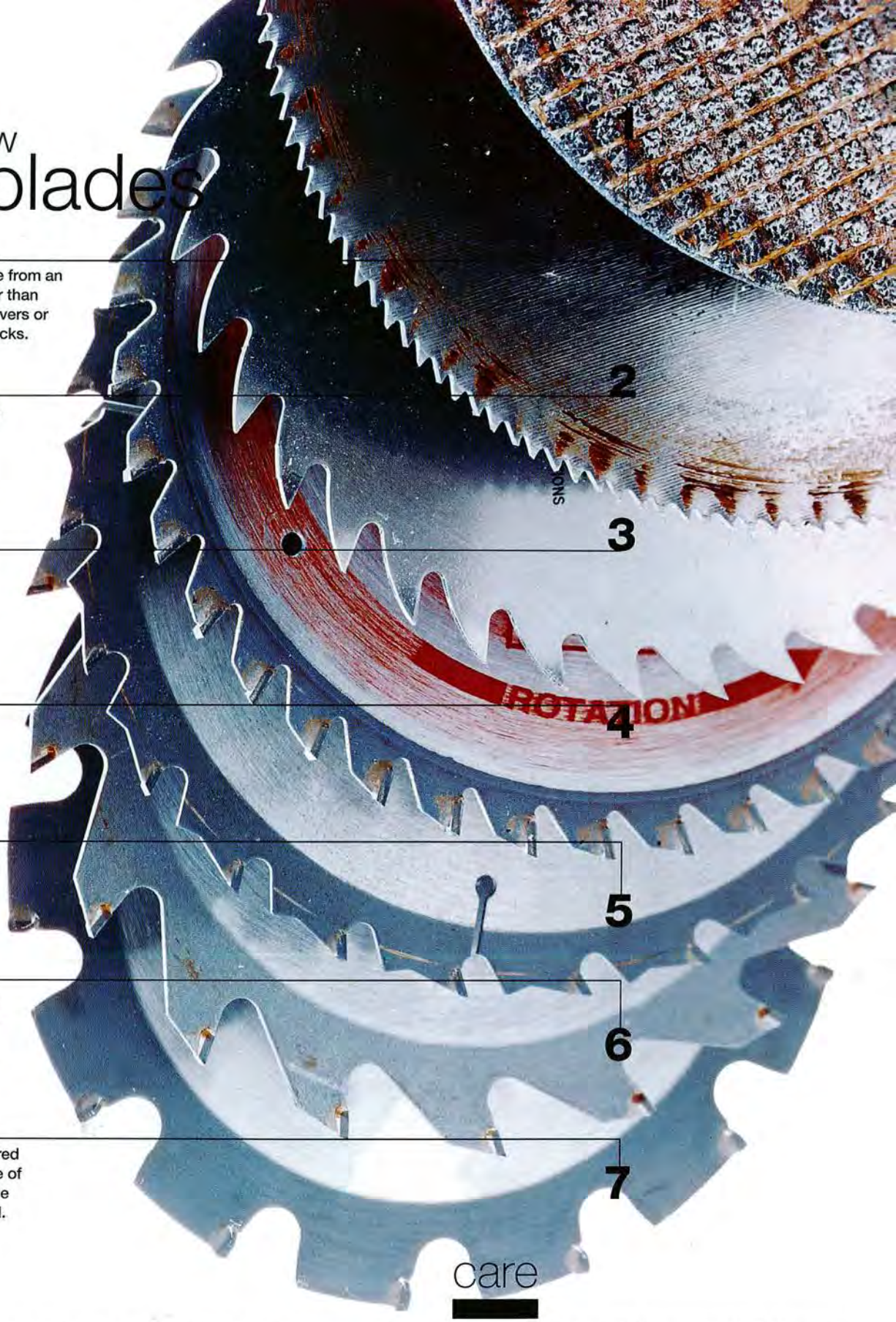
Norm Abram learned to use a circular saw when he was 14, helping his carpenter father on jobs: "It was the workhorse. It seems we did everything with the circular saw." Norm has since acquired plenty of tools; he uses his saw for its ideal purpose—rough framing. But in a more limited set of tools, the circular saw is still the workhorse.

Norm's saw is a "sidewinder"—the blade is attached to a shaft linked through gears to the motor alongside. Like Norm's, many circular saws have a blade brake for safety.

tools

tools

Circular Saw the blades



Masonry Blade

A toothless blade, this one is made from an abrasive material that grinds rather than cuts, making it ideal for scoring pavers or for cutting bricks and concrete blocks.

Plywood Blade

Unlike construction blades that gobble wood, the steel teeth of this blade nibble. It won't splinter thin surface veneers, so it's ideal for cutting plywood paneling and cabinet plywood.

Chisel-Tooth Steel Blade

This blade probably came with your saw. It cuts fast when sharp and does a decent rip cut and cross cut. Few pros would swap their carbide blades for easily-dulled steel blades.

40-tooth Trim Blade

Premium carbide-tipped blades with 40–60 teeth are finish blades; they cut more slowly—but more smoothly—than similar blades with fewer teeth.

Decking Blade

Thin carbide teeth with raised shoulders cut smoothly through pressure-treated lumber and other decking woods. Radial slots in the blade reduce warping.

General Purpose Blade

Some blades cut faster, some smoother, but this 20-tooth carbide blade combines speed and long life with a smooth cut. They must be resharpened at saw shops, but a carbide blade is worth it. It's Norm's workhorse.

Remodeling Blade

Also called a demolition blade. Squared shoulders boost the shock resistance of the few (12 to 14) teeth on this carbide blade; use it on nail-embedded wood.

buying

Circular saw blades are usually 7¼ inches in diameter. A decent general-purpose carbide model costs $8 to $10 and will stay sharp much longer than a steel blade. Norm likes thin-kerf blade versions. They cut faster with noticeably less effort. New carbide teeth should be smooth and shiny, not chipped or pitted; check them with a low-power magnifying glass.

care

To protect brittle carbide, store each blade in an old mailing envelope or pocket folder (they're great for labeling, too). A dirty blade isn't safe to cut with; use oven cleaner to dissolve gum and pitch after you remove the blade from the saw.

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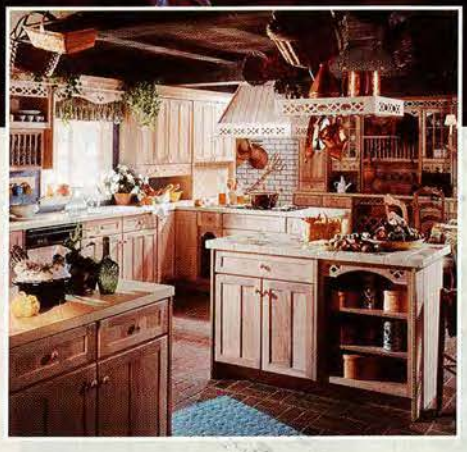

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tools

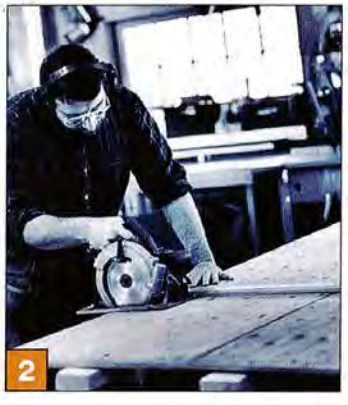
Circular Saw safety and use

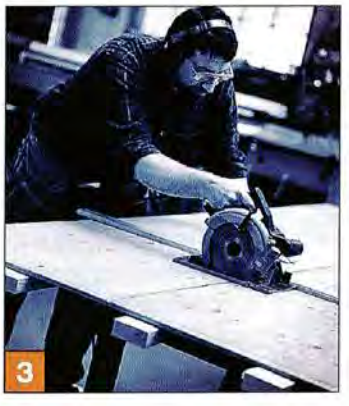
crosscutting a 2x4

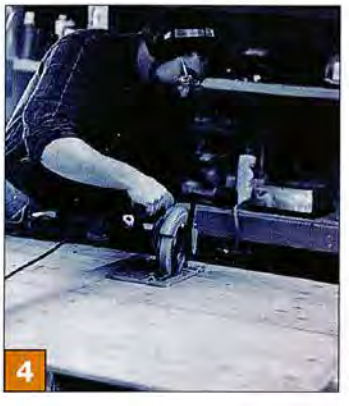
A few seconds, nothing more—that's what it takes to slice through a 2x4. Do it wrong, though, and you'll remember those seconds forever. Norm's technique may seem overly cautious, but 30 years of accident-free work with the saw is a good endorsement. Proper blade depth is crucial; it minimizes kickback and leaves fewer clawing teeth exposed beneath the cut. To set the depth (1), unplug your saw and rest the base on a 2x4 with the blade next to the wood. Pull the guard back so you can see the blade's teeth, then lock the saw at a depth that leaves the lowest tooth no more than about ⅛" beneath the wood. Mark a cutline (2), then saw freehand or (as Norm does) use the square as a guide. (3) Why guide a simple crosscut? "If you turn the saw even slightly after it's partway through the cut, the blade binds up and the saw can kick back at you." A bonus for beginners: the square also ensures a square cut. Whatever your method, never lift the saw when the blade is still moving. Instead, push it completely through the wood in a single, fluid motion (4) until the offcut drops free. Generally, Norm says, he keeps the broadest part of the base on the "keep" part of the wood, unless cutting small blocks. (Another tip from Norm: if you rock the saw forward and backward slightly as you get ready to cut, you can feel the front of the base slap against the wood; that's when you know the saw is flat and it's safe to cut.)

crosscutting plywood

Plywood can be more difficult to crosscut than dimensional lumber. The pieces are big, the cutlines are long, and the wood is more likely to splinter. Kickback is a particular risk because plywood flexes readily, so proper support is important. Norm lays several 2x4 supports over his sawhorses; add more if the plywood is less than ½" thick. To minimize splintering, cut with the good face down—because a circular saw cuts on the upstroke. After adjusting the blade depth (1), Norm sets up a self-clamping straightedge to guide the saw (2). You can get the same results with a pair of C-clamps and a stiff board. As you cut, be aware that the saw blade will graze the top of each 2x4. Be sure to keep your free hand well clear of the cut (3) no matter what you're doing. To keep from losing control of the saw, he sometimes moves around to continue the cut on the other side of the plywood. (4) Never lift the saw or pull it backwards while the blade is moving—that's asking for kickback. If the blade binds or your cut goes awry, stop the saw before repositioning it.

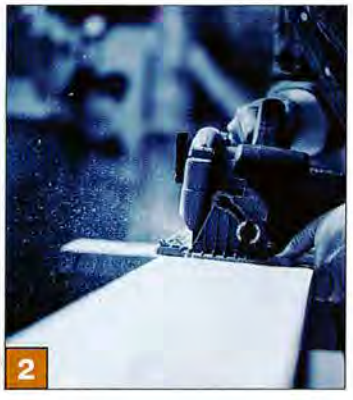


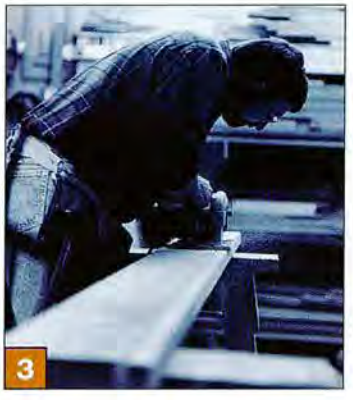




ripping a 2x8

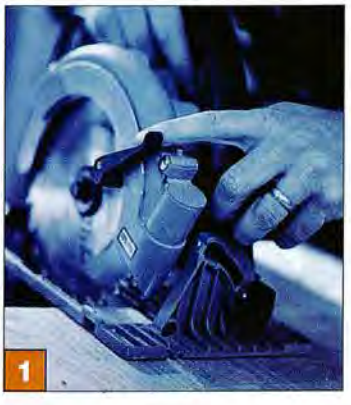
To cut a lengthwise strip from dimensional lumber without using a table saw or a rip fence, clamp the board to a sawhorse, then mark the cutline with a combination square (1). The trick is to move the pencil at the same rate as you move the square. The line will serve as a rough guide, but the real guide is "the human fence"—in the photo, Norm's knuckle (2)—which rides along the edge of the wood while his thumb guides the edge of the saw's base. When Norm reaches a sawhorse, he moves it back slightly before continuing the cut (3).

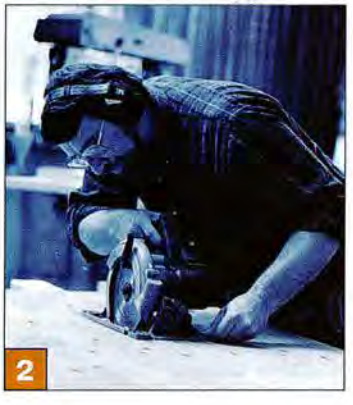


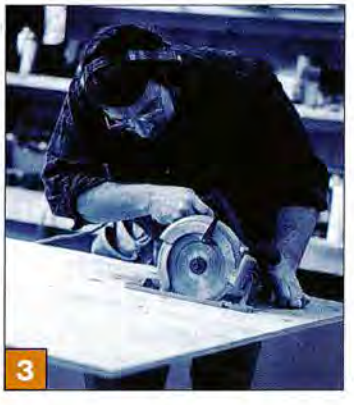


ripping plywood

When he's cutting a lengthwise strip with a circular saw, Norm supports the plywood on at least four 2x4s laid on top of the sawhorses. They run parallel to the cut, with the innermost pair of 2x4s just inches apart on either side of the cut line. To prevent the blade guard from "hanging up" on the edge of a thin sheet of plywood, Norm lifts the guard just enough to clear the wood as he starts the cut (1), then releases it as soon the saw base is past the edge (2). To complete the cut, he stops the saw and repositions himself to maintain a safe, solid stance (3).

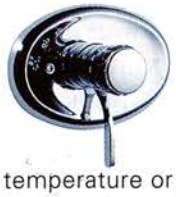






The saw's power and portability are both assets and liabilities. If its blade gets trapped in a cut, the whole saw will kick back violently—at you. Take Norm's advice and always stand to the side of the saw, just in case. Check frequently to make sure small pieces of wood haven't wedged the blade guard open. If your saw doesn't sound right, shut it off and find the problem. It could be a dull or dirty blade. To keep your saw fit, brush off the dust so adjustment levers are clear. If your saw binds or your cuts aren't square, sight down the base periodically to see if it's square and parallel to the blade. Check all knobs and screws regularly to make sure they're tight, and check the electrical cord for fraying. What if you cut through the cord? (Everyone does eventually, says Norm.) Don't repair it; just replace the whole thing. If a saw sputters or sparks, check its brushes. These small blocks of hardened carbon can wear out after a while. Norm's saw makes brush changes easy: unscrew each of the access caps; remove the old brushes (be careful—they're spring loaded); and slip in a new set.

Quality Within Reach



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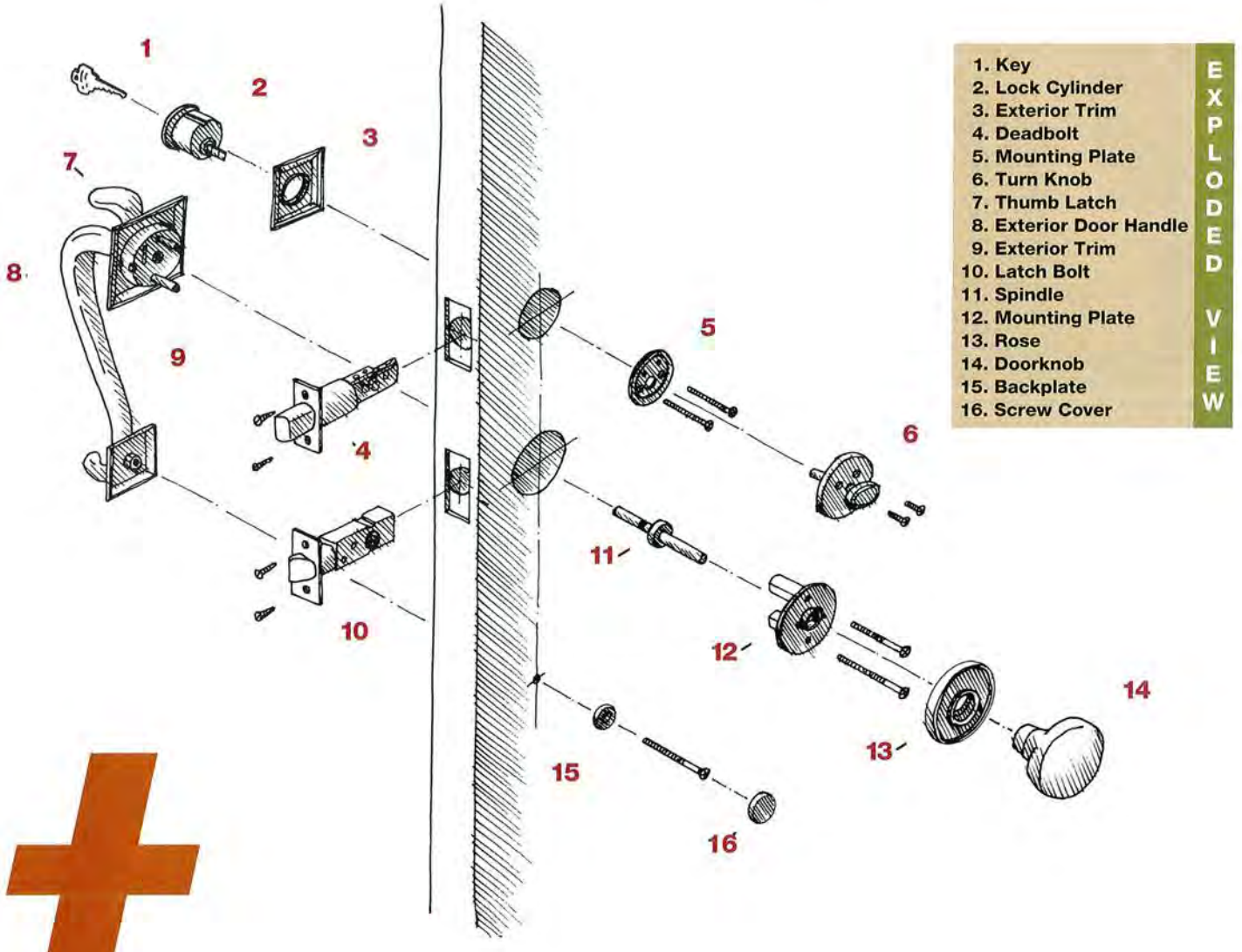
Cylinder Locksets

A guide for the (careful) amateur carpenter. **BY PETER LEMOS**

ILLUSTRATION BY JOHN MURPHY



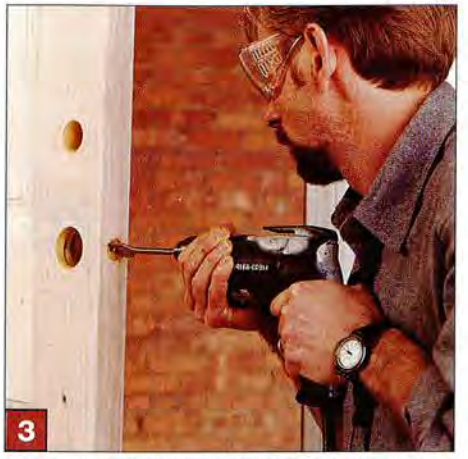
The old house in Maine I bought was owned by a man who had lived in it for 20 years without ever having locked the doors. He had no idea where the keys were and wouldn't have used them if he had. He was a man who venerated the past, cutting his grass with a scythe and heating with wood. He also apparently had nothing worth stealing. I did. A hopeless creature of the present, I quickly installed new locks—a task made easier now that manufacturers make cylindrical versions which just need a hole drilled into the door. (The old mortise style demands a lot more complicated carpentry.) The installation process is as satisfying as it is simple. The result—a good, solid lockset—gives a home an anchor that helps to welcome friends but also keeps intruders out.

fixtures & fittings

Installing a Lockset

Find the most comfortable spot for the doorknob by standing next to the door and holding out your hand, or by copying measurements from other doors. Mark the spot with pencil; tape the manufacturer's template in place over it and mark center and all screw holes. Repeat on other side.

Accurate drilling is essential. The spade bit or hole saw must stay perfectly horizontal. If it angles, the lock won't line up. Make sure all the hole saw teeth or spade bit points touch the wood evenly as you begin. Drill face holes halfway through, stop, and finish from the other side.



When you drill the edgebore hole for the latch assembly sideways into the door edge, a pilot hole helps to keep your spade bit centered at the midpoint between the door's two sides. Check that drill is straight in all dimensions by holding a straightedge at right angles to door.

To cut a mortise for the latch plate in the door edge, use the plate itself as a template and score the outline with a knife. With a chisel, score across at ¼-inch intervals to desired depth, then clean out. Work from the center of the mortise down to the bottom, then work up to the top.

Drill pilot holes for all screws or bolts as you install each one. This prevents screws from breaking off as they're installed. If you're using extra-long screws to secure the strike plate that fits in the doorjamb, make sure you have the right drill bit for the pilot holes.

You may have to make a few adjustments after installing the handles, locks and corresponding strike plates. Open and close the door until all latches and deadbolts operate smoothly and easily. You can adjust latch frames or strike plates by shimming with thin cardboard.

getting ready

A forged brass lockset costs $250 or more, a solid wooden door $300 to $500. Drilling a hole in the wrong place or at the wrong angle could damage either or both. Start by tapping a couple of opposing wedges under the door so it can't move. All cutting tools must be sharp: our carpenter, Jay Jones, used an electric drill, 2⅛-inch and 1½-inch hole saws, a 1-inch spade bit (the Speedbor 2000 is our choice), ⅛-inch and 5/16-inch bits, a 1-inch chisel, a hammer, a utility knife, a Phillips screwdriver and a tape measure. A portable drill guide and a vix bit or centering guide also can help. If you have a lot of doors, a lockset boring jig might be worth the $175–$250 investment. Avoid expensive mistakes by double-checking measurements and all the instructions included with the lockset. If you have any doubts, ask the door supplier to send it predrilled to your lock's specifications and install the hardware yourself following steps 5 and 6.

PHOTOGRAPHS BY WILLIAM VAZQUEZ

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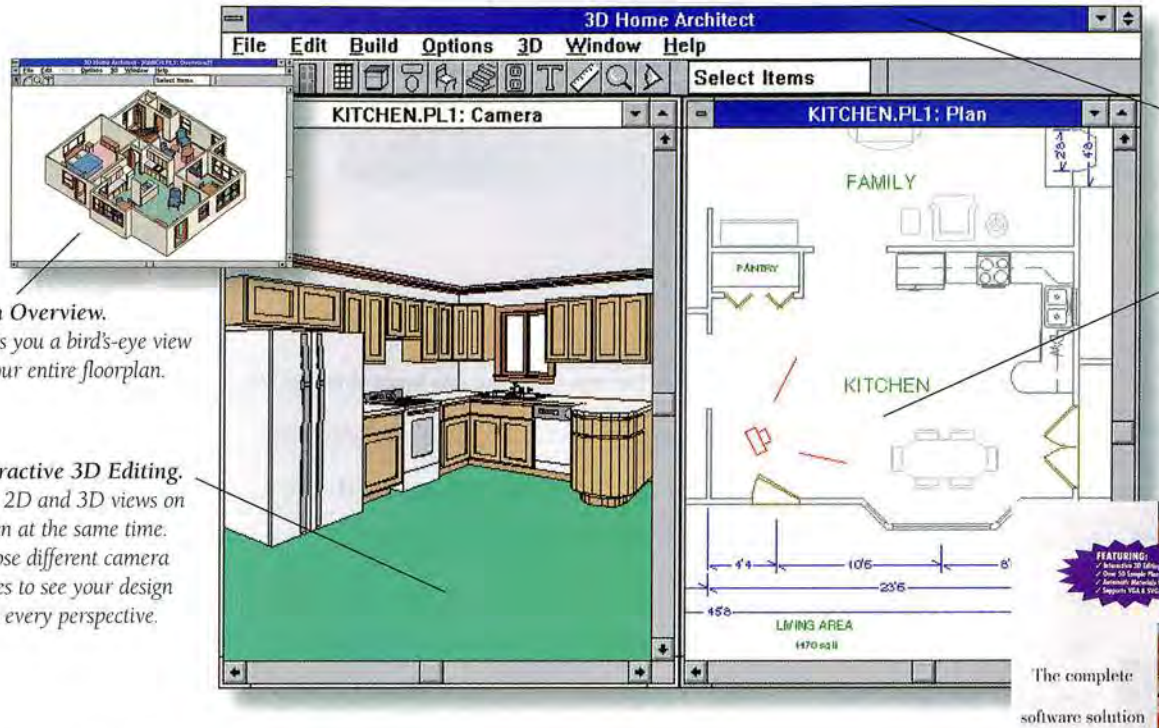

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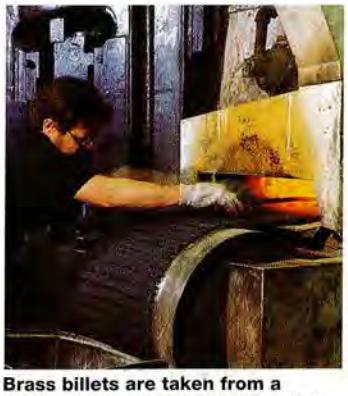
The Making of a Lockset

THE BEST LOCKSETS are made from solid forged brass. Cheaper processes, such as casting brass, can produce tiny bubbles that diminish a component's durability. Forging compresses the brass under heat and immense pressure—up to 600 tons—to create a stronger, smoother and more dense metal. The single-cylinder lockset we installed started out as almost six pounds of solid brass rods, which were forged, machined, fitted, finished and tested for smooth operation. To see it done, we visited the Baldwin Hardware Corporation's brass factory in Reading, Pennsylvania, where state-of-the-moment robotics combine with centuries-old craftsmanship to create the many components that go into a lockset.

A numerically-controlled drill bores out raw brass stock for this lever.

A computer-controlled lathe bit further refines a door lever.

Freshly forged and polished door roses await a last lacquer finish.



Brass billets are taken from a 1,500-degree oven before forging.

a burglar's view

Jeffrey K. knows more about locks than most locksmiths do. At 17, he is a veteran burglar of more than 100 homes and has already spent three years behind bars. He spoke to me just after finishing his first stretch in adult prison. Jeffrey says he always checks first to make sure a house is empty and doesn't have a burglar alarm. Then in quick succession he will use a crowbar, a screwdriver, a credit card, even a paper clip to try and pick your lock. Or, he says, "I can just lean against a door hard, especially if I don't want to make a lot of noise, and the doorjamb will split." If nothing works—which he says is very rare—he gives up and moves on. "I try not to take much time on one thing; if I can't get in I'll go someplace else." To keep Jeffrey K. and his colleagues out, choose a lockset with a hardened steel deadbolt that has at least a 1-inch throw and a steel-reinforced strike plate. Install the strike plate and any hinges with screws anchored in nearby studs.

SAFETY AND CHILDREN

For quick exits in emergencies, an interior turn knob on any deadbolt lock is best, especially in homes with children. Better still, some manufacturers—Baldwin and Schlage among them—offer an interior lever that simultaneously unlocks the deadbolt and latch bolt. Doors with glass, however, are vulnerable—burglars can simply smash and reach inside for entry. A frequent solution is to use double cylinder deadbolts with keyed interior locks on these doors. This violates many building codes, and for good reason: keys are usually stored away from the door for security. In a fire, you might not find them in time. Our friend Julia Child came up with the best solution we've seen so far: she replaced her door glass with Lexan, which is virtually unbreakable.

PHOTOGRAPHS BY WILLIAM VAZQUEZ

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BY WILLIAM A. MARSANO

We will tackle almost any home-improvement project—except electrical work. We have a healthy respect for electricity. So we were happy to learn about low-voltage garden lighting: it's cheap, it's easy to install, and best of all, it eliminates the two big drawbacks of high-voltage work—shocks and restrictive local electrical codes.

The essential item here is the step-down transformer, which alters a home's 120-volt alternating current (AC) to 12-volt direct current (DC). Low-voltage DC is too weak to kill or even seriously hurt you—which is why it's used for children's train sets and small household appliances. But it's strong enough to light your garden, if you pay attention to the bulbs you use, the size of the connecting cable and the voltage drop (see the next page for an explanation). The transformers may even come with timers, dimmers and photosensitive switches, so you can get exactly the effect you want.

Rule #7: Fixtures should be unobtrusive.

PHOTOGRAPH BY MICK HALES

process

advice from an expert

Tom Wirth, landscape architect for *This Old House*, says, "Most mistakes involve overlighting. The photos in manufacturers' brochures can make a house resemble a penal colony."

1 **Don't install uniform bulbs everywhere. Vary the breadth, depth (or "throw") and intensity. A very narrow spot can throw a focused beam about 30 feet; a very wide flood fans soft light into a cone up to 40 feet wide. There is a wide variety to choose from.**

2 **Select the right fixture for function and appearance. On a stairway, for example, use small lights to evenly illuminate each step, rather than a large globe that casts tricky shadows.**

3 **Don't try to turn night into day. If you overlight, even for safety, you can create "hot spots" of harsh light. Mix subtle "effect" lighting on house and grounds with safety lights at entrances, paths, stairs or grade changes.**

4 **Don't overlight older, taller homes: they end up looking out of place. If you overlight their grounds, a house left in darkness can take on a sinister, Charles Addams look.**

5 **Don't install so many lights along a walkway that it resembles an airport runway. Except for very long paths, one fixture at the front and one at the sidewalk should be enough. For light in between, experiment with "moonlighting" fixtures mounted high in trees.**

6 **Don't shine lights directly onto a neighbor's house. If there is any light spill, make sure neighbors won't mind.**

7 **Don't emphasize the fixtures instead of their effect. They should be unobtrusive night and day.**

process

the equipment

TRANSFORMERS range from 25 to 600 watts in ouput. To choose one, add the wattage of all the lights you'll need. The transformer wattage should be about 20 percent higher than this number—so you can add a light or two later.

OUTLETS outdoors must be weatherproofed and have GFCI (ground-fault circuit interrupt) features. Inside, a regular outlet will suffice. Never use extension cords, even with GFCIs, between outlet and transformer.

CONNECTORS are simple plastic slides with metal teeth. Clamp them shut on the cable (for heavier cable, this takes some force); the metal teeth penetrate the insulation to tap current.

CABLE (wire) is measured by gauge: 10, 12, 14, 16 and 18. The lower the number, the thicker the cable, and the more current it carries. Use landscape-lighting cable: it's not affected by sunlight (which makes regular cable brittle) and its insulation is self-sealing, so if you move a fixture, connector holes will close up.

FIXTURES should be made of sturdy materials—thermoplastic, ceramic, cast aluminum or copper—so they won't rust and will survive the occasional swat from a garden tool.

BULBS, typically 7.5 to 75 watts, consume less electricity than household bulbs and are smaller and longer-lasting. We like glass-base bulbs; they won't corrode as metal-bases do. PAR lamps (weatherproof bulbs with reflectors) go right into a socket; no fixture required. Most halogen bulbs need protective lenses.

Mount the transformer (above) at least one foot above ground somewhere on the house, to make late-night adjustments easier. Unlike 110-volt cable, which must be sheathed and deeply buried for safety, 12-volt cable (below) can be slid into a slit made by a straight-edge spade.

how to

First, design a lighting plan. On graph paper, make a scale drawing of your property and decide where you want the lights to go. Then trail a clothesline from the transformer to all proposed light sites, marking each change in direction with rot-proof stakes. Make straight runs where possible, avoiding planting beds and borders that will be rototilled. Measure the clothesline to figure out how much cable to buy. Then, with the transformer unplugged, attach the cable according to manufacturer's instructions. Run the cable—above ground—along the staked route. Attach the fixtures, add bulbs, wait until nightfall and then plug in the transformer. Adjust the lights until you're happy with the results.

To bury the cable, use an edger or a straight-bladed spade. Cut through the turf at a 45-degree angle at least four inches deep (enough to protect the cable from lawn aerators). Pry up the lip of turf and push the cable all the way in. For extra safety, bury yellow plastic construction ribbon with the cable to alert diggers (cut wires won't injure them, but splices will be needed). If there's extra cable at the end, don't cut it off—you may want to add a couple of fixtures later. Just seal the end with electrical tape, and bury it. Drive the marking stakes to ground level so you can locate the cable later.

VOLTAGE DROP

Because of cable's inherent resistance, voltage drops along its length: the end-of-run lamps will be dimmer than those at the beginning. Some drop is acceptable, and inevitable, but you want to limit it—so look for a voltage drop of less than 2 volts out of the 12.

Voltage drop is calculated as follows: Total nominal wattage (TNW), or all your lights combined, multiplied by feet of cable and divided by the appropriate cable-resistance constant.

CABLE-RESISTANCE CONSTANT VALUES

GAUGE	CONSTANT
18	1,380
16	2,200
14	3,500
12	7,500
10	11,920

Example: You have six 27-watt lamps, and your run is 120 feet. With 12-gauge cable, whose resistance is 7,500, your voltage drop will be greater than 2: (6x27=162x120=19440÷7500=2.592.)

Too much. You can reduce voltage drop in one of three ways: use lower-wattage lamps for smaller TNW; use a heavier gauge of cable; or move the transformer to a more central position and divide the cable into two 60-foot runs of three lamps each.

PHOTOGRAPHS BY GARY MOSS

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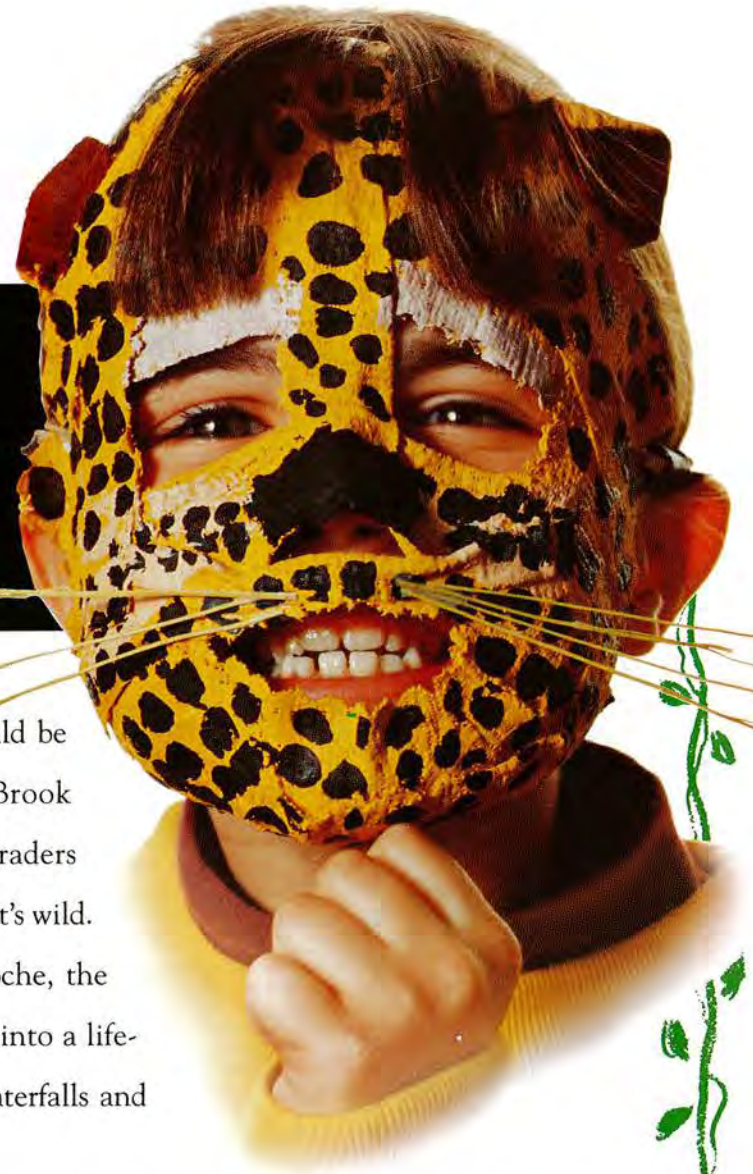
As Though A Class Of First Graders Wasn't Wild Enough Already.



You might think a roomful of 6-year-olds would be difficult to keep under control. But at Winn Brook Elementary of Belmont, Massachusetts, the first graders are perfectly well behaved. It's the classroom itself that's wild.

With help from their teacher, Donna LaRoche, the students at Winn Brook have transformed their class into a life-like rain forest habitat. Complete with vines and waterfalls and scary creatures that are half-jaguar, half-kid.

Ms. LaRoche believes "constructivist" lessons such as this help create "a community of joyful learners." Not to mention a community of South American jaguar fans.

For planting seeds of inspiration in the minds of those who, someday, may help the rain forests grow, we at State Farm are pleased to present the Good Neighbor Award to Donna LaRoche, along with $5,000 to her school.

STATE FARM INSURANCE

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The Good Neighbor Award was developed in cooperation with the National Council for Geographic Education.

Soldering Copper Pipe

Richard Trethewey demonstrates a way to fix your plumbing.

BY THOMAS BAKER **PHOTOGRAPHS BY DAN BORRIS**

A shower faucet shows the complexity possible with soldered joints.

Since its introduction in the 1920s, copper tubing has been the preferred material for supplying water to your home. Copper doesn't taint the water. It is accepted by all the building codes in the United States. It doesn't corrode (unless you have well water with an extraordinarily high level of sediments, acids or alkalis). And skilled plumbers are not the only ones who can join or repair it; homeowners can, too.

Brass and galvanized iron pipes, which preceded copper in residential plumbing, are joined by tricky threaded ends. The best way to join copper tubing, on the other hand, is by soldering or "sweating" the fittings together to form a metal-to-metal bond. Soldering is not difficult. Once you get the hang of it, it takes less than a minute to make a strong, leak-free joint that will last indefinitely. And it's a satisfying process. As Daniel Magnus, one of our staff members, says, "Learning to solder was the most liberating moment of my homeowning career."

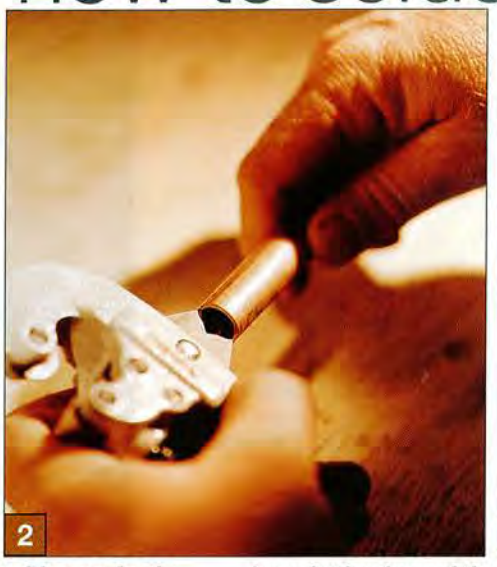
USING A PROPANE TORCH
Portable, reliable and cheap, a propane torch heats copper quickly. One with a self-igniting tip (below) keeps your fingers away from the flame when lighting up.

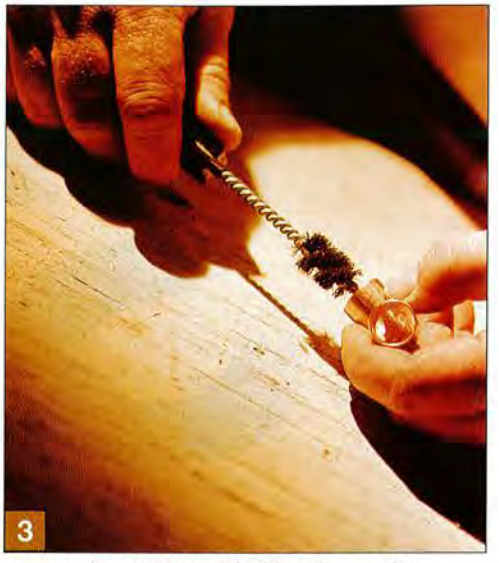
TORCH BY DARRIN HADDAD

COPPER TUBING *The pipe used in home plumbing is 99.99 percent pure copper, with a trace of phosphorus. It comes in lengths ("hard drawn copper") or in flexible, annealed coils ("soft copper") that have been heated to relax the metallic bonds. Drawn copper for residential use comes in three color-coded varieties, M (red), L (blue) and K (green), which indicate wall thickness for a given diameter. Most residential plumbing uses ½- or ¾-inch type M tubing. (Sizes are nominal: a half-inch tube has a ⅝-inch outside diameter; a ¾-inch tube, ⅞ inches.) Soft copper (types L and K only), is used where flexibility is required, such as underground.*

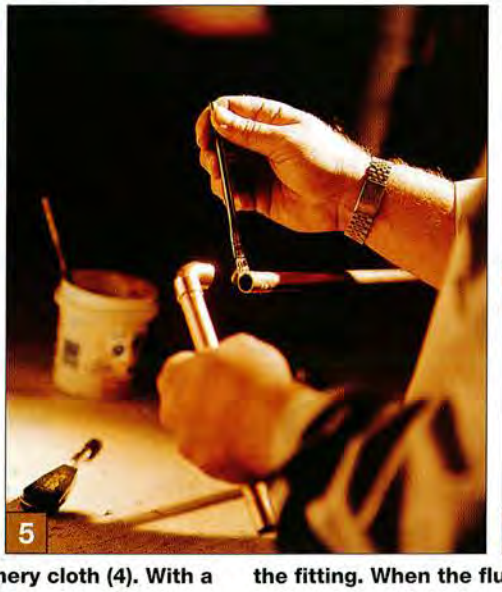
technique

technique how to solder





The secret to soldering is to have a clean joint with a perfectly round cross section. First, measure and mark a length of tube (1). Rotate a tubing cutter around the tube, tightening the handle slightly at each turn to avoid flattening the tube. Remove the burr inside with the triangular reamer (2) that folds out of the cutter; keep both edges of the reamer in contact with the tube so the tube stays round, and don't push too hard or the end will flare. Clean the inside of the fitting with a fitting brush (3), turning it clockwise to avoid breaking the wire bristles. Use a brush the same diameter as the tubing; don't touch the surface afterward.



Polish the outside of the tube with fine-grit emery cloth (4). With a disposable acid brush, coat both mating surfaces with a thin layer of flux to neutralize oxides (5), then insert the tube into the fitting. Clean, flux and fit all pieces together. Uncoil about 7 inches of solder wire; bend a 2-inch crook near the end. Holding a propane torch at an angle to the fitting, train the innermost blue flame on the fitting. When the flux bubbles, touch the tip of the solder wire to the side of the joint opposite the flame (6). (Never put flame on the solder itself.) When the solder liquefies and is sucked into the fitting, remove the flame and run the tip of the solder around the joint until it is filled. Gently wipe the joint with a wet cloth to set the solder, then wait until all parts have cooled.

safety precautions

1 Protect nearby materials with a woven-fiber heat shield, available from plumbing supply stores.

2 Water and hot solder don't mix. If the inside of the tube is wet, stuff a wad of white bread (no crust) into it. The bread absorbs drips while you're soldering, then dissolves when the water is turned on.

3 Flux is caustic: don't get it in on your skin or in your eyes. Wipe all residue off joints (it may corrode the copper); and flush plumbing before drinking water.

if it leaks Cut the tube a few inches from the leak, reheat the joint and remove the tube stub from the fitting. Be careful; it's hot. Using a straight coupling to bridge the cut, clean, flux and refit the tube and fittings as before, then resolder.

the solder itself

Solder is tin-based alloy that fuses with copper. Plumbers used to use 50/50 solder—half tin, half lead; since 1986, the solder (and flux) used for drinking-water plumbing in the United States must be lead free. Look for solders combining tin, copper and silver; avoid tin-antimony solder, which is harder to use. A UPC/IAPMO marking on the spool indicates that the solder has been tested and can be used in drinking-water systems.

the parts

1. Solder wire

2. Adapter (female solder cup with female threads)

3. Tee (with three female solder cups)

4. Emery cloth ("scratch") and fitting brush

5. 90-degree fit elbow (female solder cup with male solder end)

6. Tubing cutter

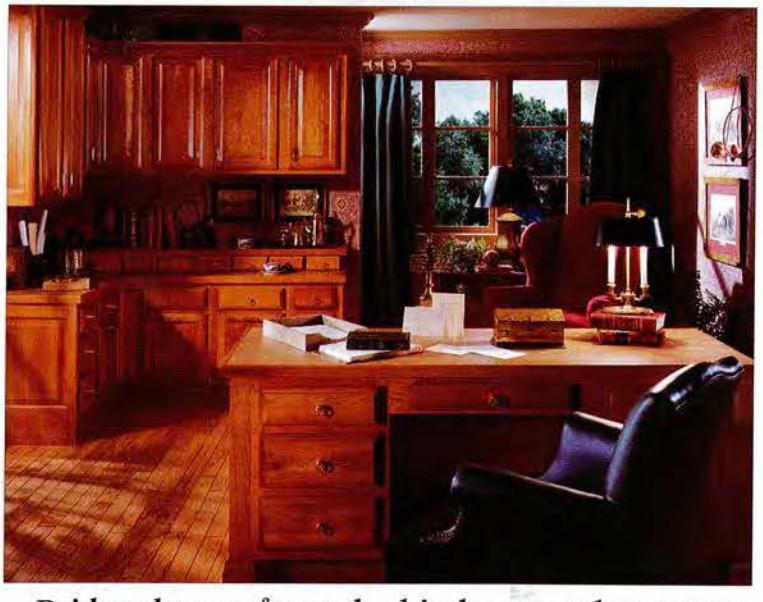
7. Fitting adapter (female solder cup with male thread)

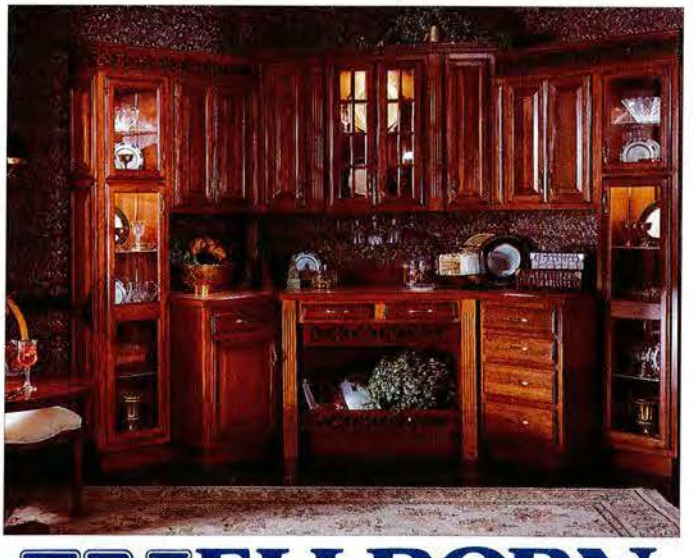
8. Flux (soldering paste) and disposable acid brush

...OR BUILD A TRELLIS

Richard Trethewey, our plumbing and heating expert, laments that his handiwork is hidden behind walls. So we designed a garden trellis, which he made using off-the-shelf fittings and half-inch copper tubing. Markings were removed with lacquer thinner; a solution of ammonium chloride and copper sulfate gave the shiny copper an aged look. It's perfect for training vines: it won't corrode, like a wooden trellis. (And the Brooklyn Botanic Garden assures us that copper has no ill effects on soil or plants.)

Great Rooms





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Is Your Contractor Insured?

Liability and workers' compensation. **BY VICTOR MOORE**

A friend of mine, a successful contractor, keeps an old English poster tacked to his office door: "Ninety-five percent of accidents happen in the home." He got it from a London subway in the 1960s and says, "It was actually part of a birth-control campaign. I thought it would be good for reminding me that this job can be dangerous."

Accidents happen on the best-run construction jobs. (Read the story of Norm Abram's fall during the building of his house, page 125 in this issue.) If a contractor is uninsured, the homeowner is liable for any property damage or medical costs that ensue. If you want to protect yourself against this kind of risk, ask every contractor who works in your house to carry both liability and workers' compensation insurance.

LIABILITY INSURANCE covers bodily injury and property damage—to anyone or anything—that occurs as a result of the contractor's work. If an open bucket of roofing tar gets knocked off the roof and into the neighbor's greenhouse (or onto the neighbor), the general contractor's liability insurance should pay for the damages. It doesn't cover faulty workmanship (if the roofer installs the wrong shingles, or just does a lousy job, liability insurance is no recourse); it doesn't cover injuries to workers on the job.

WORKERS' COMPENSATION INSURANCE covers injuries to the contractor and to his or her employees and subcontractors. If the roofer, not the bucket, falls and injures his back, workers' comp, not you, will pay the medical bills.

Proof of insurance is in the form of a certificate issued free of charge by the insurer. Ask your contractor to produce one before signing a contract, check it against our example and then file it away safely for reference.

Don't accept a photocopy of a certificate issued for another client; it should cite you and your job specifically so that you can be notified if there is any cancellation or reduction of coverage during the course of the work. If your contractor has insurance from two agencies—one for liability and one for workers' comp—make sure you get certificates from both.

The standard form for proof of insurance is the **ACORD 25-S.** The certificate will outline what type and amount of insurance your contractor carries. It will show the amount of coverage the contractor is carrying for liability insurance, and

does it matter?

If the work being done is too minor to warrant a building permit, requiring insurance is your choice (see "Going Bare," page 66, if you decide to do without). If it's a big job, your community may make the choice for you. Some states will not license contractors without insurance; many communities will not issue building permits without proof of license and insurance. If you proceed without a permit, you stand a chance of losing your certificate of occupancy. (We know; it happened to us.) Research your local rules, and follow them.

what's a contractor?

In general parlance, a contractor is someone hired to work on your house. A general contractor (GC) is the person you hire to manage the whole job and to hire the individual tradespeople. Tradespeople hired by the GC are subcontractors and should be covered by the GC's insurance. If you hire them yourself, they are independent contractors and should carry their own policies.

ILLUSTRATION BY JAMES STEINBERG

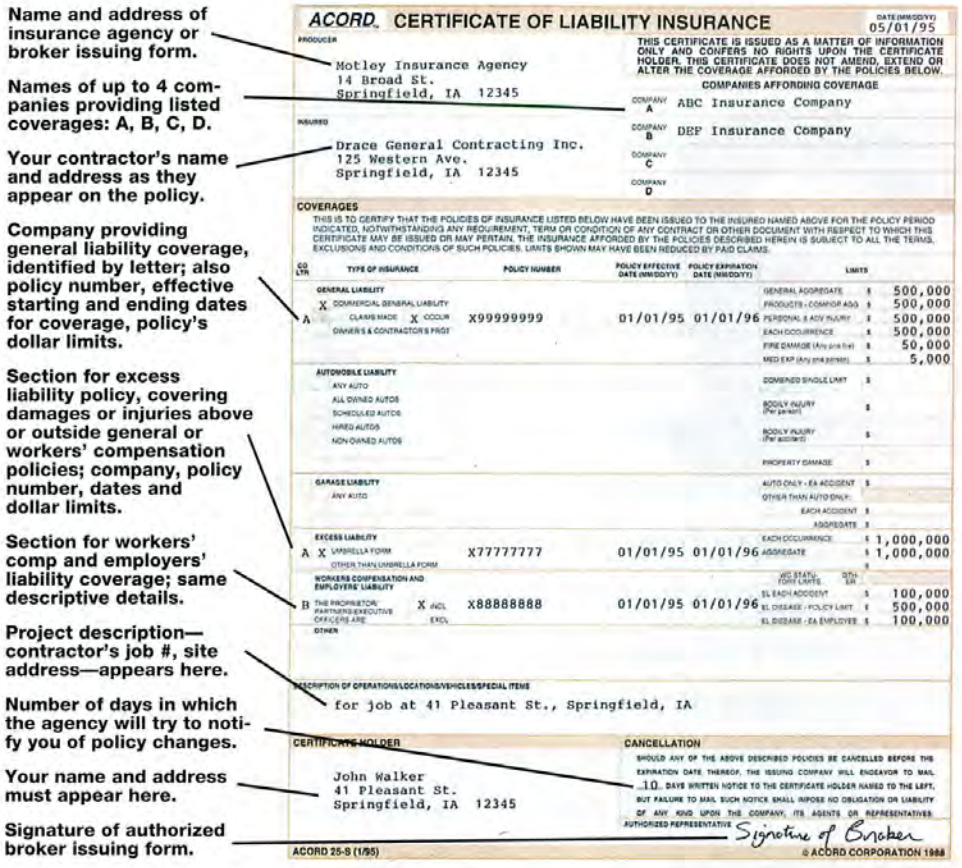
how to read the certificate of liability

what the monetary limits are for separate items such as personal injury, fire damage or medical expenses.

The aggregate, or the maximum amount that could be paid out by your contractor's insurance company, will also be listed on the form. Find out if this amount is linked to a period of time or to the project itself. A low maximum in a given time period added to an unlucky year can lead to a contractor without enough insurance left to cover any accidents on your job.

If the value of your project exceeds the amount of coverage, you may want the contractor to increase the policy limit while working on your property. Remember that when a contractor adds more coverage for a specific project, the additional premium payment usually winds up on your bill.

The certificate will also tell you the active dates of the policy. If your project extends beyond the date listed, make sure you have an updated certificate before the old one expires.



In the workers' compensation section, check to see if the contractor him- or herself is covered. In many states, contractors can opt out of coverage if they are sole proprietors with no employees, partners in the business, or major stockholders if the business is incorporated. In theory, this exemption is only for deskbound executives; if your contractor is going to be at risk at any time, he or she should be covered by workers' comp.

The ACORD 25-S is not a perfect document, lacking the space to record all eventualities. The American Institute of Architects (202-626-7300) publishes a rider (AIA document G715) to the ACORD 25-S that asks more specific questions regarding coverage and provisions of your contractor's insurance policy and outlines more thoroughly the responsibilities of each party. (We liked the section about Explosion, Collapse and Underground Hazards.) If your job is particularly large or you are particularly risk-averse, it provides worthwhile additional protection.

if things go wrong

If a contractor, employee or subcontractor damages property in the course of a job, the contractor may pay for it and submit a claim to his insurer. If the contractor doesn't admit responsibility, the damaged party's insurer must try to collect from the contractor's insurer. Bills for job-related injuries go to the company or state board that issued the workers' comp policy.

Claims over problems with completed work should go first to your homeowner's insurance provider. If a new roof leaks and ruins the drywall below, your insurer will usually issue you a check for the cost of repairing the damage and then collect from the contractor's insurer. (Most liability policies spell out the limits to coverage and the time limits for filing a claim; this is why you kept that certificate.)

Remember that the liability policy does not cover faulty workmanship, so it won't pay for having the roof redone. (This gets into warranties, contractual penalties, arbitration and—as a last resort—the civil court system, but that's another story.)

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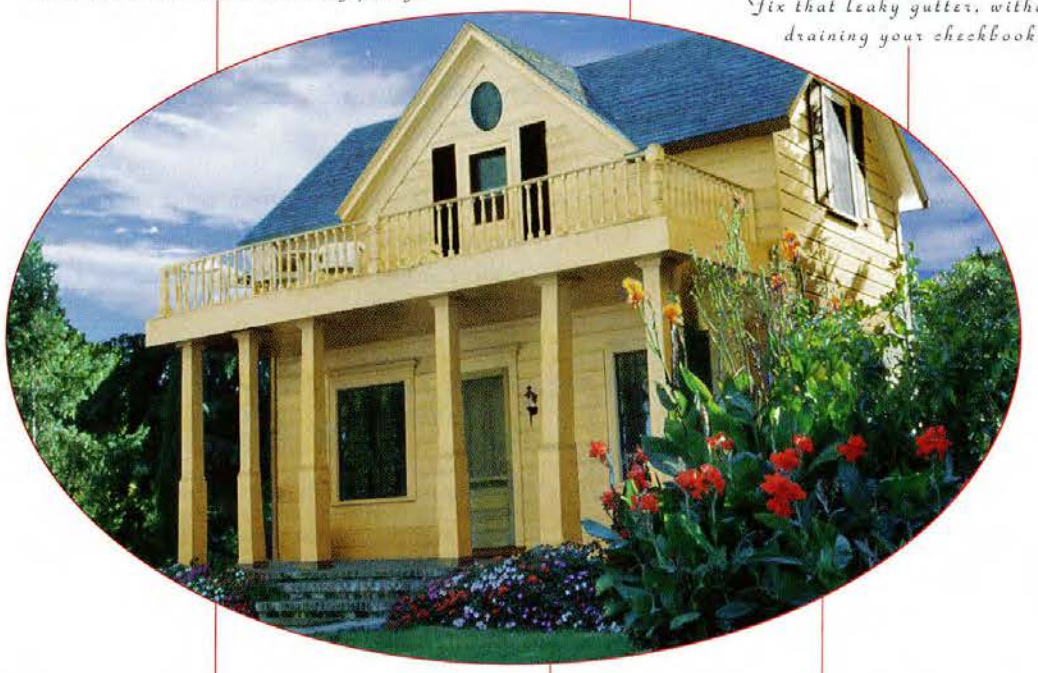
Finally, multimedia finds a home.



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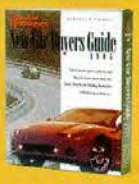
3. 3D Deck makes it easy for anyone to design and build a beautiful custom deck, while eliminating costly mistakes.



4. Popular Mechanics New Car Buyers Guide lets you compare more than 800 new cars, trucks and sport utility vehicles. Then it will calculate the exact dealer price for the model and options you select.

5. The Homebuyer's Guide helps you analyze every aspect of home buying, from searching and negotiating the best price to closing your financing.

6. Garden Encyclopedia helps you select the perfect flower, vegetable or decorative plants from more than 1000 choices.

BOOKS THAT WORK

Exactly where is multimedia headed? Your garden, for starters. Also to your kitchen, bath and attic. Books That Work titles apply the power of multimedia to do-it-yourself projects to every part of your home. They feature animations and video demonstrations, computer-aided design tools, custom construction drawings, parts lists, cost estimates, and one-touch reference guides. The Wall Street Journal calls it "a new class of tailored, task-oriented software" that "will solve real-world problems." Want to know more? Just ask for Books That Work at your software retailer or home project center, or call us toll-free at 1-800-242-4546 x144. Also, see our World Wide Web site at http://www.btw.com/.

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finances

going bare

There are reputable and competent contractors who carry no insurance. Some hate the paperwork; others simply cannot afford to pay the premiums and stay competitive. (Doctors who drop malpractice insurance for the same reasons say they are "going bare.") If you choose one, you can try to

1. protect yourself in several ways. Have a frank discussion with the broker who issued your homeowner's policy. You may already be covered for damage by a contractor; in a few states, your policy even (by law) includes workers' comp. Ask the broker about buying an umbrella policy for extra liability coverage or an interim policy to last while the work goes on. Either one will cost more than $200—but it's still cheaper than a lawsuit.

2. Get the contractor to sign a letter stating that he will defend any liability claims in connection with his negligence, and will cover all legal fees and pay any award granted (known as a "hold harmless" clause). Be aware, though, that if the contractor has no assets, an injured party can pursue you instead; if the contractor has assets, he's probably insured.

3. Some states will insure a homeowner for workers' comp. Call 800-942-4242 to see if your state is one.

4. Some states also have funds to pay for damage by uninsured or underinsured contractors, although the reimbursements are minimal. Contact your state's contractor licensing agency or consumer protection department for more details.

state by state requirements

Many communities within the United States recognize the importance of liability insurance and workers' compensation insurance by requiring proof of one or both before issuing a license to a contractor. Call your local building department or town hall for more information. The chart below lists liability insurance specifics for those states that require it. In Alabama, Arizona, Georgia, Iowa, Louisiana, Massachusetts, Michigan, Montana, Nebraska, Nevada, New Jersey, New Mexico, North Carolina, South Carolina, Tennessee, Virginia and West Virginia, contractors can be licensed or registered without proof of liability insurance; however, all states except Texas require contractors to have workers' compensation insurance (some exempt contractors with fewer than three or five employees; most exempt sole proprietors). The following states do not require statewide licensing of general contractors and hence have no statewide liability insurance requirements: Colorado, Idaho, Illinois, Indiana, Kansas, Kentucky, Maine, Missouri, New Hampshire, New York, Ohio, Oklahoma, Pennsylvania, South Dakota, Texas, Vermont, Wisconsin, Wyoming.

ALASKA	Liability insurance of $20,000 for property; $50,000 for personal injury for one person, $100,000 for two.
ARKANSAS	Residential contractors must have liability insurance of $100,000.
CALIFORNIA	Liability insurance required; amount varies by county.
CONNECTICUT	Must have liability insurance; no minimum. Contractors must carry workers' compensation for subcontractors.
DELAWARE	Must have liability insurance; no minimum.
DISTRICT OF COLUMBIA	Public liability in the amount of $100,000; $50,000 in property damage.
FLORIDA	Liability insurance required; no set amount.
HAWAII	Liability insurance of $50,000 for property damage; $100,000 per person for personal injury, $300,000 for each occurrence.
MARYLAND	Liability insurance in the amount of at least $50,000.
MINNESOTA	Contractors must carry at least $10,000 in property damage, $100,000 in liability insurance.
MISSISSIPPI	Liability insurance of $300,000 per occurrence, $600,000 total.
NORTH DAKOTA	Must provide proof of liability insurance; no minimum amount specified.
OREGON	Liability insurance of at least $100,000 or $500,000 depending on their classification.
RHODE ISLAND	Liability insurance of at least $300,000 combined single limit, bodily injury and property damage.
UTAH	Liability insurance of $100,000 per incident and $300,000 total.
WASHINGTON	Property damage insurance of $20,000; $100,000 in bodily injury or death insurance.

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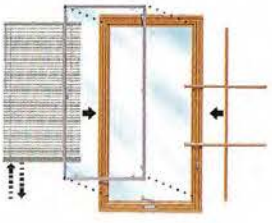

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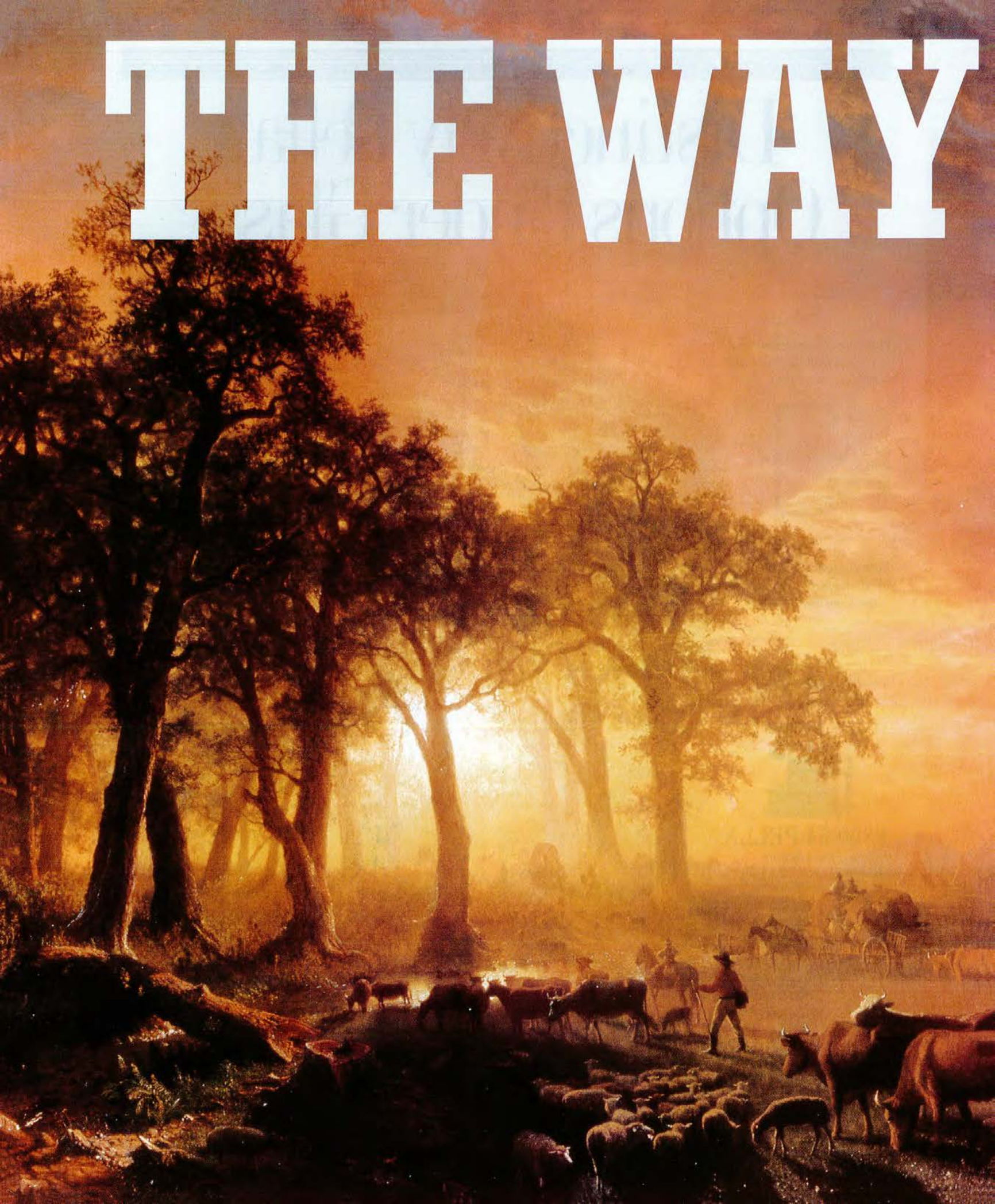
THE WAY



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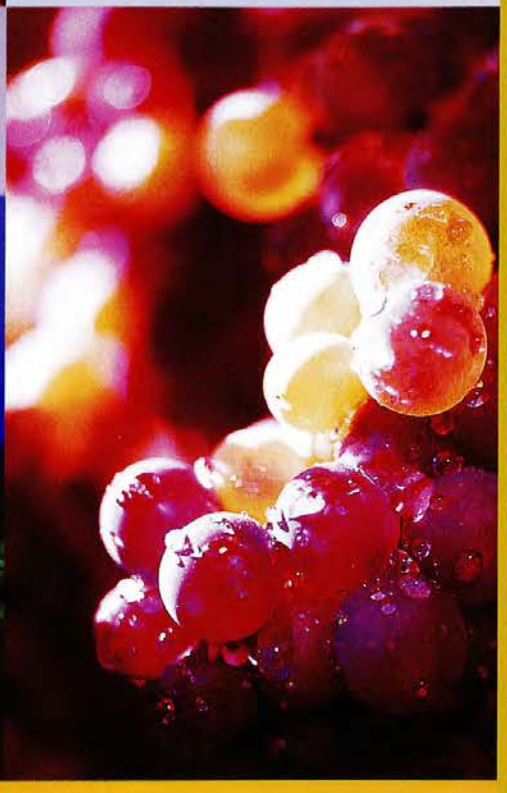

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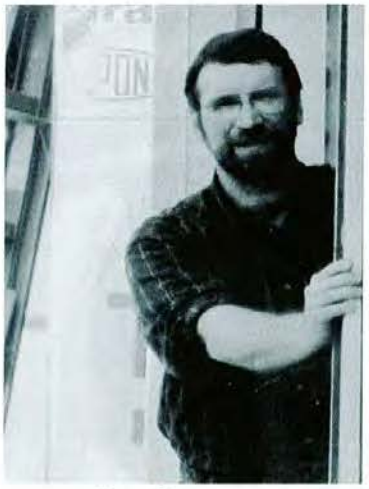
A LETTER FROM

This Old House

Steve Thomas and Isolde Motley



Norm Abram

Russ Morash

Diana Haas

John Voelcker

Tom Baker

Matthew Drace

Brooke Deterline

Jeanne Huber

Jill Priluck and Nancy McCarthy

Ben Lloyd

Bob Abranowicz

Steve Petranek

Tim Jones

RENOVATOR'S DISEASE MAY be incurable. What's worse, all of us at *This Old House* seem to have it. Renovator's disease is the inability to stop working on your house even when it makes no economic sense to keep doing so. Russ Morash, who created the show in 1979 and still directs it, may have the worst case: he has continually renovated his 1800s farmhouse since he bought it in 1975. Master Carpenter Norm Abram is building a new house (there's a story about it in this issue); it has been in process for so long now (four years) that it is starting to qualify as a renovation. Steve Thomas, our host, does finish his projects—pursuing them with maniacal singlemindedness. He then immediately embarks on another one, which, like all the rest, begins innocently and then expands to three times the intended scope, not to mention cost.

This Old House is our house too, and we tinker with it constantly. What you have in your hands is our latest addition: *This Old House,* the magazine. In the sixteen years we've been on the air, we've often wanted a print companion—a place to tell the stories we come across but don't have time for in a half-hour show, or to provide the details that just don't translate well to TV.

So: welcome. Please make yourself at home. And let us know what you think. Like our own houses, *This Old House* is a work in progress. It will never be finished, because we will always be "improving" it.

PHOTOGRAPHS BY TERRI BLOOM; NORM BY MICHAEL MCLAUGHLIN; MATTHEW BY DANIEL PROCTOR; TIM BY PETER BOSCH

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Workers pried up the old kitchen floor, then demolished the exterior walls to the studs and tacked up plastic sheeting to keep out the rains. Next, they braced the ceiling and, soon after this photo was taken, ripped out the studs. New exterior walls extend 8½ feet beyond the old ones.

choosing kitchen materials

BY BRAD LEMLEY PHOTOGRAPHS BY DANIEL PROCTER

***This Old House* host Steve Thomas uses a nailer on window jamb extensions.**

Renovation in this part of the house often focuses on cabinetry, but countertops and floors have much more impact on style and utility.

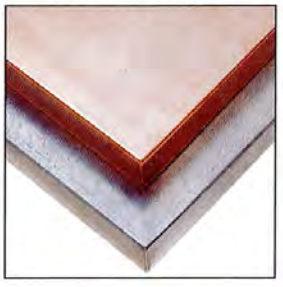
DENNIS DUFFY, A 47-YEAR-OLD mortgage broker in Napa, California, had a modest dream: a brighter kitchen. While most of his 1906 farmhouse retained its charm, the kitchen had been blighted by a 1960s renovation. The pseudo-brick vinyl tile floor, copper-colored appliances and brown laminate countertops had to go . . . maybe a few more windows?

While he was dreaming, Dennis saw an article in the *Napa Register* newspaper, and before long his kitchen had become the site of a *This Old House* renovation. The show's producer introduced Dennis to designer John Lail, who argued for a more extensive revamp. Soon Dennis was making "50 decisions a day," mostly about the materials for a kitchen that was about to grow from 436 square feet to 640, including a new utility room and bathroom. Choosing between four shades of green countertop can be harrowing, but Dennis loved it: "I felt like a kid in an F.A.O. Schwartz toy store."

Dennis's affability in the midst of a renovation was due not only to his nature, but also to manufacturers eager for credits on the show. They donated everything from cabinets to a refrigerator—leaving Dennis free to indulge his tastes. He picked soft green solid-surface countertops, windowpane-trimmed oak floors and white wood cabinets. Though the clean, spare, modern kitchen now contrasts jarringly with the dark, antique coziness of the rest of the house, he's delighted.

The rest of us have a better shot at winning the lottery than of luring *This Old House* into renovating our old kitchens. For us, selecting kitchen materials requires balancing tastes and budgets. Steve Thomas, coauthor of *This Old House Kitchens,* believes fiscal limits aren't necessarily bad, and says there is no single best countertop, flooring or cabinet. When remodeling a kitchen, he says, "you have an opportunity to accommodate—and celebrate—your family's way of doing things."

COUNTERTOPS

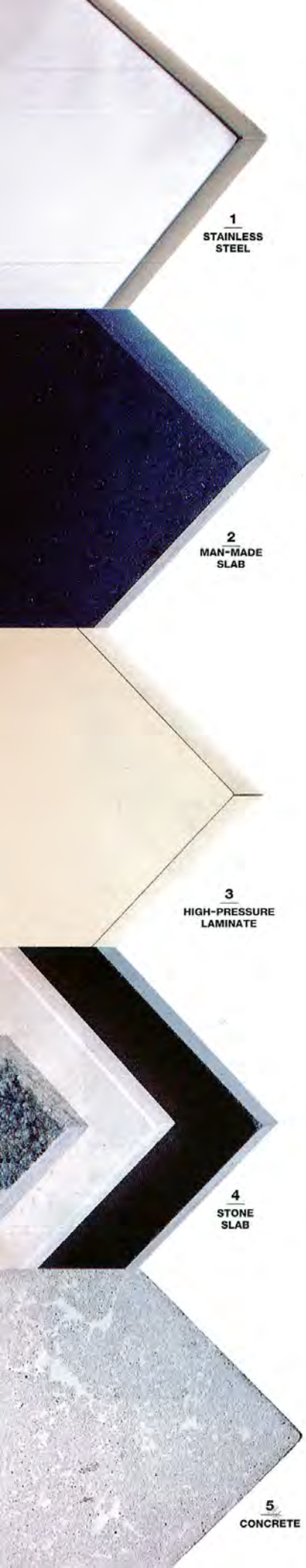


FLOORING

VIRTUAL KITCHENS

countertops

CHOICES



1. STAINLESS STEEL

INSTALLATION: Glued to plywood substrate; professional installers form edges and backsplash.

PROS: Stain-proof; scorch-proof; difficult to dent; industrial appearance.

CONS: Fabrication is expensive; industrial appearance.

PRICE: $100 per lineal foot, installed.

2. MAN-MADE SLAB

("FireSlate")

INSTALLATION: Same as stone slab.

PROS: Very durable; resists heat, scorching, etching, staining.

CONS: Unusual in homes; installers may be inexperienced; may appear more commercial than residential.

PRICE: $23 per square foot, plus installation.

3. HIGH-PRESSURE LAMINATE

(Formica, Wilsonart, Micarta)

INSTALLATION: Sheets are glued to medium- or high-density fiberboard backing; ready-made lengths available at home centers.

PROS: Inexpensive; widely available; tough surface; wide range of colors, patterns and textures; easy to clean; well-suited to most cooking tasks.

CONS: Hard to repair; not suitable for cutting; brown edge may show at seams; can be scorched by hot pots.

PRICE: $20–$45 per lineal foot, installed.

4. STONE SLAB

(granite or marble)

INSTALLATION: Same as wood, but base cabinets may have to be reinforced to support extra weight.

PROS: Long-lived; luxurious in appearance; impervious to scorching; good for baking areas.

CONS: Expensive; hard; cold; marble may etch or stain if improperly sealed.

PRICE: $150 and up per lineal foot, installed.

5. CONCRETE

INSTALLATION: Poured into molds, removed and installed like stone slabs.

PROS: Scorch-proof; hard to scratch; looks like stone slab at lower cost.

CONS: Edges can chip; must be sealed regularly.

PRICE: $75–$200 per lineal foot, installed.

6. WOOD

(such as butcherblock)

INSTALLATION: Screwed in place or secured with silicone adhesive.

PROS: Natural warmth; resilient surface; damage can be sanded away; good for chopping.

CONS: Susceptible to warps and cracks, stains, water damage and bacteria buildup (unless disinfected regularly); should not be used near sinks.

PRICE: $50–$60 per lineal foot, installed.

7. SOAPSTONE

INSTALLATION: Same as stone slab.

PROS: Authentic material for 19th-century-style kitchen; resists heat.

CONS: Experienced installers are rare; stains easily; challenging to maintain; more susceptible to cracking and chipping than harder stone.

PRICE: $140 per lineal foot, installed.

8. EXOTIC METALS

(zinc, copper, rusted steel)

INSTALLATION: Same as stainless steel.

PROS: Durable; scorch-proof.

CONS: Must be thoroughly waxed and sealed for food safety; zinc stains badly and is recommended for bars only, not food preparation, because zinc layer is only ½₂ inch over steel.

PRICE: $60 and up per lineal foot, installed.

9. CERAMIC TILE

INSTALLATION: Should be laid on cement backer board or in a bed of mortar—not glued directly to plywood or particleboard.

PROS: Inexpensive; durable; resists heat and scratches; easy to clean.

CONS: Professional installation adds to cost; can chip; grout may discolor; requires sealing; uneven surface makes baking tasks difficult.

PRICE: $5–$25 per square foot.

10. SOLID SURFACING

(Avonite, Corian, Surell)

INSTALLATION: Factory-licensed shops fabricate.

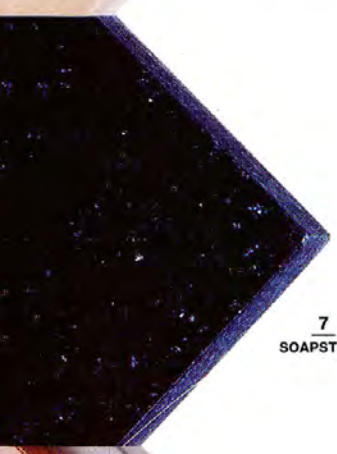
PROS: Seamless; very durable; easy to clean and repair; resists scorching; sinks of the same material can be glued to underside of counter, giving seamless bond.

CONS: Expensive; makers discourage do-it-yourselfers.

PRICE: $100–$200 per lineal foot, installed.

Countertops are often measured by the lineal foot: a 25-inch-deep section that is one foot wide.

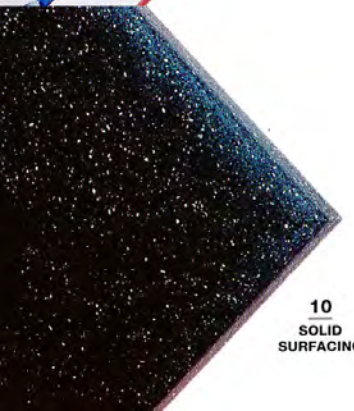
6
WOOD



7
SOAPSTONE

8
EXOTIC METALS

9
CERAMIC TILE



10
SOLID SURFACING

COUNTERTOPS ARE THE most visual and tactile kitchen elements; it's easy to fall in love with one type to the exclusion of others. Don't. In his home, Steve "disregarded common sense" and set his sink into a maple counter. The wood's expansion and contraction with humidity changes repeatedly breaks the polyurethane sealant he used on the sink rim. Despite diligent mopping, the wood is now cracking.

So it's smart to put different sorts of countertops in locations that make the best use of their strengths. Ceramic or stone tile can go next to stoves, so hot pans can be placed there. Butcherblock can be set into an island surface meant for lots of slicing and chopping. (Duffy's island has two such inserts.) Laminate or solid surfacing can be used everywhere else. Another solution is pullouts. Steve likes a kitchen he saw with lavish polished granite counters and no fewer than six pull-out cutting boards at key points around the room.

Countertops that meet a wall commonly have a backsplash—a vertical section about four inches high to guard against spills. But it makes sense to go higher. In the Duffy kitchen, the Avonite backsplash behind the cooktop extends up to the ventilating hood. Elsewhere it reaches to the bases of windowsills. And there's no rule that backsplashes must be made of the same material as counters. One of Steve's favorite small kitchens, squeezed into an urban closet, uses mirrors as backsplashes to expand the sense of space.

A level countertop begins with a level cabinet. Steve taps a wood shim under a cabinet corner to raise it, checking his progress as he goes.

THE ART OF THE SOLID SURFACE

The architect's drawings originally specified granite countertops, but at $250 per lineal foot installed, the $12,000 price seemed too high even for donated material. So Dennis went with Avonite, a solid-surface synthetic. The color used was slate-green with a black detailing stripe. The edge is bullnosed with cove molding.

First, installer Kara Raymond made a cardboard template to record sizes, sink cutouts and wall irregularities. In her fabrication shop, she used the template to lay out the counters. Although a skilled do-it-yourselfer could craft solid-surface material with woodworking tools, manufacturers are wary of amateurs who make mistakes and then demand refunds. That's why it's difficult to buy such materials in home-improvement stores.

Kara also attached four-inch-wide, ¾-inch thick plywood strips to the counter's underside, raising the finished height to a standard 36 inches. Back in the kitchen, she joined large sections of the countertop with pigmented two-part glue. Then she sanded it smooth and glued the countertop assembly to the base cabinets with silicone.

flooring

CHOICES

1. HARDWOOD

(including oak, cherry, birch, maple and hard yellow pine; laminated or solid strips, square tiles)

INSTALLATION: Strips are nailed, glued or screwed to subfloor; tiles are glued.

PROS: Warm underfoot; not as hard as stone or tile; polyurethane finishes resist stains and water damage.

CONS: Frequent refinishing may be required; may squeak if badly installed; shows wear; dirt collects in grooves and cracks.

PRICE: $5–$15 per square foot, installed.

2. CERAMIC & STONE TILE

(includes terra cotta, granite, marble, slate, pigmented concrete, quarry, saltillo and terrazzo tiles)

INSTALLATION: Often set in thin mortar layer on backer board; seams filled with cement- or epoxy-based grout.

PROS: Durable; impervious to dents and scratches.

CONS: Hard surface; cold underfoot; noisy; dirt can collect in grout; can be costly.

PRICE: $5–$25 per square foot, on average; some tiles cost $100 per square foot.

3. LINOLEUM

INSTALLATION: Laid like sheet vinyl, but joined with heat, not chemical adhesives.

PROS: Inherently antiseptic; pleasant linseed oil smell; no man-made ingredients; solvent-free.

CONS: Now a specialty product, so difficult to find.

PRICE: $4–$5 per square foot, installed.

6. CORK TILE

INSTALLATION: Laid like vinyl tile.

PROS: Soft underfoot; good heat and noise insulation; renewable resource.

CONS: Less durable than some options; unfinished cork requires frequent sweeping.

PRICE: $2–$6 per square foot, installed.

7. TERRAZZO

INSTALLATION: Mix of marble chips with cement or resin base poured in place; cement base requires concrete substrate; epoxy base requires only plywood; surface is ground smooth.

PROS: Very durable; can be sanded or sealed to look like new.

CONS: Installers are rare; installation creates "a hellacious mess"; expensive.

PRICE: $25 and up per square foot, installed.

8. RUBBER

INSTALLATION: Laid like vinyl in sheets or tiles.

PROS: Durable; almost maintenance-free; comfortable underfoot; resists spills; many textures available; industrial look.

CONS: Can be cut by sharp objects; industrial look.

PRICE: $5 and up per square foot, installed.

4. VINYL TILE

INSTALLATION: Glued to subflooring; tiles butt, edge tiles cut to fit; patterns need careful planning; classic do-it-yourself project.

PROS: Simple to install; easy to repair; wide range of color and pattern options.

CONS: Poorly installed tiles can crack or lift; floor has many seams.

PRICE: $2–$10 per square foot, installed.

5. SHEET VINYL

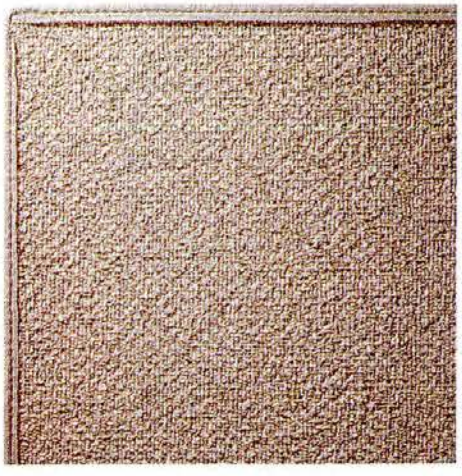
(resilient flooring)

INSTALLATION: Glued to subfloor—challenging for amateurs.

PROS: Inexpensive; soft underfoot; easy to clean; few seams.

CONS: Slippery if wet; can be cut or sliced by sharp objects; may last only 10 years; subfloor flaws show if poorly installed; smelly when new.

PRICE: $2–$10 per square foot, installed.



9. CARPETING AND AREA RUGS

INSTALLATION: Carpet laid as in other rooms; rugs require nonskid pads.

PROS: Inexpensive; quick to install; soft underfoot; easily replaced.

CONS: Distinctly unhygienic; may retain odors from cooking or spills.

PRICE: $1–$4 per square foot, installed.

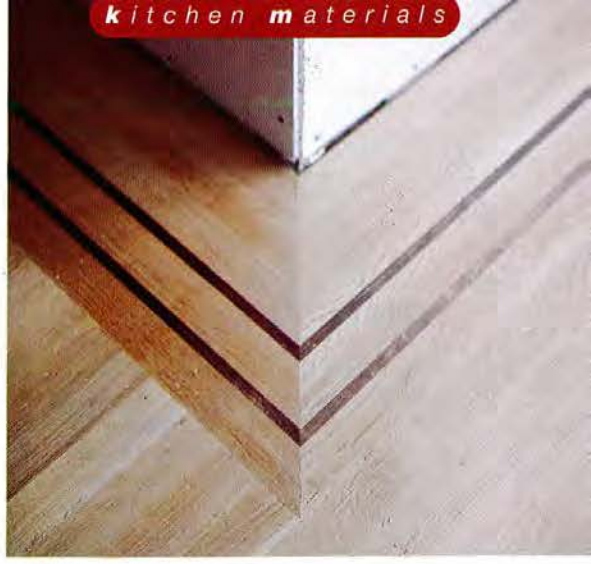
10. EPOXY

INSTALLATION: Squeegeed or rolled in place by professionals.

PROS: Durable; no seams to collect dirt.

CONS: May be difficult to find experienced installer; abrasive surface.

PRICE: $5–$9 per square foot, installed.



HARDWOODS AND HARD WORK

The Duffy kitchen floor was laid with quartersawn two-inch-wide white oak strips. First, a kraft-paper vapor barrier was placed over the ¾-inch plywood subfloor. Then workers drove in a pair of one-inch steel finishing nails every seven inches along the top of each oak strip. To save money, no flooring was laid where cabinets would sit (below). The border trim (above) featured a pair of ½-inch strips of Peruvian walnut. Installers used a vintage 1940s machine called a Cavanaugh; the operator whacked a plunger on the top with a one-pound mallet to drive in and countersink nails 1/16 inch below the surface of the strips. The resulting dimples, and any other tiny gaps, were then filled with wood putty and the whole floor was drum-sanded. The first coat was a thick high-build sealer specifically formulated to bulk up the finish. Then came three coats of less viscous, waterborne urethane. Most wood floors are now made from ¾-inch-thick strips with tongue-and-groove edges that lock together. Nails don't show because they're driven diagonally. But Duffy's dining room and parlor, which adjoin the kitchen, have far thinner 5/16-inch-thick flooring, so the kitchen strips are similarly thin to avoid toe-stubbing thresholds.

visualizing your kitchen

VIRTUAL KITCHENS

Most architects still produce hand-drawn renderings of their designs, but a few now offer computer-generated 3D simulations as well. This new technology lets users "walk" through a computer-rendered image of a space shown on screen. In many cases, owners and occupants can identify spatial layout problems or specify new design requirements before any work is done.

The Duffy kitchen was first simulated (top) when David L. Munson, a longtime fan, approached *This Old House* and volunteered to do it. He was eager to show off his work at the advanced technology group of Hellmuth, Obata, Kassabaum (HOK)—one of the world's largest architectural firms. The firm's software, which runs on powerful scientific workstations, had been used mostly to depict high-end laboratories costing up to $600 per square foot. Munson spent more than 200 hours entering data from the blueprints of the first version of the design. He estimates that his time would have cost a client $30,000.

high-tech computer simulation

Some cabinet showrooms and home centers offer 3D modeling programs that display their cabinets as they would look installed in shoppers' own kitchens, based on a simple floor plan. Shoppers are often given a printout of the simulated design to take home.

the home computer version

If you want to do it yourself, the cost drops considerably—to about $60, the price of 3D Home Architect, from Brøderbund Software, which is the best-selling 3D home simulation program on the market. (You'll need a PC running Windows, too.) We asked Brøderbund to model the final version of the Duffy kitchen using 3DHA (middle). It took an experienced user about five hours to enter the data; a novice requires at least twice that.

Viewers may recall that Norm Abram, when viewing HOK's model, questioned the location of a support pillar that limited the size and accessibility of the breakfast nook. The final kitchen (bottom) doesn't have the pillar. As desktop computers gain power, home users may soon be able to do as Norm did: identify flaws in a design before the first nail is driven.

Dennis Duffy's finished kitchen

BLUEPRINT INSERT

The folded insert shows several views of the Duffy house plans. The full set of architectural drawings and specifications ran some 20 pages, but these are representative of the drawings an architect would use to help a client visualize a project.

The four house exteriors are called elevations, and they immediately reveal a limitation of such flat-on views. In the elevation showing the west wall of the completed kitchen, the two sets of French doors appear flush with the back wall. There's nothing in this drawing to indicate that the doors on the left are set back 3 feet 6 inches, and those on the right recessed 8 feet 6 inches. To get that information, you must inspect the "Proposed Floor Plan," but that still isn't enough to allow anyone unaccustomed to such renderings to envision the kitchen.

For that you'll need an axonometric drawing. (While architects routinely draw them, this wasn't part of Dennis's original plans. It was commissioned for $500 by *This Old House* magazine.)

It's important to note that this isn't a true perspective view, in which parallel lines would, if extended, eventually meet at vanishing points. The axonometric drawing is simply a perspective-free tilt-up from two dimensions. There's only a small difference between this and what the eye sees, although for much greater square footage, a true perspective might be helpful. If these views aren't enough, you can ask for a scale model, but that naturally drives up costs. Robert Livingston of Architectural Associates, the firm that prepared the drawings, says he knows of one high-end architect who builds up to 10 models of each residential project he designs.

All these drawings were done by hand, but Livingston says his office—and many others—are installing computer-aided design, or CAD, systems. Traditionalists may sniff that CAD removes the art from architecture, but its ability to crank out drawings from any perspective inexpensively can help to quiet the age-old plaint of the client: "That's not how I imagined it!"

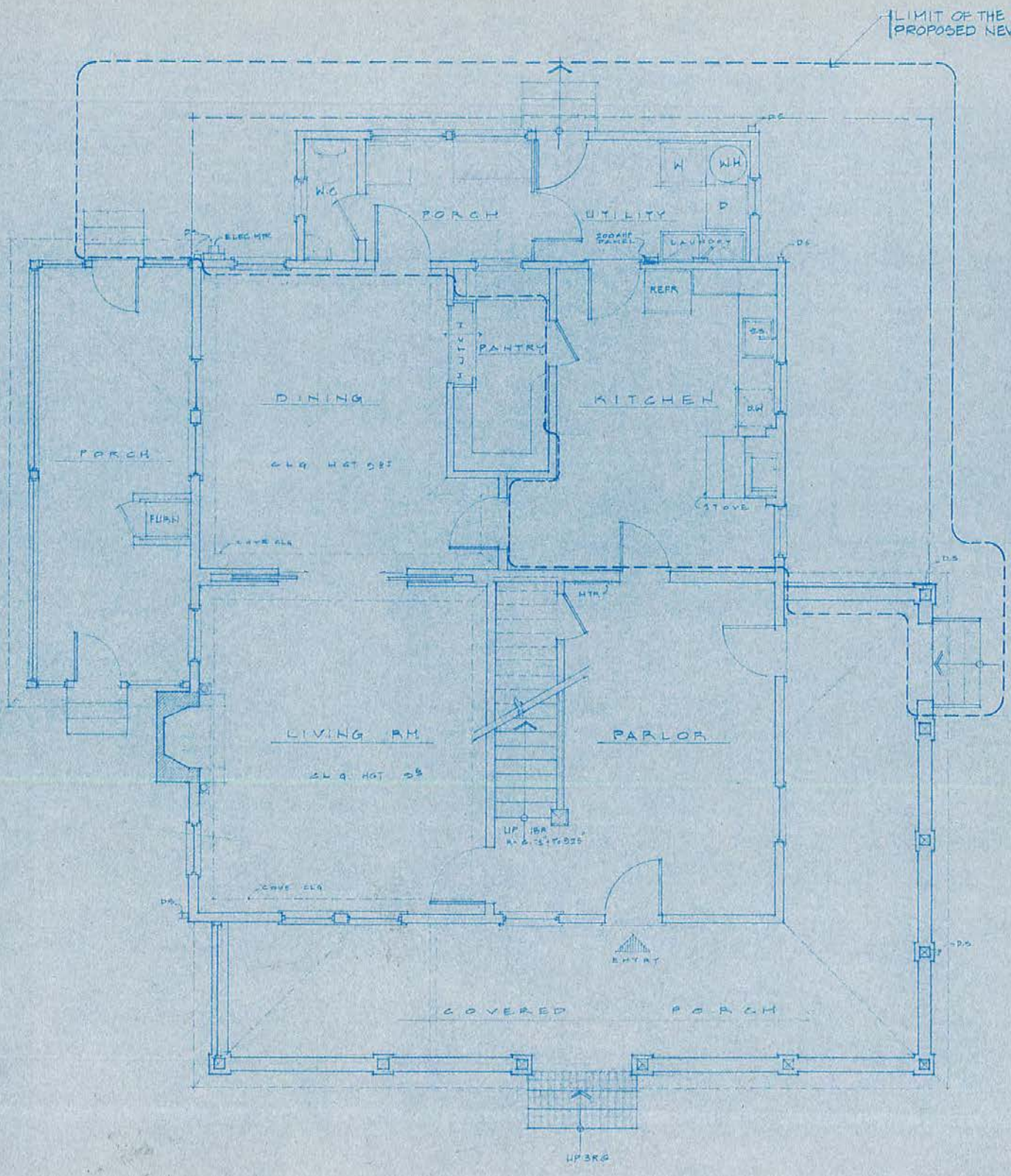
LOCATION MAP

SOUTH ELEVATION

WEST ELEVATION

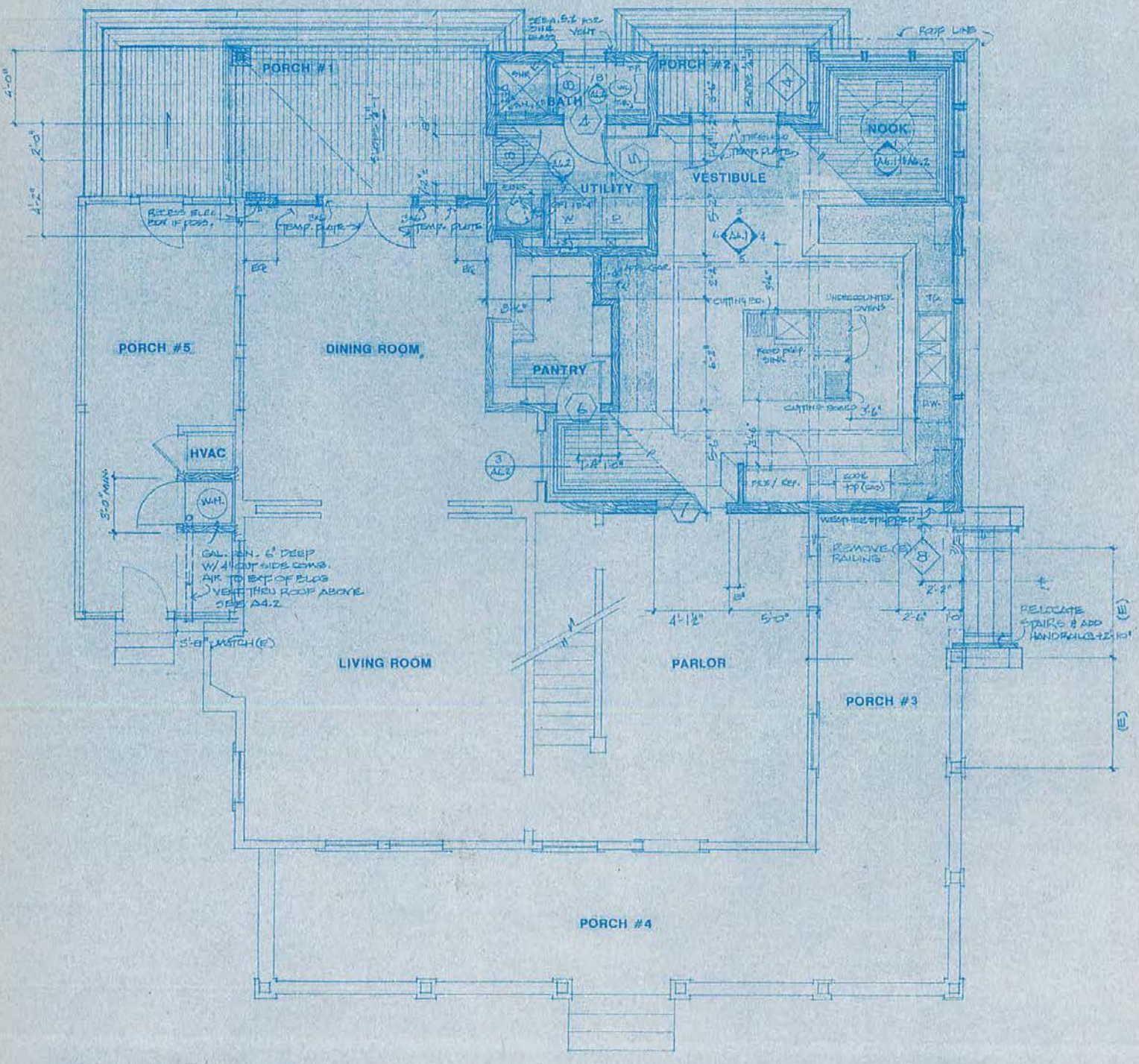
EAST ELEVATION

NORTH ELEVATION

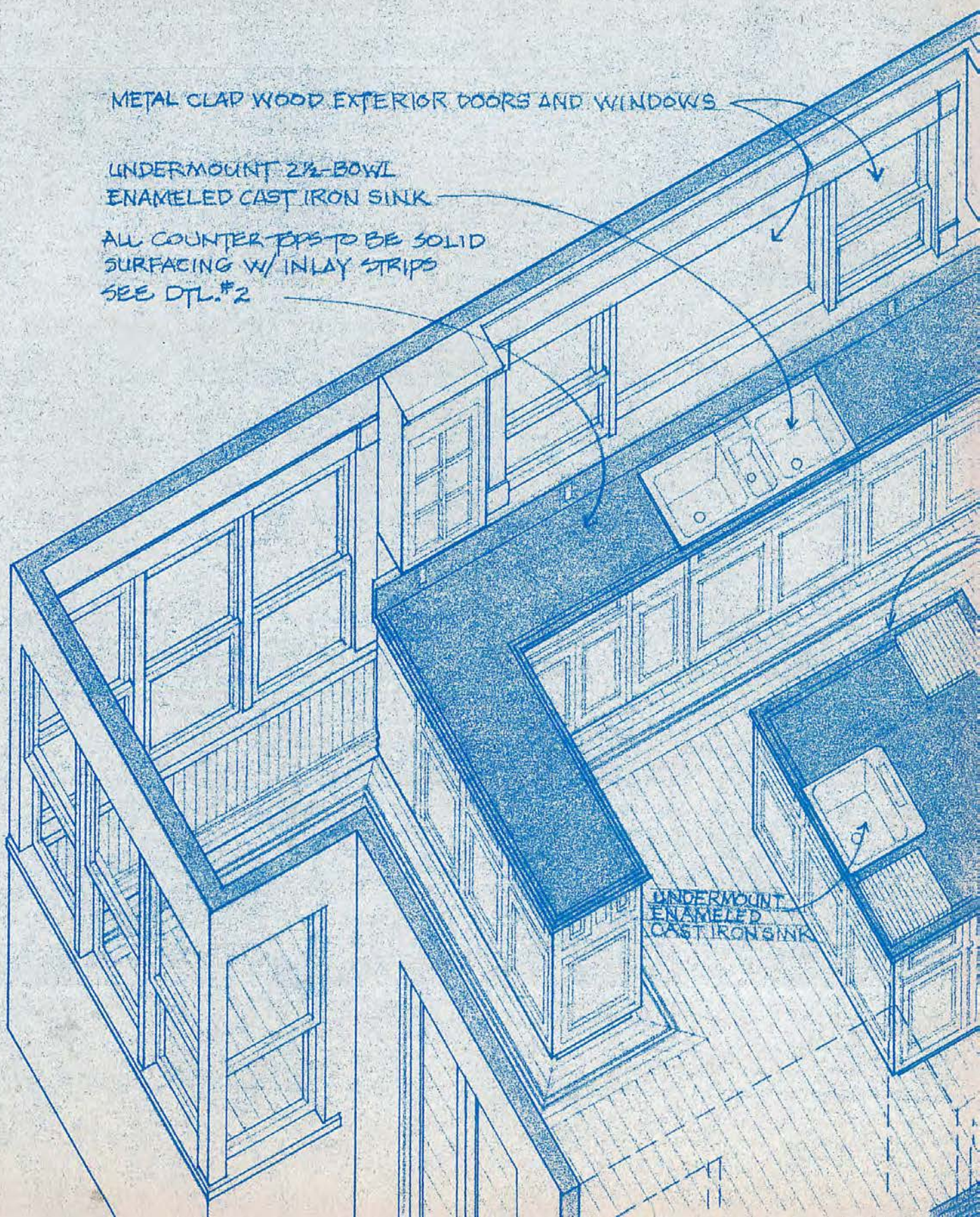


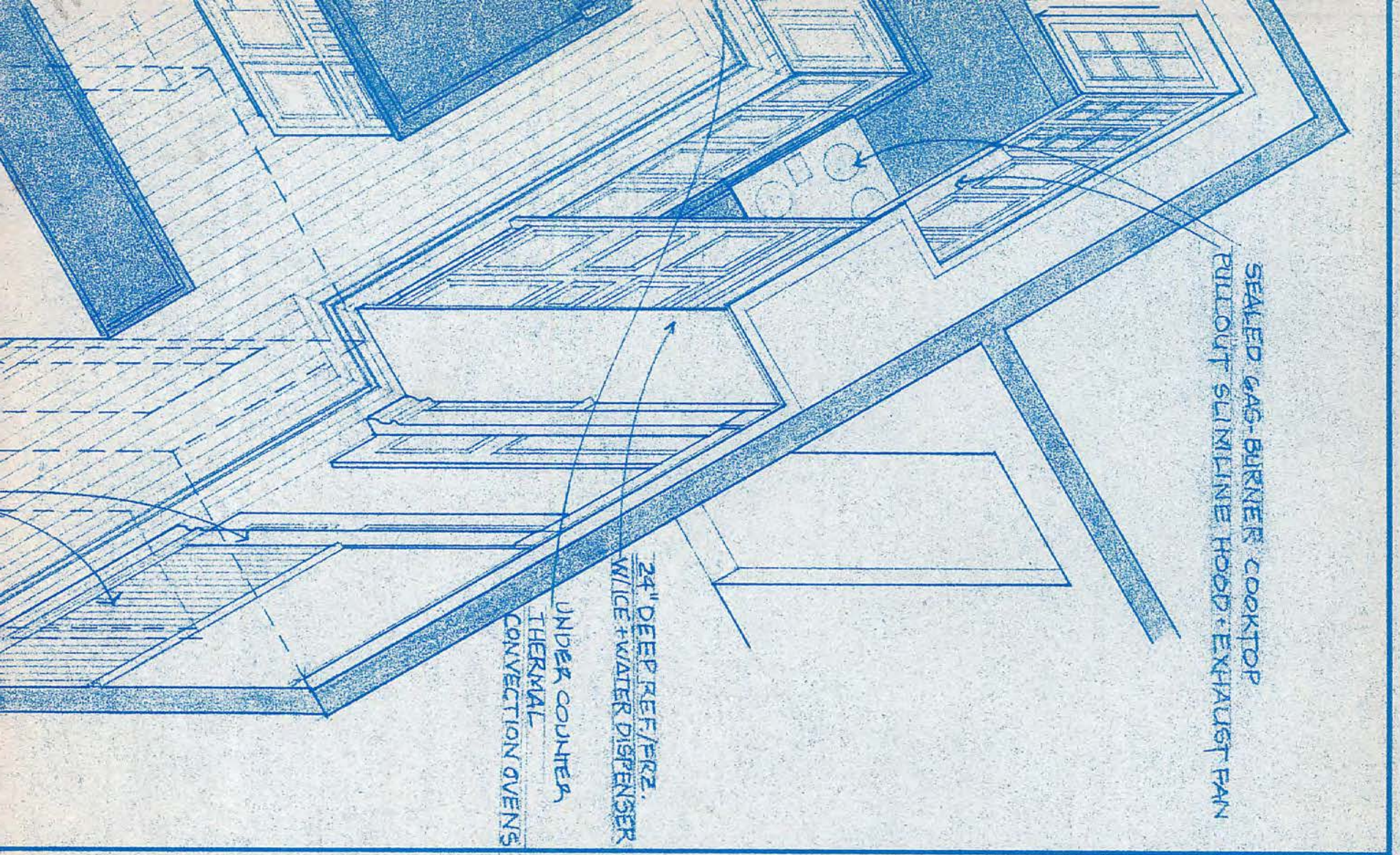
EXISTING
GROUND FLOOR PLAN
DUFFY RESIDENCE NAPA CA

1/4"=1'-0"



1 PROPOSED FLOOR PLAN


METAL CLAD WOOD EXTERIOR DOORS AND WINDOWS
UNDERMOUNT 2½-BOWL
ENAMELED CAST IRON SINK
ALL COUNTER TOPS TO BE SOLID
SURFACING W/ INLAY STRIPS
SEE DTL. #2
UNDERMOUNT
ENAMELED
CAST IRON SINK



IA

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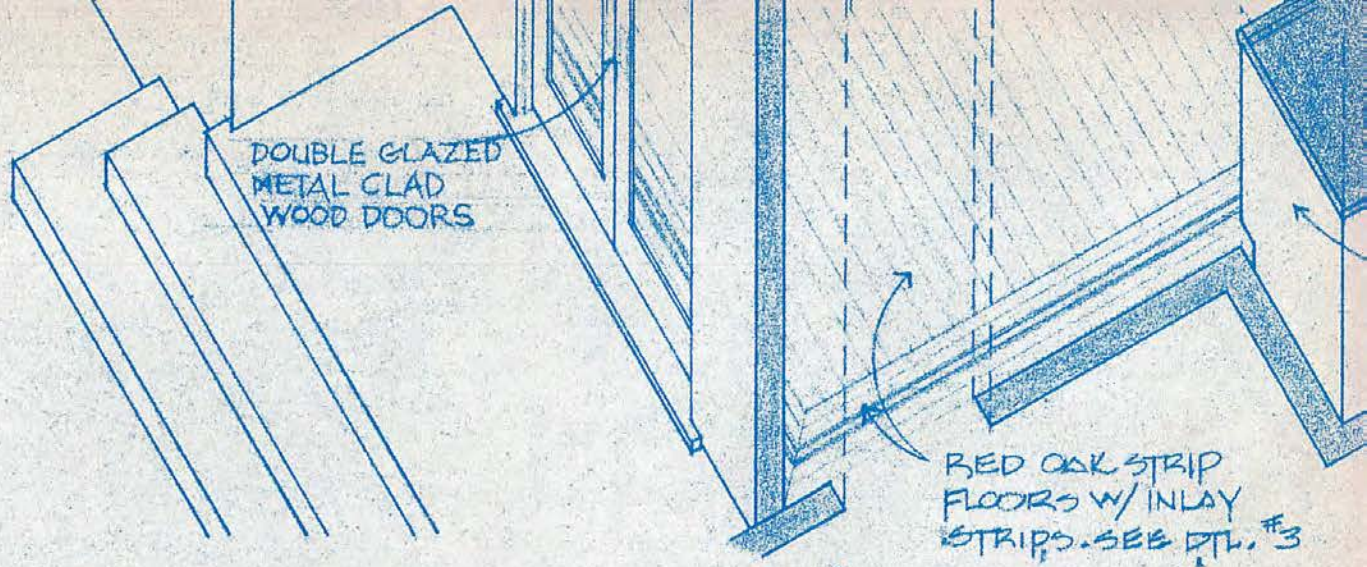
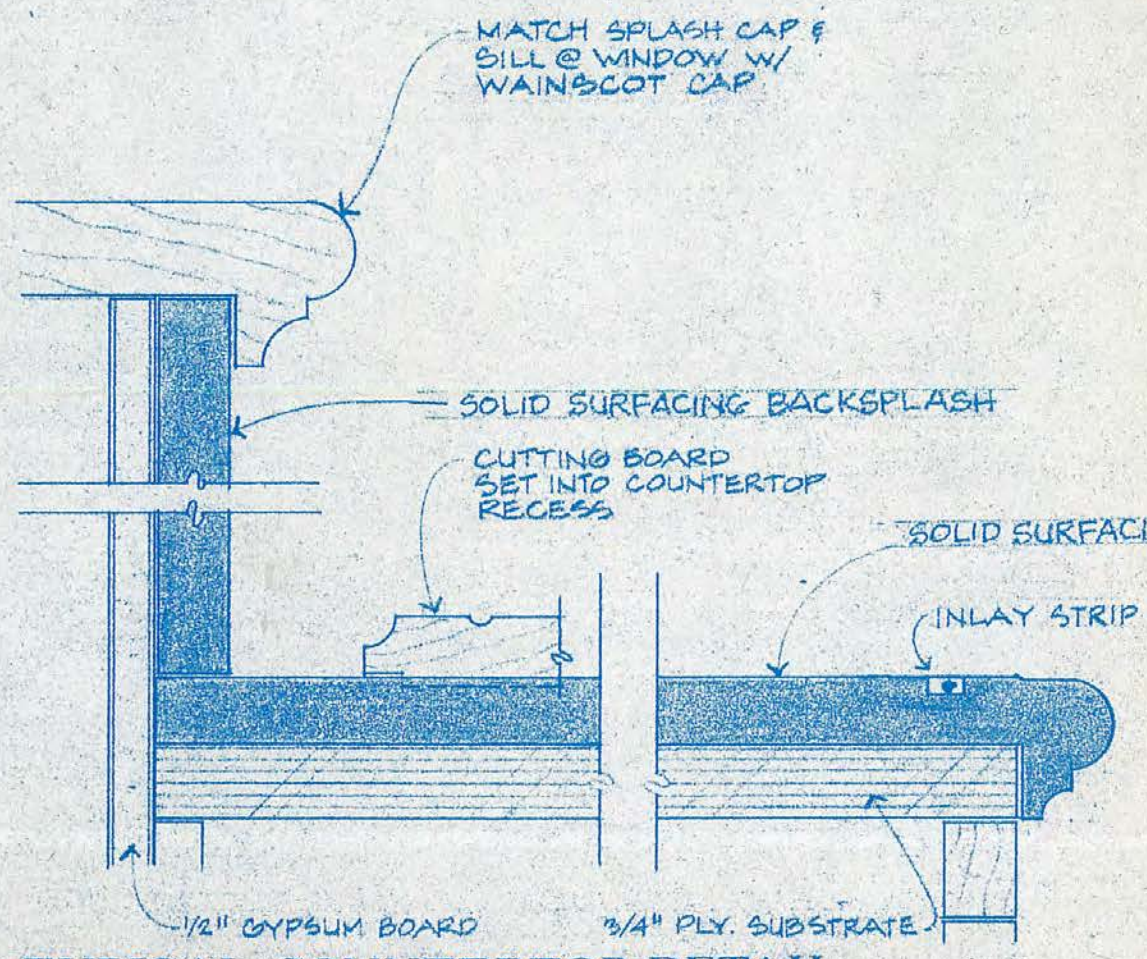


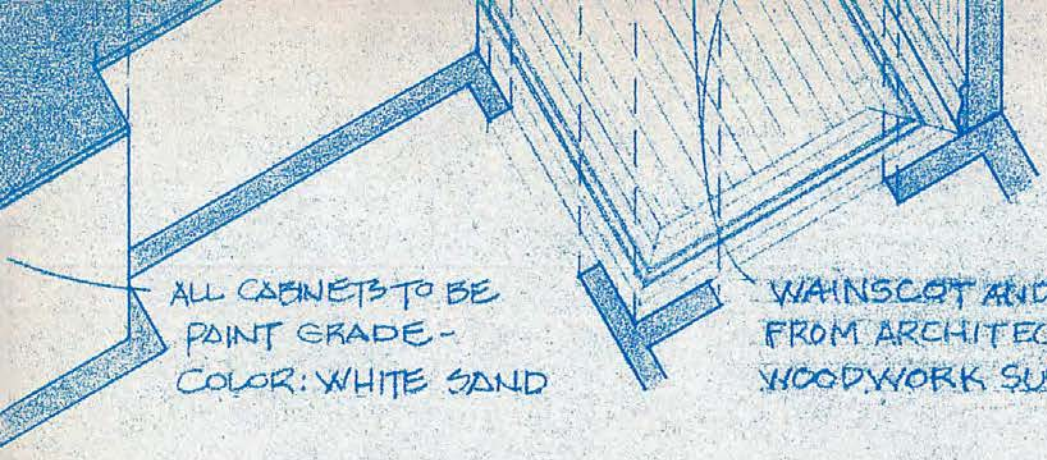
1 KITCHEN AXONOMETRIC

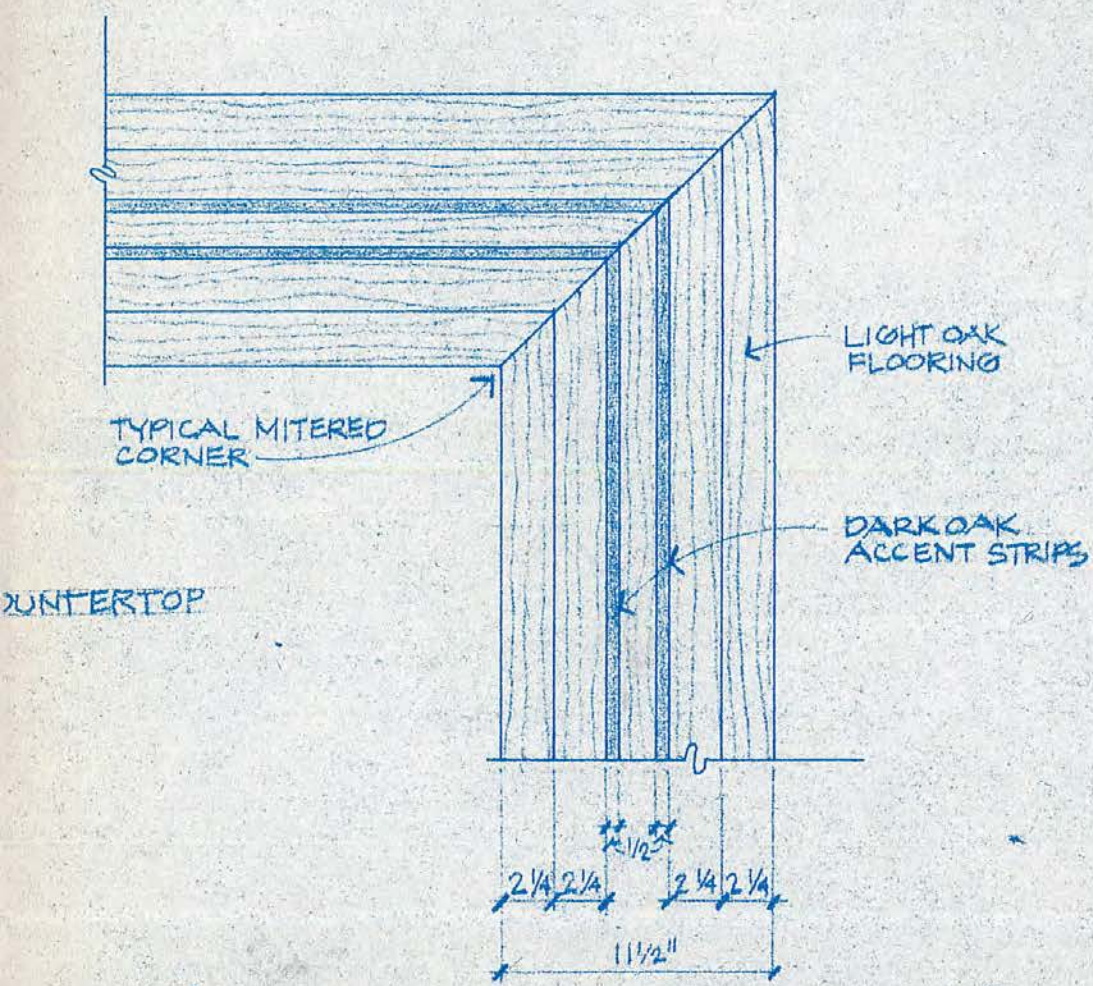
3/8" = 1'-0"



2 TYPICAL COUNTERTOP DETAIL

HALF SIZE





3 TYPICAL FLOOR BORDER DETAIL

1-1/2" = 1'-0"

DUFFY RESIDENCE

5185 BIG RANCH ROAD NAPA, CALIFORN

Date	
Scale	
Drawn	Doug Osborn
Job	
Sheet	
Of	Sheets

the finish

THE KITCHEN IS by far the most expensive room to revamp. Some contractors claim that you can recapture what you spend when you sell the house, but that is a slippery equation packed with variables, including house size, average neighborhood home prices and the homeliness of the original kitchen. Brokers say light-colored cabinets and "neutral" countertops help sell.

Careful planning is the key to cutting costs. Kitchen designers say that in the most successful renovations the planning stage lasts as long as construction. Avoid the false economy of eschewing professional advice. A good architect or kitchen designer nearly always pays for him- or herself. While a licensed architect inspires confidence, don't ignore certified kitchen and bathroom designers and others with less-imposing credentials. For his kitchen, Steve relied on the late Marilyn Ruben, a self-taught kitchen designer whose work was, as he put it, "infused with the great good sense born of many years of caring for a large and active family." (Steve gallantly confesses that the sink-in-the-maple-counter idea was his, not hers.)

Clearly, a more effective way to beat the high cost of remodeling is to have your home become a project for *This Old House*. Bills are still rolling in, but Dennis says his probable outlay—including the foundation work—will be about $130,000. That's $20,000 above his original budget, with almost all of the total going for labor. Virtually all materials—$110,000 worth—were donated.

All donations will be taxed as income for Dennis, which may mean another $35,000 out of his pocket at tax time. So *This Old House* cut his personal outlay from $220,000 to $165,000.

A few *This Old House* renovations have left homeowners shaken, even cranky, as their projects expanded beyond the original scope. Dennis believes he would have spent less had he not been chosen by the show. But the new kitchen pleases him, right down to the undercounter wine-storage unit installed by *This Old House* as a gift. "I'd do it again in a second," he says.

See Directory, on page 134, for lists and addresses

salvaging antique lumber

WOULD YOU look for lumber at the bottom of a river? If you needed choice wood for flooring or a cabinet front, would you don scuba gear? That's what George and Carol Goodwin and their crew do. Goodwin Heart Pine of Micanopy, Florida, makes a business of recovering century-old logs from riverbeds, drying and milling them, and selling the prized lumber.

Heart pine is the wood of the longleaf pine, *Pinus palustris*. These 80- to 125-foot-tall trees used to cover 40 percent of the southeastern coastal plain from Virginia to eastern Texas. Once the most common of woods, it is now so rare and valuable that it's worth the time and effort it takes to reclaim it. Salvagers remove it from old buildings or fish it by hand out of the muddy bottom of the Suwannee River, as the Goodwins do.

BY BEN LLOYD PHOTOGRAPHS BY MICHEAL P. MCLAUGHLIN

100 years ago

longleaf pines were ax cut, dragged to the river and formed into rafts 15 logs wide. The rafts were pegged together, up

to 20 at a time, and floated down the river to the mills. On the way, logs

knocked against sharp bends and scraped on shallow bottoms. Working loose from their forged iron

fastenings, they were left to sink. Those that made it to the mill floated in holding ponds; tightly crowded, some were pushed under and lay buried in silt for a century.

HEART PINE tells the story of American settlement. When European immigrants started to arrive on the eastern seaboard in large numbers, they needed food and shelter. The longleaf forests were logged and turned into farmland. As strong as steel for their weight, the long, straight timbers became beams or ship masts. The forests supplied 200 billion board feet of wood before they were depleted. Today, less than one percent of the nation's forests are replanted longleaf pine; of the original 75 to 85 million acres of old growth, less than 10,000 remain.

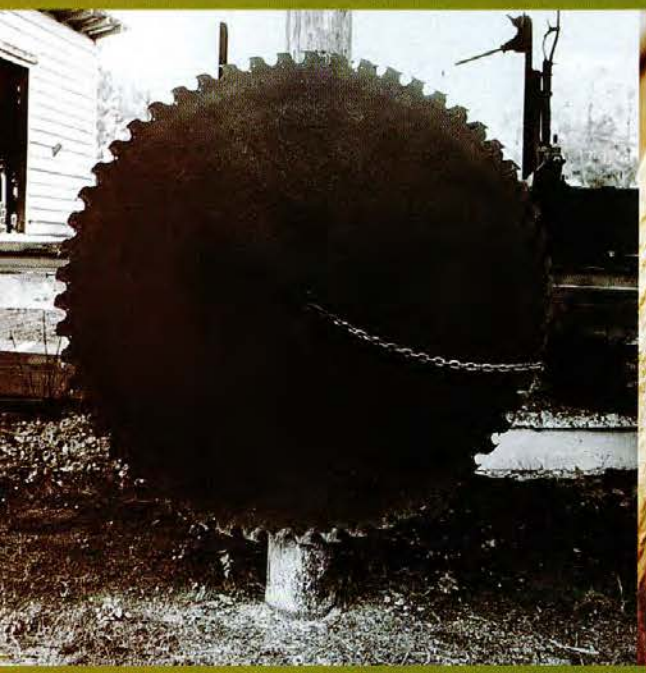
George (right) and his crew raised 800 logs in 1994.

A slow grower (it takes 30 years to add an inch in diameter), the longleaf pine is dense, long-grained and very resinous: mature trees were tapped for turpentine. The resin also resisted decay—longleaf pine served as the pressure-treated wood of its day—and helped to preserve the logs that sank to the river bottom. River currents gradually washed away the outer shell of bark and sapwood, leaving the harder heart of the pine.

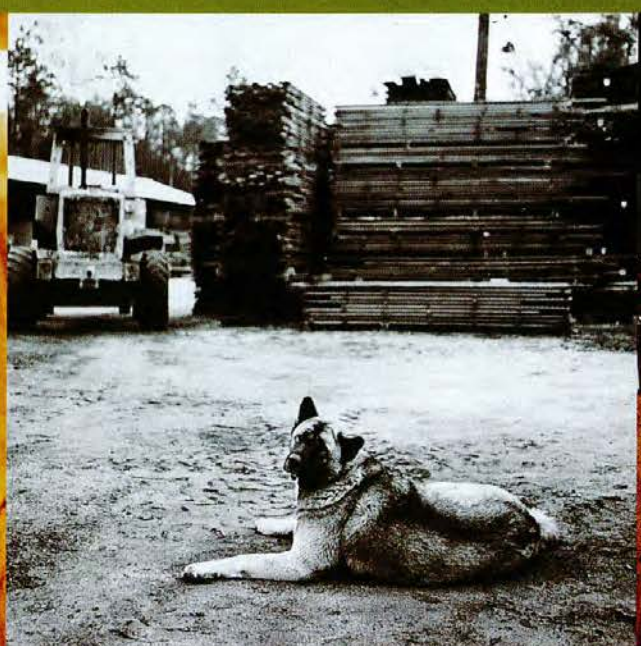
"Most of the logs that were easy to find have gone," says George Goodwin. "We have to search in deeper water these days." After divers haul them up, salvaged logs are winched onto a trailer to finish their interrupted trip to the mill.

To avoid damage to the river bottom, Rick Bennett uses only his hands and a chain to raise a heart pine log that shows century-old ax cuts at its base. On land, this 20-foot-long trunk will weigh about two tons; in the water, one man can maneuver it. Rick and the crew will hitch it to the flat-bottom barge with two-inch-thick chains for towing to a landing point.

LEFT: Rough-cut boards are air dried. MIDDLE: John Waters, sawyer; Paul Cone, supervisor; George Goodwin, boss; Chris Acker, yard hand. RIGHT: Si-Chrome alloy saw teeth.



LEFT: The 60-inch blade is 8-gauge steel and costs $3000 (without the teeth). MIDDLE: Cat-face cuts where the tree was tapped for turpentine. RIGHT: Fresh from the river.



LEFT: Resin buildup is removed to keep the blade sharp. MIDDLE: Sheba, the yard dog. RIGHT: The 1923 Yates Planer-Matcher was rebuilt at the mill by George Goodwin.

SAWMILLS were different 100 years ago; so were the cutting patterns. To produce lumber that will match boards in old homes, George Goodwin purchased an old sawmill. "I had to track down some old-timers to teach me how to use the equipment, and how to mill lumber the right way," he says. Here, a 50-year-old Frick saw cuts into a whole river log.

At the mill, the logs are checked for major flaws and cut into manageable lengths. Those that pass muster are fed through the sawmill, which can handle boards up to 24 inches wide. The boards are sorted by size and grade, and stacked outdoors for two to three months to air-dry. The boards then go into a dehumidifying kiln for 14 to 21 days of seasoning. Once the moisture content is low enough, the boards are milled into final sizes. Unacceptably large knots, splits and pitch pockets (little pools of resin) are cut out. In grading their lumber for sale, the Goodwins follow the last published standards for heart pine: from the 1924 *Lumber Men's Yellow Pine and Cypress Reference Book.*

BUYING AND USING

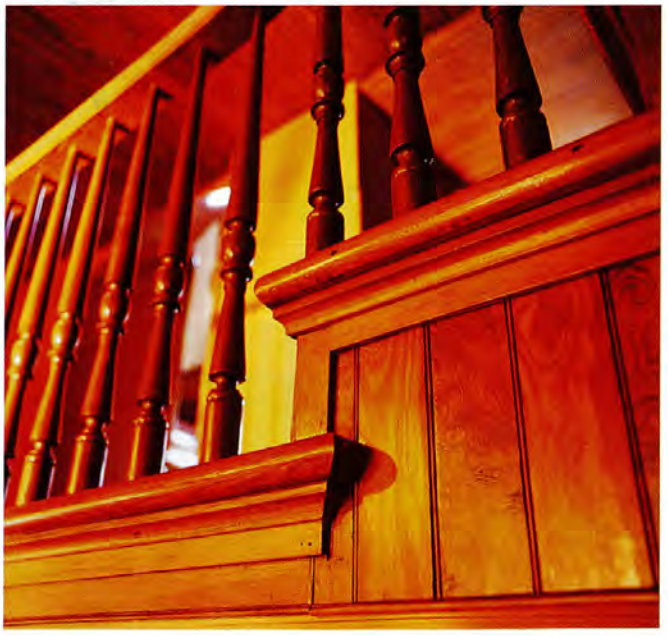
Goodwin Heart Pine sells three main grades of lumber: "select," "vertical" and "curly." The terms are confusing because they encompass both sawing technique and presence of knots. Customers who order "select" will get wood with a few tight, sound knots. Only if they specify "FAS" will even one surface be free of knots. Regardless, "select" boards will be "flatsawn" (or "plainsawn"), simply sliced from the log. Viewed on end, flatsawn boards have annual growth lines running nearly up and down at the edges and horizontally in the middle. Thus, they can cup as the growth rings straighten out. Not so "vertical" sawn boards, which account for about 25 percent of Goodwin's sales. Their growth rings run nearly perpendicular to the face, so the wood is more stable.

Most lumberyards charge about the same for a 12-inch-wide board as they would for three 4-inch-wide boards of the same thickness and length. Because its supply is limited, Goodwin charges a steep premium for wide, thick boards. Regular "select" lumber costs $3.95 a board foot for pieces 1 inch thick and 3 inches wide, but $11.58 for the same volume in pieces 2½ inches thick and 12 inches wide. Prices for "select" and "vertical" grades don't vary according to whether wood is rough, planed smooth or milled for tongue-and-groove. And the rare "curly" grade? It's $16 or more a board foot, with no choice as to knots.

HEART PINE is prime flooring material because it wears well. River-recovered logs are especially prized because they can be cut into wide boards like these 11-inch pieces. Goodwin does not center the tongue-and-groove on its flooring; this is so the thicker "half" can face up, allowing more resurfacings.

IN ITS TIME, heart pine was a utility wood, used mostly for framing, floors and boats. But now that it's rare, its attractive grain patterns and strength give it a place in furniture, cabinets and paneling. Goodwin offers a line of stair parts, including single-piece and glued-up stair treads and blanks for ballusters, rails and molding.

LEON NEEL, a specialist in applied ecological foresting, likes curly heart pine so much he paneled his living room with it. He says that the best curly pine comes from the base of the trunk.



ETC.

Recycled barns, remilled flooring from old homes, river-recovered cypress and Douglas fir: There's a world of reclaimed wood on the market. Merle Adams of Big Timberworks in Gallatin Gateway, Montana, says: "We're logging the industrial forest more than the farming forest." That means recycling beams from industrial buildings erected earlier this century. Unlike the deeply notched timber-frame barns of New England, these buildings were usually just bolted together. The wood is easy to reuse. And when a building is torn down, the supply of beams can be enormous. One obsolete mill in Longview, Washington, yielded 5 million board feet of old-growth boards and beams—and Adams' company built 50 houses with the wood. Tedd Benson, the New Hampshire timber framer, bought some. So did Jake Jacob of Resource Woodworks in Tacoma, Washington. The irony, he said, is that much of the recycled wood is coming from old mills made obsolete by the demise of the old-growth forests they once fed on. Old mill wood is a finite resource, too.

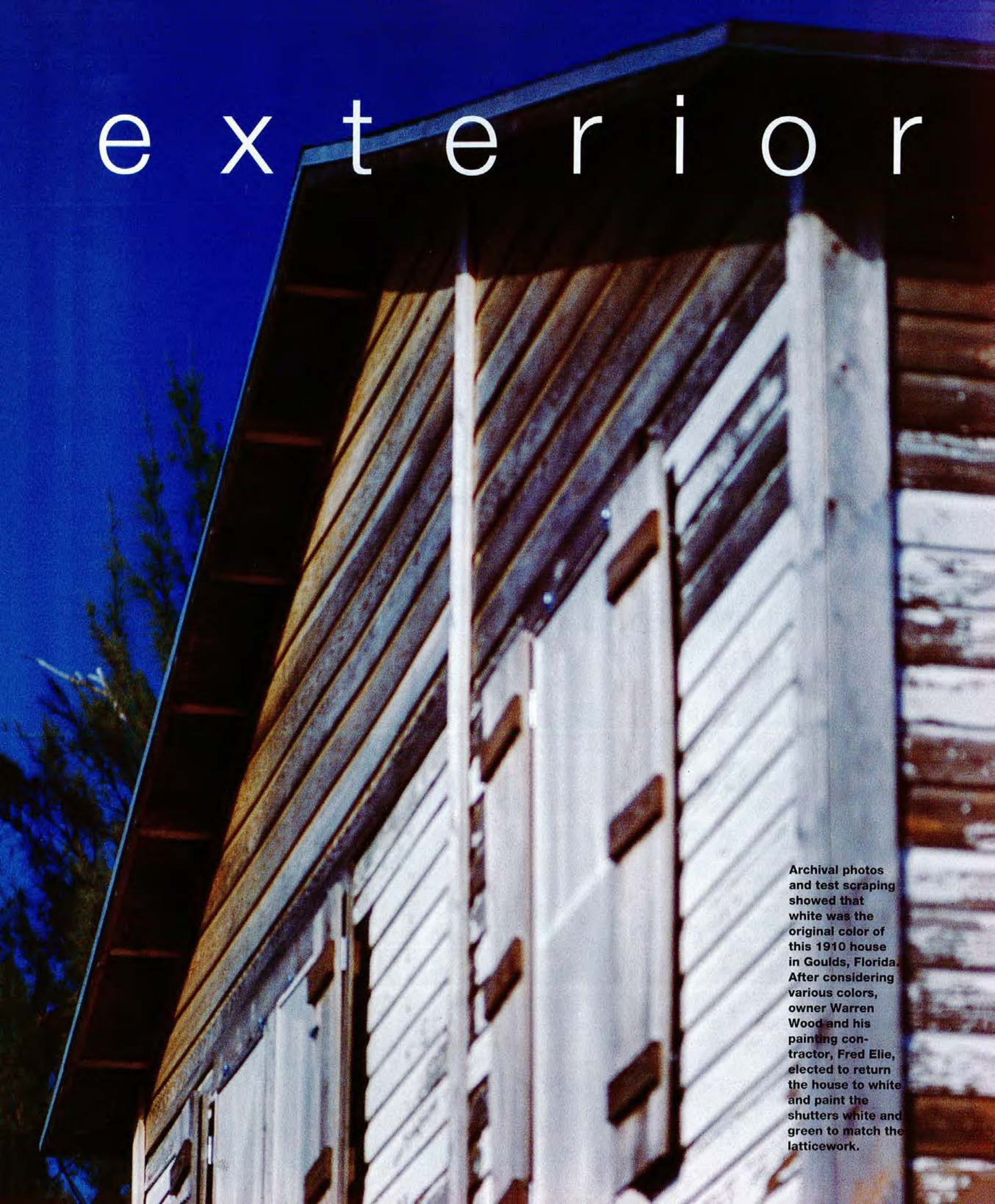
RIVER-RECOVERED logs are free of nail, screw and woodworm damage. "It's in the same prime condition it was in 100 years ago," says George Goodwin.

Curly Heart Pine

One in every 200 longleaf pine trees develops this distinctive grain; instead of lines, it runs in whorls and curls. A pattern of bumps on the log's surface tells the salvager he has found a prized curly-grain log, worth about four times as much as the others. It will most likely be sold for cabinet doors or fine furniture.

♦ *See Directory, on page 134, for lists and addresses*

exterior



Archival photos and test scraping showed that white was the original color of this 1910 house in Goulds, Florida. After considering various colors, owner Warren Wood and his painting contractor, Fred Elie, elected to return the house to white and paint the shutters white and green to match the latticework.

painting

BY JOHN S. SALADYGA

PHOTOGRAPHS BY PETER BOSCH

We tend to think of paint as a cosmetic; it isn't. A good paint job protects a house—it's a bit like wrapping the entire building in a thin, waterproof sheet. There are two simple rules to getting it right: buy the very best paint you can afford, and prepare the surface well.

The first coat of primer, a water-based stain blocker with mildew retardant additives, was applied with a four-inch nylon bristle brush. The paint goes on across the grain and is brushed out with the grain; the painter works from one small area to the next, fast enough to let the primer work into the surface before it sets and cures. The first coat makes small cracks, nail heads and other imperfections more visible. After they're filled with glazing compound and sanded down, a second primer coat will go on, to be followed by two top coats.

1. The shutters were removed and **POWERWASHED** with 3 parts water and 1 part bleach. The powerwasher delivered 1,500 to 3,000 pounds per square inch (psi) of pressure, enough to remove dirt, mildew and chalking (the dry film on the surface of old oil paint). More than 2,000 psi will strip paint, but can also gouge wood and break windows.
2. The clapboard was also powerwashed, with the spray angled downward to stop water from getting underneath the boards. The wood was left to **DRY** for two days.

3. A hook **SCRAPER** was used to remove most of the loose paint. In spots where the old wood was uneven, Fred used a putty knife: easier to control and less likely to scrape the wood itself.

7. Paint **SPRAYERS** provide coverage four to five times faster than brushes. But the finish tends to be uneven, and even with the "airless" versions half the paint drifts away. Fred used an airless sprayer with an adjustable tip to apply primer in hard-to-reach spots, following with a brushed-on top coat.
8. The sprayer is unbeatable for coverage on latticework and other intricate surfaces. Fred applied very thin multiple coats, allowing the paint to dry slightly between **LAYERS.**

9. Before spraying, the acrylic latex paint was thinned with about 10 percent water and strained to remove any debris that might **CLOG** the sprayer's nozzle. Clogs still occurred, and the sprayer's nozzle had to be disconnected and cleaned every two hours.

4. Next, a **WIRE BRUSH** was used to remove any remaining particles of loose paint. Glossy patches of sound paint were sanded to a dull finish; thick spots were tapered or feathered. All loose or cracked caulking was also removed.

5. After the first coat of primer went on, door and window surrounds and joints were filled with a siliconized acrylic latex **CAULK.** Hidden cracks—under windowsills and beneath clapboards, for example—were caulked to prevent drafts.

6. A bead of caulk was run into each joint, then smoothed with a wet finger; excess was wiped off with a damp sponge. Popped nails were countersunk; scrapes and holes **FILLED** and sanded. The surface was mopped with damp cloths and tackcloth to remove dust.

10. The newly painted shutters were rehung and **TOUCHED UP** with a three-inch brush. The painters "followed the sun" as they worked, avoiding direct sunlight, then painting as the surface cooled.

11. Before work began, heavy **PLASTIC** was taped over all the screens and windows, and drop cloths were laid on the ground. By the end of the job, the plastic was coated with dust and paint spatters.

brushes

For coverage, penetration and finish, brushes are best. For faster application, rollers can be used—a sprayer for tricky situations—but both still should be followed by brushing. Most paint jobs can be handled with just three kinds of brushes:
1. A three-inch straight-edge siding brush.
2. A two-inch angled sash brush.
3. A two-and-a-half-inch straight-edge trim brush.
Good brushes of any size have long bristles with chiseled (tapered) ends and flagged (split) tips. The kind of bristle depends on the paint: natural bristle (hogs' hair is best) may absorb water from latex paints, ruining the brush, so they should be used only for oil. Some nylon and polyester do not release oil paint uniformly, so these should be used only for latex.

House paint made before 1978 is likely to contain lead. Have yours tested professionally (home test kits are unreliable). The National Lead Information Center, 800-LEAD-FYI, or the National Lead Information Clearinghouse, 800-424-LEAD, can provide commonsense advice.

♦ *See Directory, on page 134, for lists and addresses*

Paint Test

Paint is pigment and binder dispersed in a liquid, such as water or mineral spirits. Binders for oil-based paint can be linseed oil, alkyd (a synthetic resin) or tung oil. Latex paints use acrylic, styrene-acrylic or vinyl acrylic binders. Until recently oil paints were superior to latex; that's no longer true. Laws aimed at reducing volatile organic compounds (VOCs) in the air have forced manufacturers to reformulate oils and alkyds; meanwhile, latex manufacturers have improved *their* formulas. Tests conducted over the last eight years at the U.S. Department of Agriculture's Forest Products Laboratory in Madison, Wisconsin, show oil paints cracking, peeling and flaking sooner than acrylic latex under the same conditions. We still use an alkyd primer over new, bare wood (the resins help preserve the wood), but choose acrylic latex to prime old surfaces and for all top coats.

The better the paint, the higher the ratio of pigment and binder to liquid and additives. But paint manufacturers do not list ingredients on their labels, so consumers must use a rule of thumb: the more expensive the paint, the better. This pine board was given two coats of three different paints from the same manufacturer: the most expensive paint is at left, the bargain paint at right. The board was exposed to all weather climates for two-and-a-half years at Rohm and Haas' Paint Quality Institute outside Philadelphia. The results are obvious. Since labor is the most expensive part of a paint job, it makes sense to invest as much as possible in the paint itself. It can mean the difference between a paint job that lasts two years and one that lasts ten.

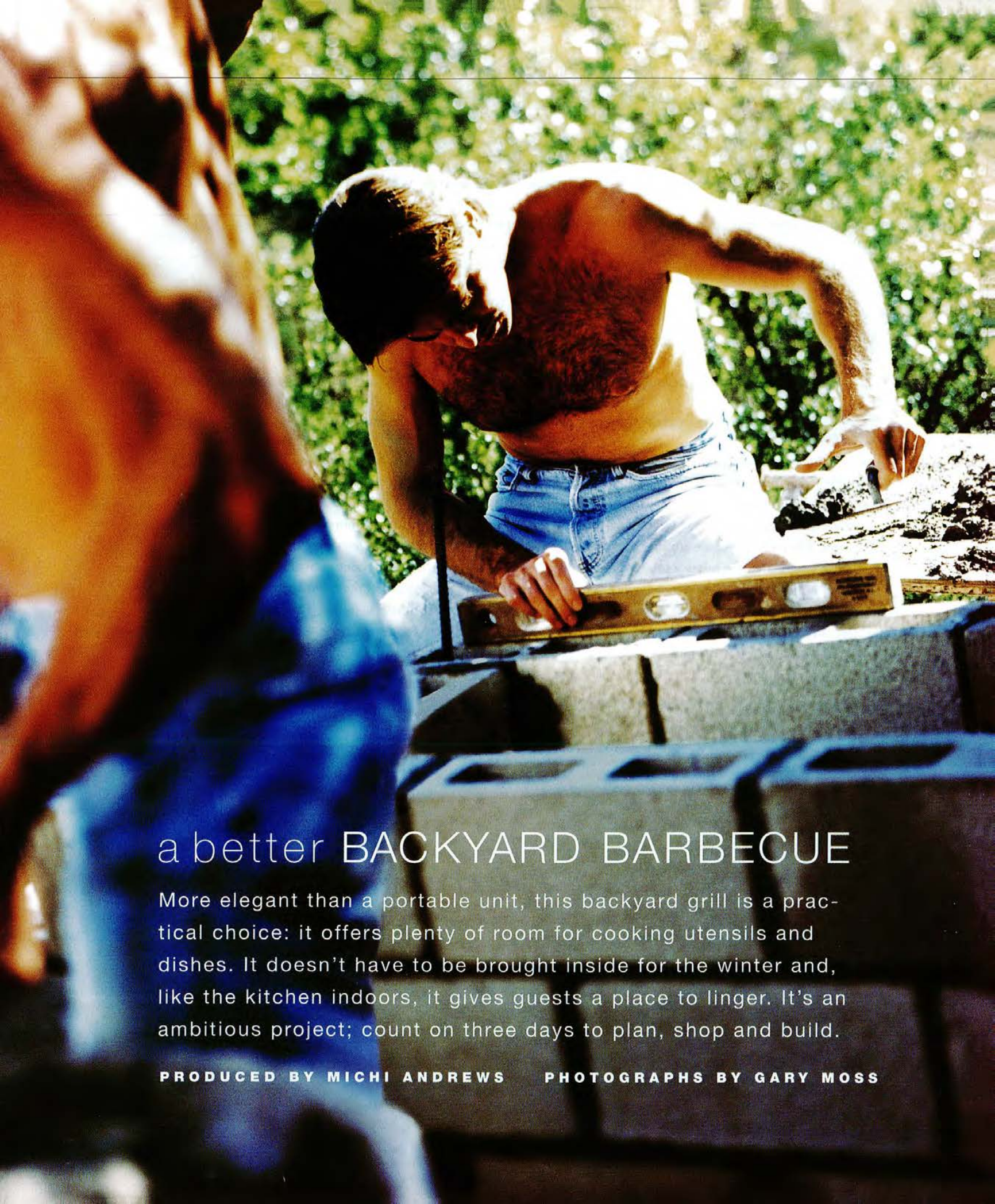
PHOTOGRAPHS BY DARRIN HADDAD

THE HURRICANE

ON AUGUST 23, 1992, Hurricane Andrew made landfall three miles away from Warren Wood's house in Goulds, Florida. The closest wind gauge recorded 120-mph gusts before it was destroyed. Warren estimates that at the peak of the storm, which lasted from 3:50 am to 6:45 am on the 24th, winds reached 200 mph. He sat it out with "three friends, two birds, three dogs and a bottle of vodka. We stayed upstairs until the windows were blown in, then we moved downstairs." By the time Andrew moved on, the pitched roof and gables had gone, the upstairs ceiling had been sucked out, blown 300 yards and dropped in an avocado grove, and rain had soaked through the first-floor ceiling. At least 250 trees on Warren's 15-acre property were damaged; the 60-foot Casuarinas that lined his driveway were all 10 to 15 feet shorter. When the insurance adjuster arrived two weeks later, he declared the house a total loss and told Warren to "bulldoze it, torch it, do whatever I wanted." Warren adds, "My friends said I should total it and start over, but I just couldn't do that." Built in 1910 of Dade County pine, the house is a good example of the Florida Pioneer style. In its 85 years, it's only had two owners: the builder—a cut-flower grower—and Warren, who bought the house in 1979 and operates a tree nursery on the grounds. After the storm, Warren rented out the ruined house as a location for the movie *Ace Ventura Pet Detective* (it plays the villain's birthplace), and then spent two-and-a-half years restoring it. He did much of the work himself, along with Brian Pollard, a Michigan-based carpenter who specializes in Victorian restorations, and a helper. "I made it better than it was before Andrew," says Warren. "I like old things. This house suits me."

THE COST

Warren got $100,000 for the house and its contents from his insurance company, and $42,000 from the Florida Historical Society ("the best organized, most intelligent bureaucracy I had to deal with"). A contractor estimated restoration of the house at $230,000. By acting as his own contractor and doing much of the work himself, Warren fixed up the house for $120,000. Painting, which cost $2,700, was the last step.



a better BACKYARD BARBECUE

More elegant than a portable unit, this backyard grill is a practical choice: it offers plenty of room for cooking utensils and dishes. It doesn't have to be brought inside for the winter and, like the kitchen indoors, it gives guests a place to linger. It's an ambitious project; count on three days to plan, shop and build.

PRODUCED BY MICHI ANDREWS **PHOTOGRAPHS BY GARY MOSS**

DESIGN YOUR OWN

Our streamlined design features a concrete block skeleton, hidden by a veneer of manufactured stone. First steps: Check local building and fire codes and buy a grill or drop-in barbecue unit. Adapt our plan to your site (and your grill); make a rough sketch. Shop, using the materials list on page 102 as a guide. Pile up concrete blocks to test the design. Mark the perimeter and dig the foundation hole. Pour the concrete using the excavation edges as a form. (In Southern California, a 6-inch slab was sufficient, with its top just below ground level.) Next day, lay blocks. Test mortar consistency by scraping a furrow. If the sharp edge holds, it's right. Check level frequently.

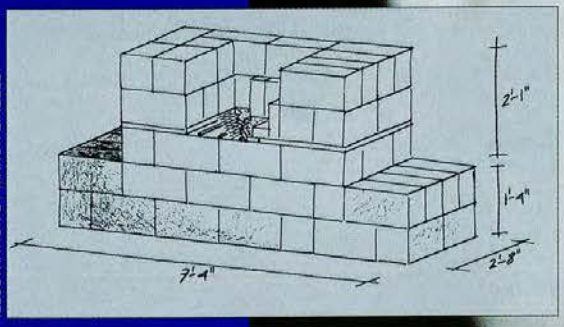
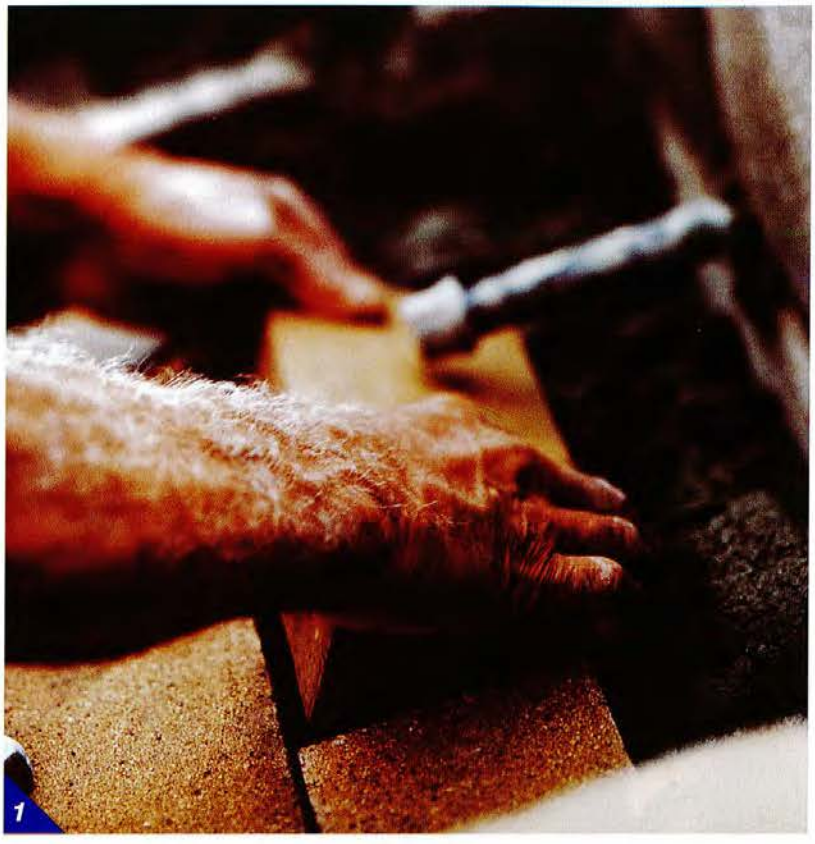
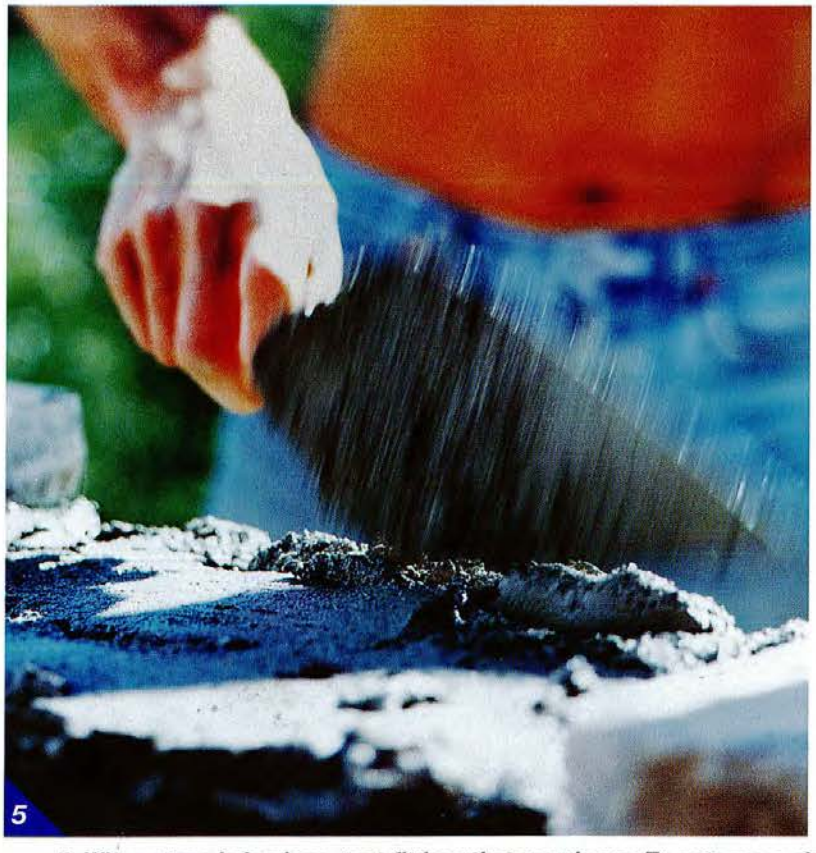


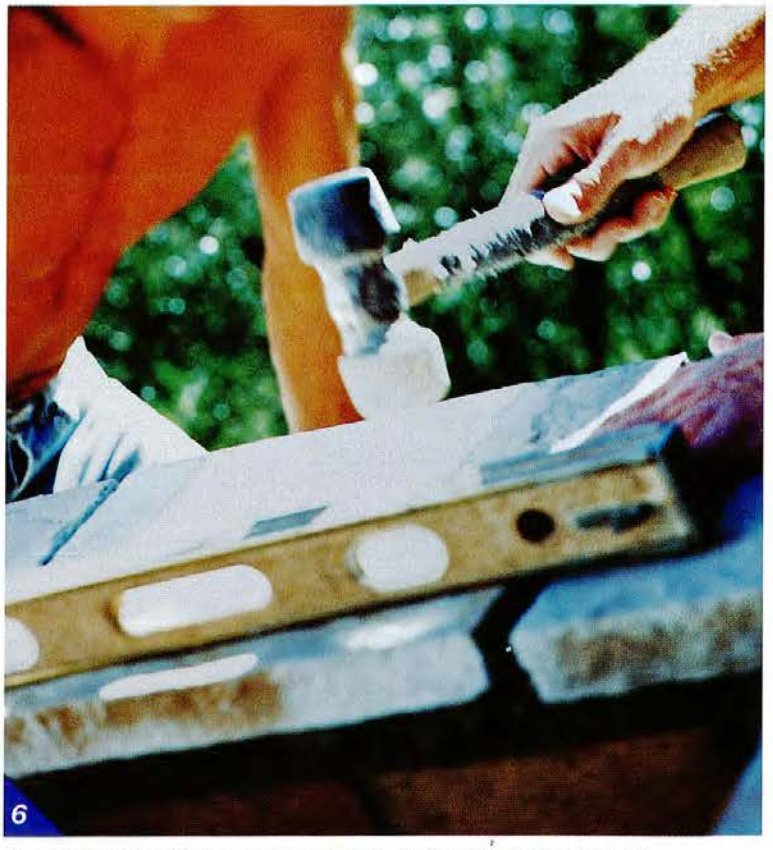
ILLUSTRATION BY MANON ZINZELL

Scrape off excess mortar, but don't worry; this work will be hidden. To support a firebox, lay four pieces of No. 4 rebar across blocks from front to back through mortar; cover with wire mesh.

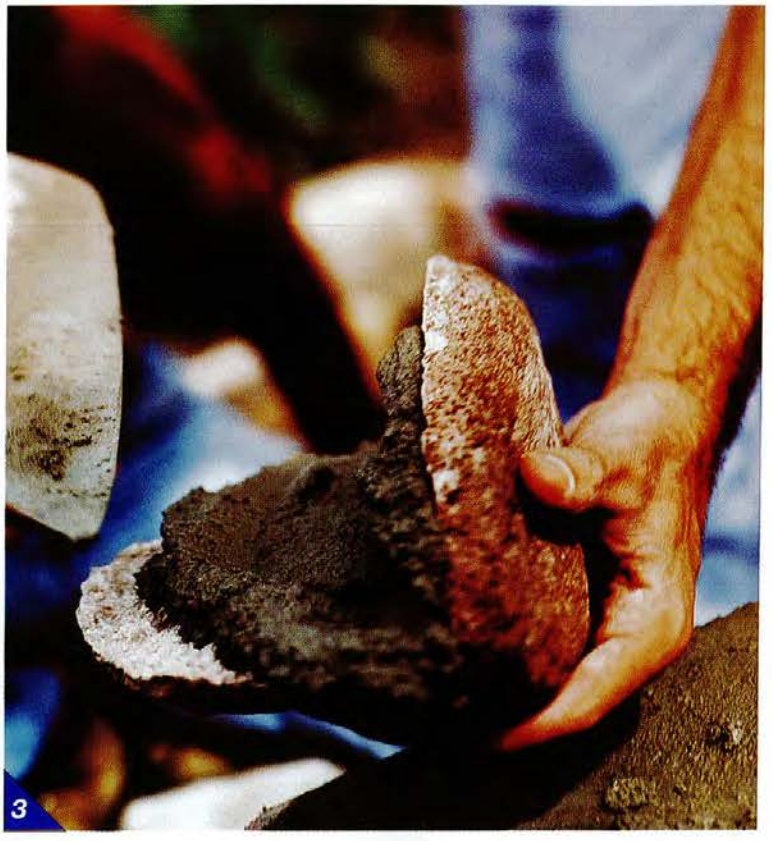


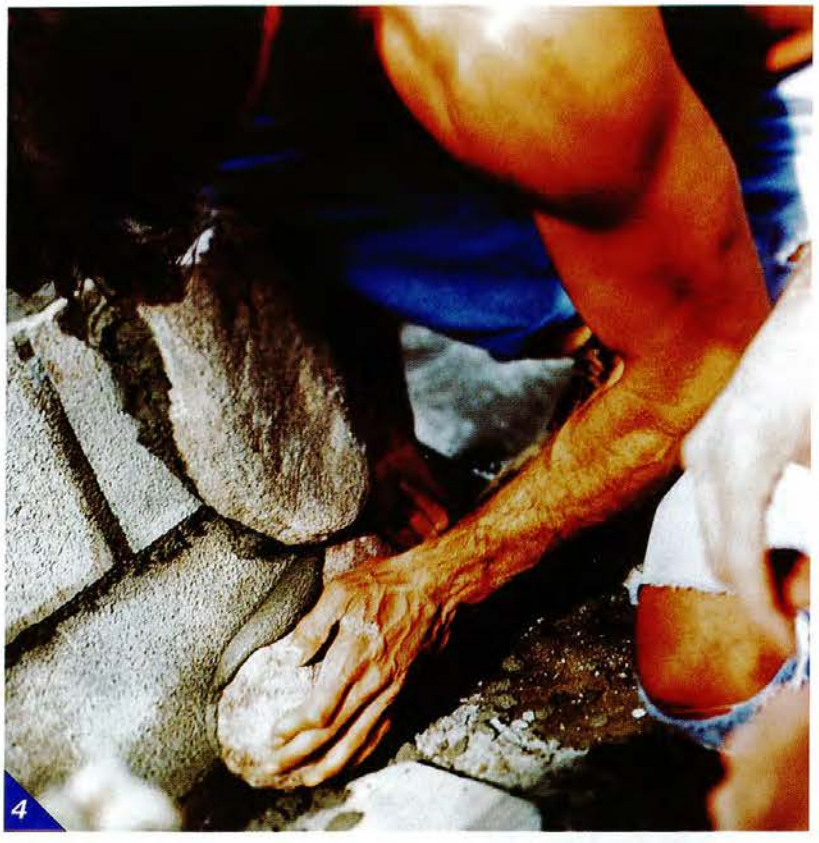
1. The final day of work begins. Line cooking pit with thick layer of mortar, then set in firebrick made of aluminum silicate clay, which resists high temperatures. Across bottom, bricks are tightly butted and laid in without mortar. 2. Up the sides and back walls, mortar holds the firebricks in place. First, coat their backs with mortar; place bricks close together—¾ inch maximum—and then fill spaces



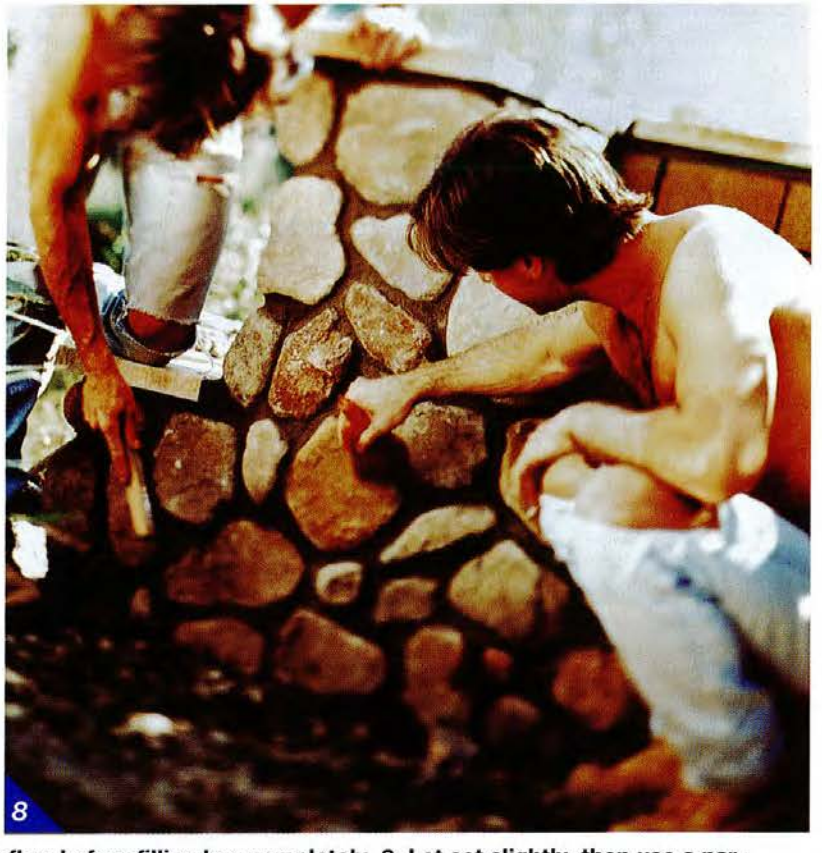


5. When stone is in place, test-fit hearthstone pieces. To cut, use a circular saw with a Carborundum blade. Before installing hearthstone, dump grout (runny mortar) down holes in blocks until full. Layer on a uniform bed of mortar, then set the slabs in place. 6. Use a rubber mallet to seat and level slabs. 7. Pointing between stones is applied with a mortar bag, which looks like a giant cake frosting





with mortar. Make sure they're level and neatly trowel off excess. 3. Begin installing stone veneer on corners, starting at top and working down so the most irregular edge will be hidden in grass or dirt. Butter backs with mortar and press firmly into place. 4. Make narrowest spaces between pieces fairly consistent at ⅜ inch. Don't worry about filling voids with mortar; that comes later.



tube. For smooth flow, add a bit of extra water to mortar. Test the flow before filling bag completely. 8. Let set slightly, then use a narrow trowel, called a tuck pointer, a gloved finger or a small stick to smooth mortar between stones. In about an hour, clean rock faces with a nonabrasive bristle brush. If mortar clumps on bristles, wait longer. Wait at least a week, then light the first fire. Celebrate.

THE MATERIALS

Dimensions of concrete blocks are specified in order of width, height, length; masons (they're mostly men) use the saying "Women Have Legs" to remember that order. Dimensions include a ⅜-inch mortar allowance. Flat pieces of manufactured stone veneer are sold by the square foot, corners by the linear foot.

We mixed concrete from scratch, using one part cement to two parts sand and three parts pea gravel. Mortar was one part plastic cement (it has lime and other additives) to three parts sand. Concrete and mortar mixes are also sold by the bag; all you need to add is water, which should not be salty or dirty.

WHAT WE USED:

3 bags Portland cement
2 bags plastic cement
1 ton washed masonry sand
½ ton pea gravel
69 concrete blocks, 8x8x16 inches, plus 2 half-blocks (Break with brick chisel.)
4 pieces No. 4 rebar, each about 30 inches long
1 piece wire mesh, 24 by 30 inches
60 square feet manufactured stone veneer, flat pieces (We used Earth Blend River Rock from the Stone Products Corp.)
15 linear feet manufactured stone, corner pieces
21 square feet hearthstone (We bought 9 19x20–inch pieces of Cultured Stone's Blond Driftwood.)
60 firebricks, each 4x2x9 inches
Custom grill, 24¾ by 18 inches, on 11-inch supports

TOOLS NEEDED

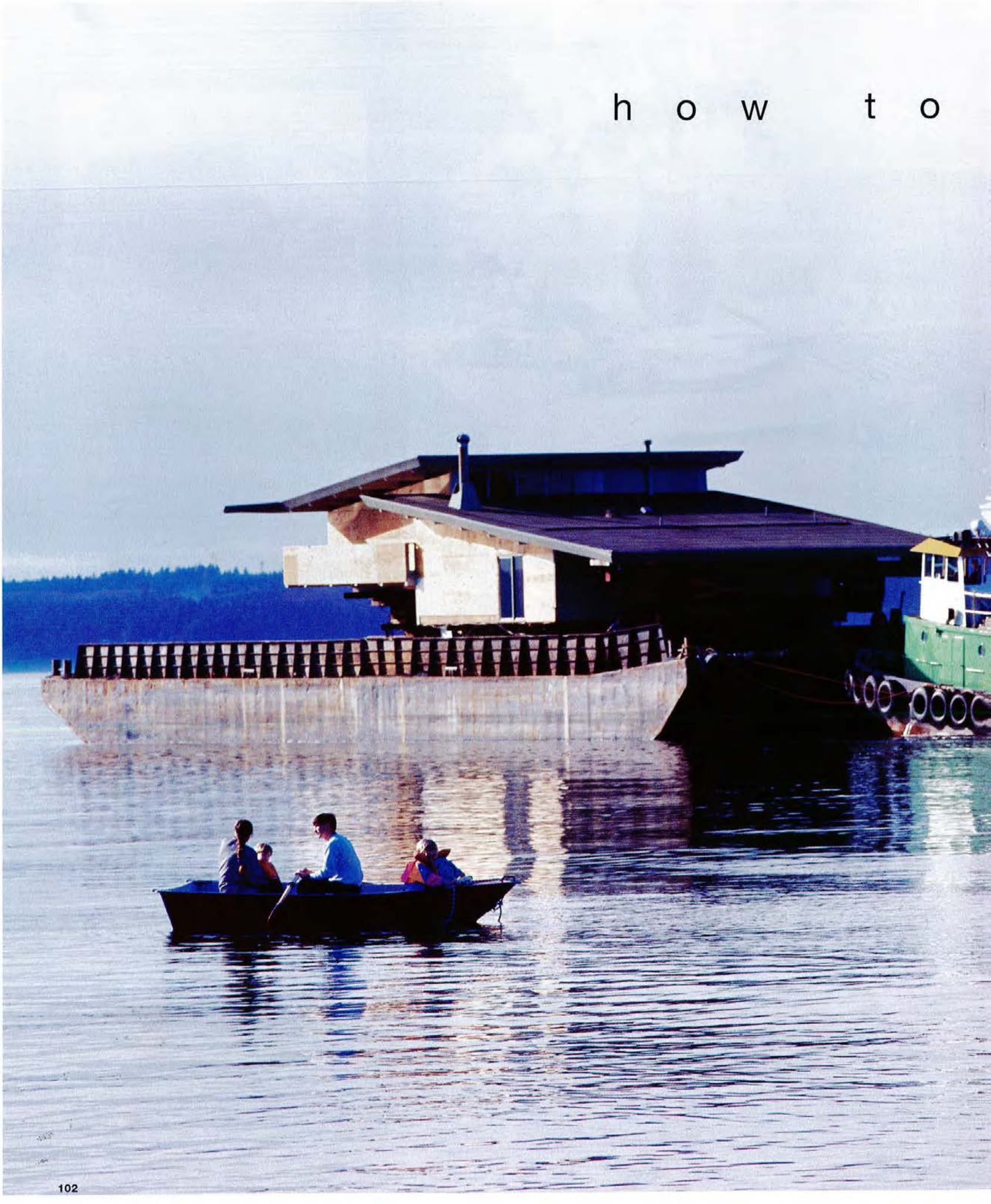
Portable cement mixer (can be rented, or you can mix by hand)
Wheelbarrow and shovel
Trowel
Tuck pointer (or small stick)
2-, 3- or 4-foot level
Nonabrasive bristle brush
Rubber mallet
Medium-size mortar bag

GAS GRILL

Drop-in barbecue units add versatility—and complexity. They usually mean running utility lines, a step almost sure to require a building permit. The drop-in gas grill shown here has a rotisserie and smoker cover. Similar units allow height adjustments for cooking over briquettes. For wood fires, skip the drop-ins and go for a simple grill. Ours was custom made; we have also used old oven racks successfully.

♦ *See Directory,* on page 134, *for lists and addresses*

h o w t o



s a i l a h o u s e

WHEN MIKE ROBBINS heard that Karen and Bill Steele wanted to get rid of a house in Normandy Park, Washington, so they could build on the site, he was skeptical. A second-generation house mover, Robbins knew that only one in ten houses is worth moving. But when he saw the Steeles' custom-built, 2,000-square foot, 1960s contemporary, he liked it enough to want to live in it.

Mike offered to buy the house for a dollar; the Steeles accepted. They couldn't stand the thought of tearing down a perfectly good house and tossing it in a landfill. And with demolition estimates running from $20,000 to $30,000, Mike's offer was too good to pass up.

Robbins and his six-man crew spent almost a week removing basement insulation and ductwork, disconnecting the plumbing, punching holes in the foundation and inserting wide-flange steel I-beams 20 to 64 feet long to support the house en route. They popped the house off the foundation with six 25-ton hydraulic jacks, then rested all 80 tons of it on cribbing—stacks of solid 6x8 timbers.

On moving day, this past January, the crew placed the house on three 70-ton capacity dollies and hauled it down to a waiting barge using three 80,000-pound capacity, truck-mounted winches. When high tide lifted the barge clear, the house began a 20-mile, tug-powered trip across Puget Sound. At its new site, a 40-foot bluff near the community of Gig Harbor, it will be hoisted into place by a 400-ton, barge-mounted crane.

Mike paid $115,000 for the land, with its view of the Sound. He estimates the move will cost about $30,000 (a customer would pay $50,000, he says). It was money well spent. He says local real-estate brokers now appraise his home on its new site at $400,000. Not bad for a one-dollar house.

Photograph by **John Patrick Salisbury**

long-lived trees

WHAT CAN YOU DO THAT WILL LAST A THOUSAND YEARS?

AT MIDDLETON PLACE, near Charleston, South Carolina, there's a live oak tree that was 750 years old when this garden was begun in 1741. Consider: this tree was alive 500 years before Columbus dreamed of a New World.

There's something magical about long-lived trees. We love them and we respect them. But do we plant them? For a century, we have filled our yards and parks with decorative small trees like Japanese cherries, Asian dogwoods and crab apples. Foresters, meanwhile, have concentrated on fast-growing species that can be harvested quickly. And the grand old specimens? Middleton Place's oak is cherished, but other estate trees have been cut down for subdivisions. Even California's giant redwoods are threatened.

Imported pests and disease also take their toll—Dutch elm disease, hemlock, woolly adelgid, chestnut blight. Road salt kills nearby sugar maples. Imported trees die young because they aren't adapted to North America's extremes of heat, cold and drought. European beeches, for example, live 300 years or more in England, but only 100 to 150 years here. And some of the most majestic native trees are simply dying of old age.

The trees we grew up with will soon be gone; unless we plant new ones, the impact will be more than aesthetic. Long-lived native trees are the backbone of a local habitat—and the microclimate. Planting them is an investment that will pay great dividends for our descendants.

PHOTOGRAPH BY RAYMOND MEEKS

TWENTY-ONE TREES FOR THE NEXT MILLENNIUM

ZONE 2

Engelmann's spruce

PICEA ENGLEMANNI

Native to the Rockies and the Cascades, this conical blue evergreen has high wildlife value. Drought and heat resistant, but subject to wind damage. Grows 100 feet tall, 35 feet wide. Lifespan: more than 500 years.

Colorado spruce

PICEA PUNGENS

Blue-green evergreen with the classic Christmas-tree shape. Native to the central Rockies, it's a slow grower, reaching 100 feet. Lifespan: more than 400 years.

ZONE 3

Alpine fir

ABIES LASIOCARPA

Another Cascades-Rockies native, this narrow evergreen spire grows to 100 feet. It is shade-tolerant, and a good choice for a wide range of soil conditions (except flood areas). Lifespan: 250 years.

American beech

FAGUS GRANDIFOLIA

Shade-tolerant tree with dense foliage that turns golden brown in fall and lasts during winter. Native from Minnesota through the Appalachians, it grows to 100 feet. Lifespan: 300 years.

northern red oak

QUERCUS BOREALIS

Common from the Mississippi to the East Coast, this oak is a particularly good choice for urban areas—it's tolerant of pollution, and easy to transplant. Grows 100 feet tall—and just as wide. Lifespan: 300 years.

Canada hemlock

TSUGA CANADENSIS

Shaggy, shade-tolerant conifer from the forests of the eastern United States. Left alone, it grows to 100 feet tall and 50 feet wide, but it can be pruned as a hedge or into shapes. Lifespan: 400 years.

red maple

ACER RUBRUM

If you live in the South but miss autumn color, plant a red maple. It tolerates heat, and even flooding, and grows happily from Maine to Florida. Grows 120 feet tall, in a nice lollipop shape. Lifespan: 150 years.

sugar maple

ACER SACCHARINUM

A prairie native, this is a fast-growing maple. Its handsome, three-pronged silver leaves don't cast much shade. Grows over 100 feet. Lifespan: 125 years.

eastern white pine

PINUS STROBUS

This asymmetrical, long-needled conifer usually tops out at 100 feet. It has particularly high food value for birds and small mammals. Lifespan: over 500 years.

American plane tree

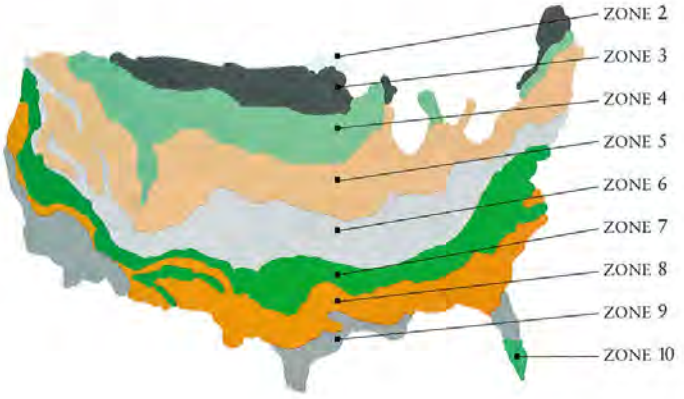
PLANTANUS OCCIDENTALIS

Another good winter landscape tree: when bark sloughs off, it reveals a smooth celadon green and buff trunk. Grows to 100 feet. Lifespan: 350 years.

eastern black walnut

JUGLANS NIGRA

This familiar, stately tree, with divided leaves that turn bright yellow in the fall, grows 150 feet tall and wide and is found in parts of South Carolina, Oklahoma, Kansas, Michigan, Texas and other states. The nuts are a delicacy and the wood has long been valued for fine carpentry work. Lifespan: about 150 years.



THE SITE

Most long-lived trees grow tall enough to be a major feature in the landscape. Their roots extend far beyond the drip line, so they must be planted well away from foundations. If your property is less than a quarter of an acre, consider planting a long-lived tree in a public place. More and more towns and villages have programs that encourage planting in parks, playgrounds and other public areas. (My editor just planted a pair of red oaks in front of her town's library, for example.)

ZONE 4

bitternut hickory

CARYA CORDIFORMIS

A deciduous tree with a rounded form, it ultimately grows as wide as it does tall: 100 feet. An eastern native, it is tolerant of a wide soil range. Leaves turn a glorious gold in fall. Lifespan: 200 years.

shagbark hickory

CARYA OVATA

This midwestern and midatlantic woodlander has picturesque, peeling black bark that looks great in a winter landscape. Shade, heat and drought tolerant; doesn't take to uprooting, so plant a young one. Will grow to 100 feet. Lifespan: 250 years.

ponderosa pine

PINUS PONDEROSA

This evergreen offers food and shelter to birds and small mammals. A western native, it needs sun, stands droughts. Grows over 200 feet. Lifespan: 350 years.

white fir

ABIES CONCOLOR

A dense evergreen, native to the west. Provides food and shelter for wildlife; an exceptional specimen for large landscapes, grows to 100 feet. Lifespan: 300 years.

ZONE 5

northern catalpa

CATALPA SPECIOSA

This deciduous midwestern tree has huge leaves, cigar-shaped fruit and white foxglove-like flowers that bloom in summer. Fast growers, catalpas can reach 100 feet but take severe pruning in stride. Lifespan: about 100 years.

common bald cypress

TAXODIUM DISTICHUM

It looks like a needled evergreen, but is actually deciduous, with pretty purple or orange fall color. Native to the swamps of the Midwest and Florida, this tree is so adaptable it even works as a street tree. Grows more than 100 feet tall. Lifespan: 400 to 600 years; can age to 1,200 years.

ZONE 6

American sweet gum

LIQUIDAMBAR STYRACIFLUA

Native to the central-eastern states, with spectacular fall color: leaves turn purple, yellow and red. Grows to 100 feet. Lifespan: 150 to 300 years.

ZONE 7

bur oak

QUERCUS VIRGINIANA

A massive evergreen, growing 80 feet tall and as much as 100 feet wide. It has excellent wildlife value, as do all the oaks. Lifespan: 200 to 300 years.

ZONE 8

California live oak

QUERCUS AGRIFOLIA

This is the tree you see covering sandy hillsides in coastal California. Low and scrubby, it can spread up to 80 feet wide. It is exceptionally heat and drought tolerant, and its low-hanging branches have a dense covering of holly-like evergreen leaves. Lifespan: 250 years.

ZONE 9

mahogany

SWIETENIA MAHAGONI

We associate mahogany with South America and the West Indies, but this classic timber tree is also native to south Florida. Grows to about 75 feet; tolerant enough to make a good street tree. Lifespan: 150 to 200 years.

CALLIGRAPHY BY DUGALD STERMER

100 feet

90 feet

Two pecan trees planted by George Washington at Mount Vernon are still alive today.

80 feet

70 feet

60 feet

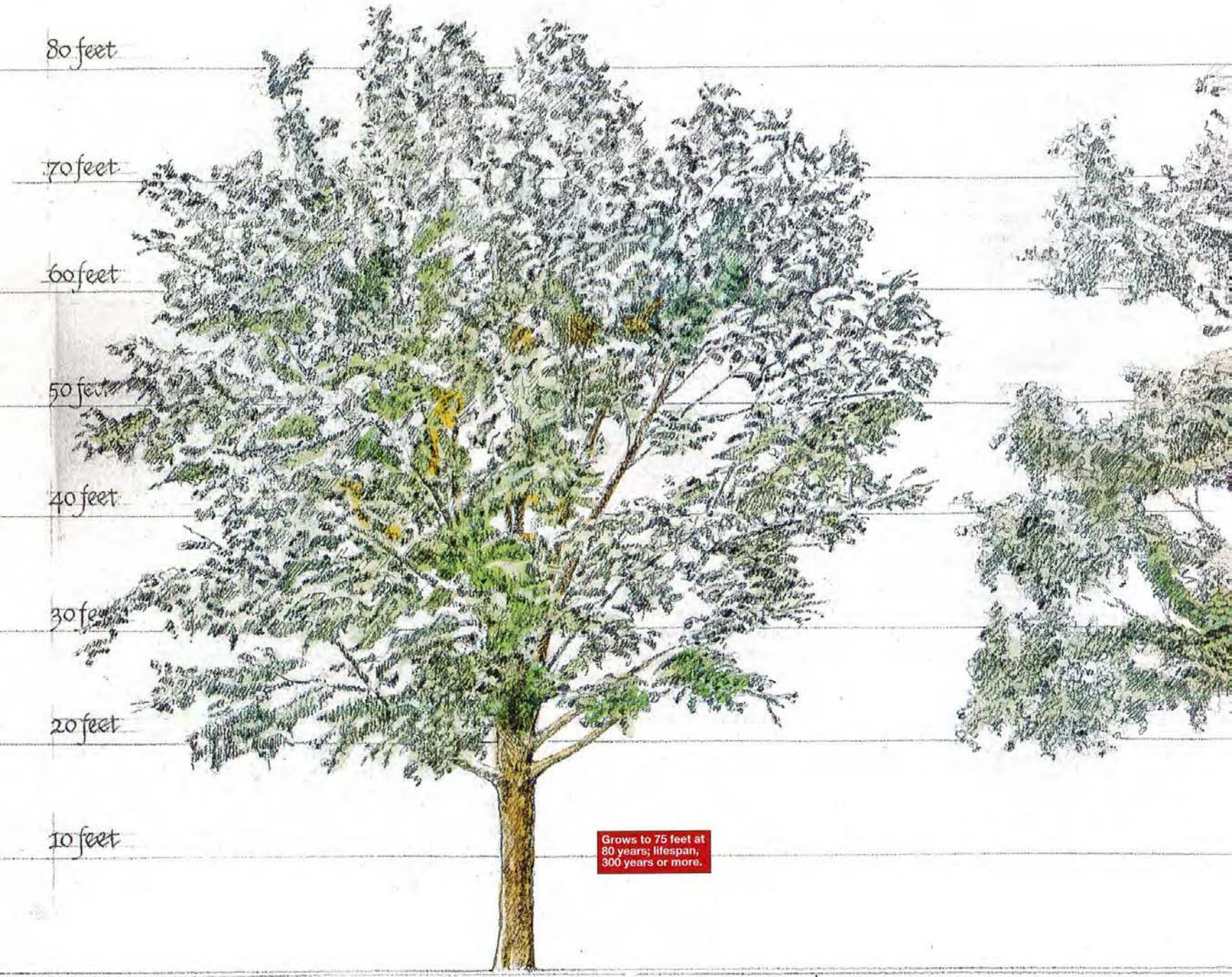
50 feet

40 feet

30 feet

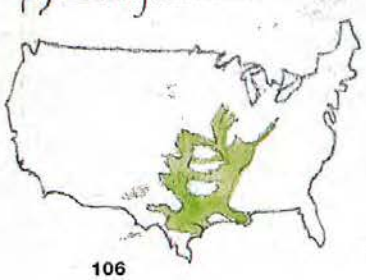
20 feet

10 feet



PECAN

75~100 feet



Carya illinoensis

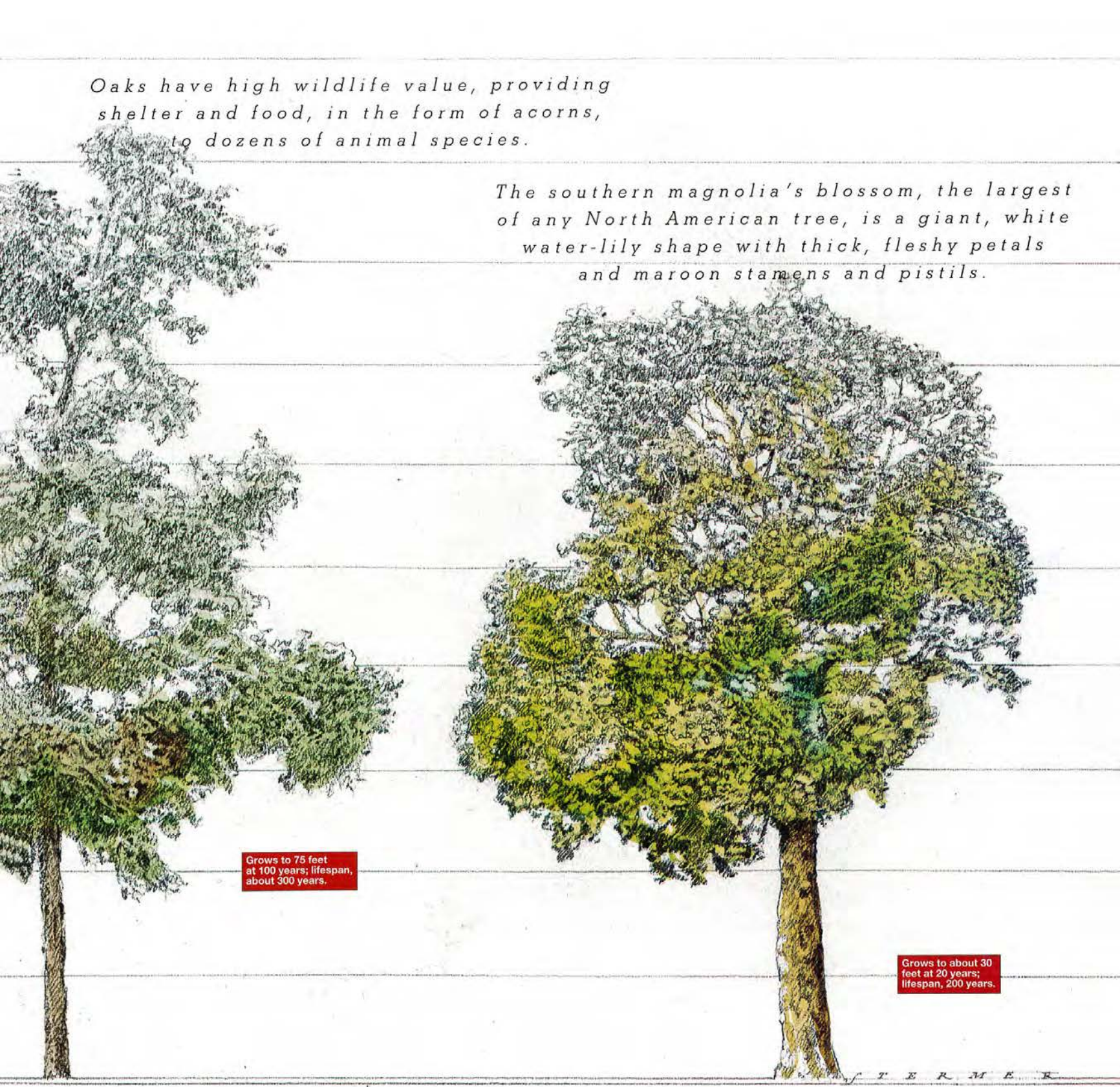
A cousin of the shagbark and bitternut hickories, this is the largest and most beautiful family member. The symmetrical, feathery leaves turn golden yellow in autumn, signaling the end of the summer nut harvest. The pecan can be grown into areas of zone 6; plant young, as it dislikes transplanting. It prefers moist soil and will survive a flood; it is heat resistant, but not a good choice for urban locations because it is sensitive to salt and some pollutants.

BUR OAK

75~100 feet

Oaks have high wildlife value, providing shelter and food, in the form of acorns, to dozens of animal species.

The southern magnolia's blossom, the largest of any North American tree, is a giant, white water-lily shape with thick, fleshy petals and maroon stamens and pistils.



Quercus macrocarpa

The leaves of the Bur oak emerge yellow in spring; by summer they are dark green, turning gold in the fall. Its long taproot resents transplanting; buy a small one, or plant one of the large, shiny nuts (macrocarpa means "big fruit") in a protected pot outdoors, then transplant in the fall. Salt, pollution and heat tolerant, this is a good urban choice.

SOUTHERN MAGNOLIA *Magnolia grandiflora*

60–80 feet

Close up, the southern magnolia is dominated by its shiny 5–8-inch-long evergreen leaves, malachite on the top, felted tan beneath. Its silhouette is muscular, with a straight trunk and dense growth. First thought to be hardy only in Virginia, it grows as far north as zone 6 in protected spots (we've seen one in Boston against a south-facing wall). The huge, fragrant flowers are followed by large fruit that drops scarlet seeds.

150 feet

135 feet

120 feet

The sugar maple turns red in September in zone 3; the color washes south, traveling a hundred miles every two weeks, to reach zone 7 in November.

105 feet

90 feet

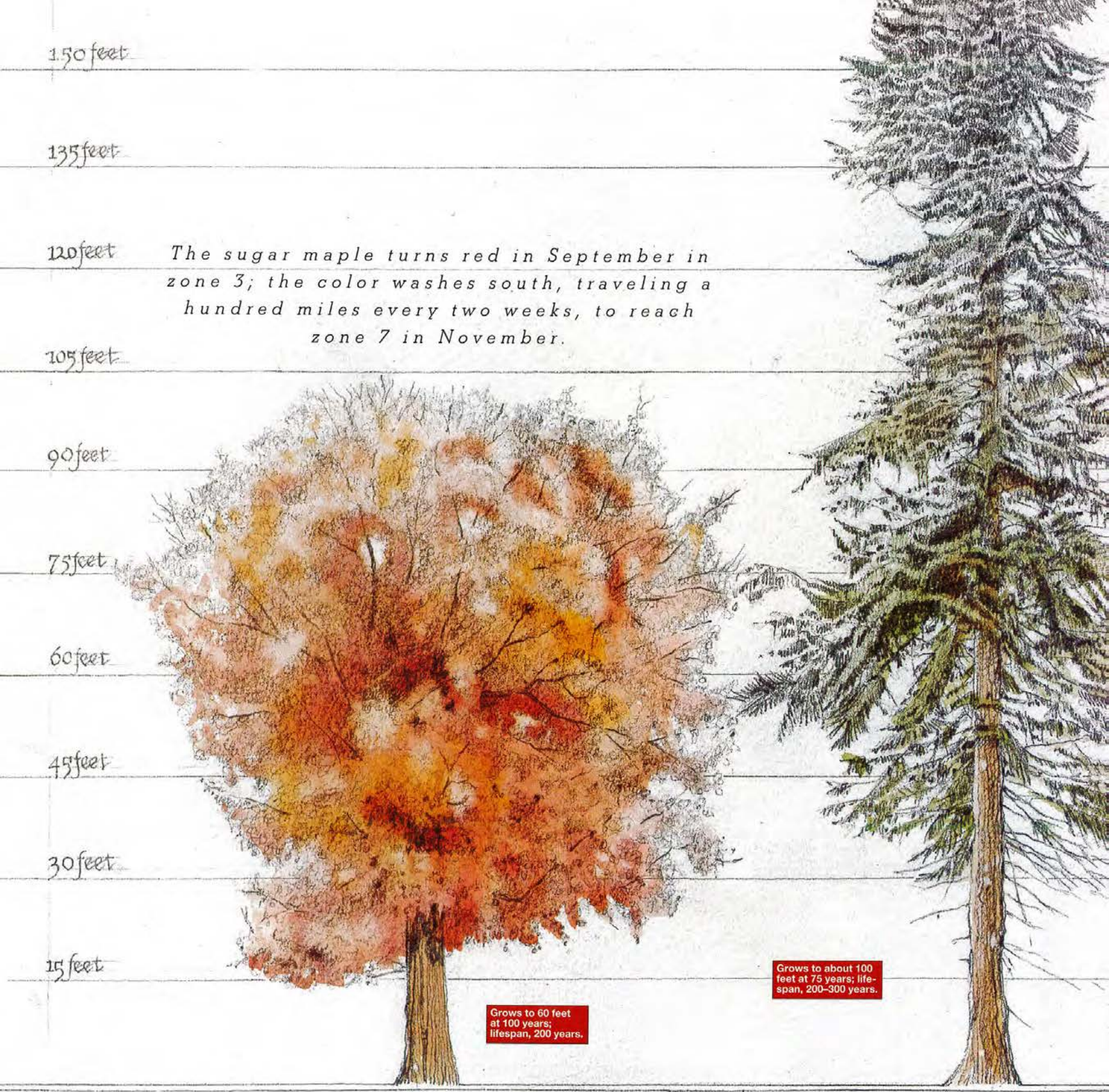
75 feet

60 feet

45 feet

30 feet

15 feet

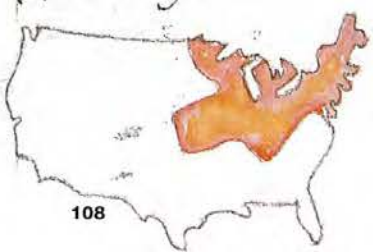


Grows to 60 feet at 100 years; lifespan, 200 years.

Grows to about 100 feet at 75 years; lifespan, 200–300 years.

SUGAR MAPLE — *Acer saccharum*

75 ~ 100 feet



Source of blazing fall color and maple syrup, this is the tree that makes New England famous. Given space, it achieves a perfect, globular shape. It is shade tolerant, but needs good drainage for its shallow roots (flooding will kill it); does poorly in heat or drought. The real enemy, though, is salt, which is killing roadside maples all over New England. Plant away from roads and driveways. High wildlife value: it is favored by songbirds and upland ground birds.

DOUGLAS FIR

80 ~ 200 feet

The Douglas fir is one of the tallest trees in the world. Left alone in the wild, some will reach more than 300 feet—the height of a 30-story building.

A variety of cottonwood is sacred to the Sioux in South Dakota; its top branches, which reveal a perfect star shape in cross section, were used as the centerpiece of the sun-dance ritual.

Pseudotsuga menziesii

Native to the Pacific Coast mountains, the Douglas fir is a familiar Christmas evergreen. Left in the wild, it becomes a narrow, conical spire with blue-tinged needles. Tolerant of shade (it likes a grove of its brethren), it needs moist but well-drained soil. Buy a balled and burlapped specimen for Christmas; after a week indoors plant outside (dig the hole before the ground freezes!).

EASTERN COTTONWOOD *Populus deltoides*

75~100 feet

Sometimes, the cottonwood is considered a weed tree: its fluffy, airborne fruits take root almost anywhere (including gutters). Cousin to the Lombardy poplar that lines roads and avenues in France and Italy, it is planted here as a street or windbreak tree. In optimal conditions, it achieves a graceful, sweeping form, wide as it is tall. Deciduous, grown from the Rockies to Maine, it is a good choice in windy, dry conditions.

PHOTOGRAPHS BY PETER BOSCH

in the worst conditions

TO CHOOSE YOUR TREE, first visit a full-grown specimen. American Forests maintains a national register of Big Trees; call 800-368-5749 for information. Few nurseries carry long-lived native trees, concentrating instead on the more popular decorative trees. The National Arbor Day Foundation (402-474-5655) can supply the name of the closest source for the tree you choose. Purchase the largest tree you can afford (go by trunk size, not just height). Branches should be well-spaced, forming "Ls" (a 45° angle to the trunk) not "Vs". The soil around the root ball should be firm but friable, not claylike or hard.

Standard tree-planting routines—dig hole, plant tree, fill with dirt, water—assume near-perfect conditions. We wondered how to plant in adverse conditions—in south Florida, say, where soil is only a foot deep. Here's how: 1. Rent a truck-mounted drill rig with a 42-inch bit. 2,3. Drill a 4-foot-deep hole into soil and underlying rock.

4. We chose an 8-foot container-grown mahogany (Swietenia mahagoni). 5. Cut the container away and loosen the roots. (Don't pull the tree out or the crown—where the trunk meets the roots—may be damaged.) 6. Take "potting soil"—equal parts of Everglades muck, peat moss and sand—and mix with rock from the excavation.

7. Put a foot of mix in the hole; fill the hole with water; let it drain. 8. Put tree in hole, center it, and fill hole halfway with mix. Add 2 tablespoons of Terra Sorb, a water-storing polymer, and 5 tablets of slow-release fertilizer. Refill with water. 9. Straighten tree (use a level); bring soil up to crown (check with board across hole).

water is the key to a good start

MAKE A BERM of soil around the circumference of the planting hole to act as a catch basin. Water deep and often for the first season. Once established, a properly planted native tree will care for itself.

OH, HOW WE searched for that ideal romantic cottage—something different, genuinely cozy, with a big yard, with charm, lots of charm. Then one day, there it was. Even the address was romantic: Cherry Lane, in the town of Silver Spring. It was love at first sight.

The realtor warned us: "Get it inspected." But I thought I knew enough to do it myself. Besides, I didn't want to find anything wrong. So my friend, a builder, said he would have a look.

We sat on the porch and I imagined spring coming, with the still leafless forsythia—my forsythia—in full bloom.

"You're right," my friend said, "it's perfect..."

I grinned with delight.

"...except it's going to fall down."

"You're crazy."

So he led me to the aboveground north wall of the foundation, brick veneer over block. "See anything

BY STEPHEN PETRANEK
REPORTING BY BRAD LEMLEY
PHOTOGRAPHS BY DANIEL PROCTOR

found

A house without a strong foundation is little more

wrong?" he asked. I looked, hard, scanning the whole side of the house from rooftop to the ground. "Doesn't it look crooked to you?" he asked.

Suddenly I came out of the fog. Yikes! It was definitely crooked, even bowed. "You know those bedroom doors upstairs that don't close?" My friend said. He pointed at the wall. "This is why."

"How long will it last?" I wondered.

"Ten days or ten years, it's hard to tell," he said, looking intently at a pattern as he traced it with his finger. "See all these zigs and zags between the bricks? Repointed. That was a crack." The brick had been painted over. Only an expert would have noticed the repair.

Still optimistic, I asked: "How much?"

"Don't ask," he said. "Just walk away."

WHY IS THE foundation the part of a house nobody notices, the part that exists outside normal consciousness? Is it because the truth—no house lasts longer than its foundation—is too frightening? Is it because a foundation's demise is so insidious: a little crack, a little water, a little rust in the reinforcing rods, a little freezing and there goes the farm? Are we too busy caring for the siding, roof, floors and plumbing to realize that the whole house is slip-sliding away?

Whatever the reasons, it's time to take notice that a foundation not only holds a house up, it holds a house together. Like a rock, it gives strength to all the soft wood tacked on top of it. Dennis Duffy's house in Napa, California, is a classic example. The concrete foundation, built with unwashed river gravel, had deteriorated relentlessly since it was poured in 1906. The house hadn't fallen down, but one contractor who examined it wanted to jack up the whole structure and replace everything under it—for $40,000. Duffy was only vaguely aware of the problem. Norm Abram and Steve Thomas had to give him the bad news: remodeling his kitchen would not be possible without repairing and replacing major sections of the foundation.

From a distance, the Duffy house in Napa—which appeared on the 16th season of *This Old House*—seems as solid and strong as the walnut trees that surround it, but a closer examination shows huge cracks (left) in the foundation wall that are causing parts of the house, like the back porch (above), to pull away from the main structure.

ations

than a wobbly pile of sticks held together by nails.

WHAT GOES WRONG

CHECKING OUT A FOUNDATION doesn't always require a degree in architectural engineering. Start with the obvious: a slow walk past it outside, then an interior inspection. Napa contractor Jim Nolan, who is rebuilding the Duffy house, says cracks are the major sign of trouble, probably indicating a weak concrete mix or a lack of reinforcing steel rods, called rebar, in the wall. Even if a wall does have rebar, cracks are bad news because they allow water to penetrate and rust out the rebar.

You can get a sense of the strength of the concrete by whacking the wall with a hammer. Concrete should not crumble under a single blow. A cement block should be whacked a third of the way from the end, in one of its two cores. If the hammer goes through, not all the blocks were filled with concrete. Foundations are mostly block or poured concrete; if block, they should be filled with concrete in earthquake country.

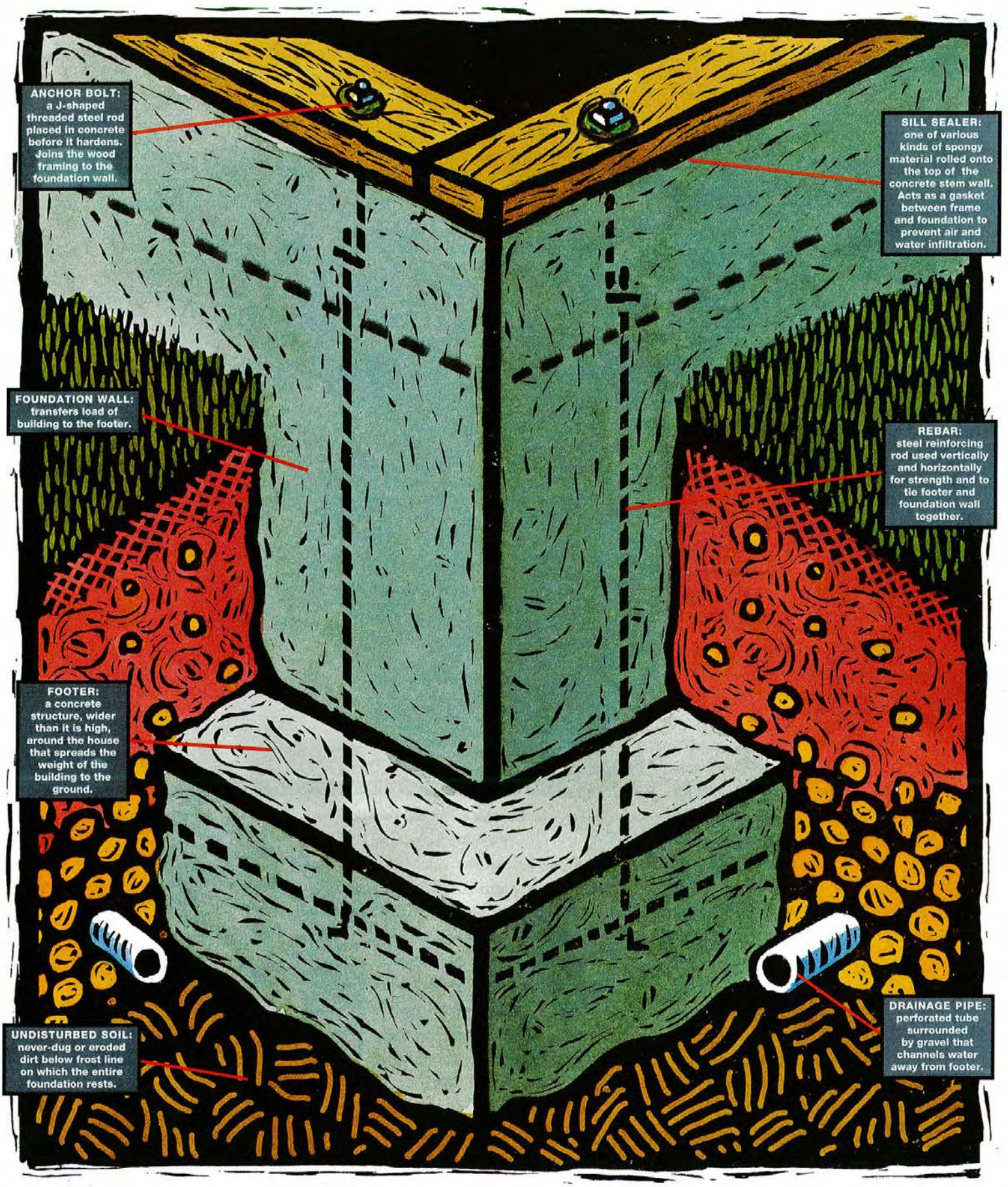
Sight along the wall to see if it is crooked or leaning—indications that it is no longer able to support the load. The results of such problems can be seen elsewhere in the house. In the Duffy kitchen, for example, an orange dropped on the floor rolled merrily along a pitch. In the living room, the hearth, once level with the floor around it, had sunk an inch below it.

There are five problems common to concrete—and most block—foundations. The Duffy house has four of them:

- First, unscreened, unwashed river gravel was used, weakening the concrete. Crack a concrete piece and you'll see that it breaks around the stones because they're stronger than the bonding agent. Dirt clumps in concrete act like breakable stones.
- Second, workers apparently did not strictly limit water in the mix. Adding water is tempting, making concrete easier to pour and work, but it greatly weakens the final result.
- Third, the original footing is too narrow. The weight of the entire house ultimately rests on the footing. The bigger and wider the footing, the less pressure per square foot on the ground. The Duffy house has been subject to what engineers call "subsidence," a fancy word for sinking into the ground.
- Fourth, no rebar was used in the footing or foundation wall. Concrete is strong in compression but weak in tension, so reinforcement is absolutely necessary.
- Fifth (the one problem the Duffy house appears to lack), older foundations were often poured in hundreds of barrow loads over many days. When fresh concrete is added to hardened concrete, the layers don't mix; they form a seam called a cold joint. Without aggregate, these joints are weak.

A short foundation wall at the Duffy house kept the ground enticingly close to insects like termites. Modern building methods employ insect barriers, called termite shields, between the concrete foundation and the wood framing. They are made of noncorroding metal or inorganic material.

The weak foundation under the chimney at the Duffy house is sinking faster than that of the house—so the two are being ripped apart.



anatomy of a foundation

illustration by jose ortega

BUILDING IT RIGHT

THE INVERTED-T SHAPE of foundations hasn't changed in more than 100 years, and the basic construction methods haven't either. But many mistakes, like using unwashed gravel, have been corrected and many construction details have been refined.

For a full basement, a hole is excavated, then footing forms, usually made of wood, are erected around the perimeter of the hole. In the case of a crawlspace foundation—the Duffy house has one—a simple trench is dug with a backhoe. The trench itself serves as the form for the footing.

Relentless rains in California made digging even the shallow footer trench for the Duffy foundation a thankless job.

Footers must penetrate below the frost line, the deepest point at which the earth freezes during the coldest winters in a region. Otherwise, frost heave, the expansion of soil from freezing and thawing water, will lift and crack the foundation. In Napa, foundations need only be one foot deep. But in the northern United States, where the ground will freeze four feet down, building codes are written accordingly.

Soil type is the other factor determining depth of a foundation. The idea is to place the footer on undisturbed soil containing no organic material. (Roots and other plant debris under a foundation will eventually decay, causing the soil to shrink and the house to sink.) But the fertile topsoils of the Napa Valley can be as much as 30 feet deep (one reason grapes grow so well there). Experience has taught contractors and engineers that footings still can be poured on such soils if the footers are made wide enough to spread the load.

In the Napa Valley, where building codes are among the strictest in the country, footing width is calculated exclusively by engineers. Even Jon Lail, the experienced designer of the Duffy addition, does not make such calculations. Engineer Juan Escudero decided on an oversized footing because it was less expensive than getting a full soil report. He specified a footing for most of the kitchen addition at 16 inches wide and 15 inches high, even though a smaller one probably would have sufficed. However, one section of footing that receives

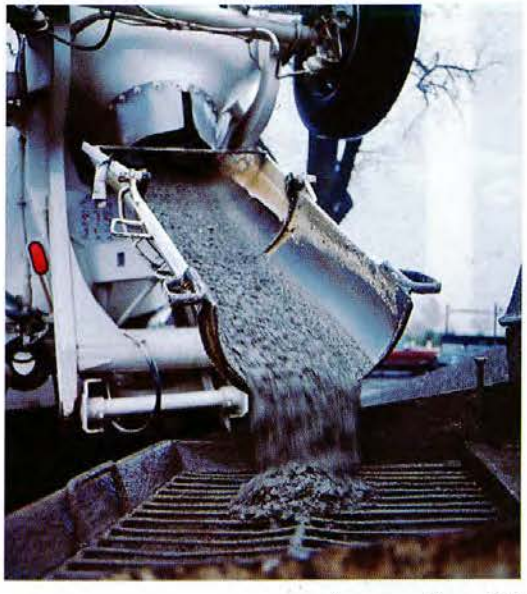
Raw foot power (above) is often necessary in foundation work where power shovels cannot reach. Pink aerosol spray paint (below) makes a visible line that is easily followed by a backhoe operator.

A concrete truck at the front of the Duffy house dumps its 9-cubic-yard load (below) into a special hopper attached to a concrete pump. The pump forces the concrete mix through a hose to the back of the house where workers (above) use it to fill the channel dug for the footer.

a lot of weight from a large laminated beam holding up a fourth of the house is 36 inches square.

Once the trench is dug for the footing, the next step is cutting, bending and positioning the half-inch-diameter steel reinforcing rods, or rebar, to match the shape of the footing trench. Workers put wooden stakes in the center of the trench and hang the rebar by wires from these stakes.

Then the trench is ready for concrete. Because the Duffy addition is in the back of the house, bringing concrete trucks up to the footing trench would have meant tearing out a hedge and leaving huge ruts in the yard, which had been soaked by some of the heaviest, most relentless rains in nearly a decade. So Tom Jinks, the concrete contractor, hired a concrete pumping machine. When the trench was filled, workers snipped the wires holding the rebar in place, pulled out the wooden stakes, and troweled the top smooth.



The last step in building the footer is to prepare it for a strong union with the foundation wall. When building a basement, a contractor will often make a "keyway" by pressing a strip of lumber into the footer. When removed, it leaves a slot for the foundation wall. In the Duffy house, there will be no lateral force on the foundation wall. Thus, pieces of rebar were shoved vertically into the wet concrete after it set for 30 minutes (enough so they stood up).

The footer must set for at least two days. The timing really depends on temperature, humidity and the precise formulation of the concrete mix. As a general rule, the more slowly concrete cures, the stronger it will be, which is why builders often spray mist on it or cover it with wet burlap in hot weather.

34 percent of all American houses have full basements, 12 percent have partial basements, 26 percent have crawl spaces and 26 percent are built on slabs. Two percent have some other arrangement.

Mushroom caps on vertical reinforcing rods keep workers who trip from impaling themselves.

Although the foundation wall can be

formed with sheets of plywood and other wood, concrete contractors often use special reusable metal forms that are erected on top of the hardened footer. The two sides of the form are linked by small metal ties, and the horizontal rebar is laid on top of the ties at specified heights. The concrete is poured in, troweled off on top, and

A backhoe with a 16-inch bucket dug the footer trench for the kitchen in less than half an hour.

bolts to hold down the sill plate are inserted, threads up, into the still-wet concrete.

At the Duffy house, the contractor also had to join the new concrete walls to the existing foundation with rebar. Holes drilled in the old foundation were filled with epoxy, and one end of the bar was stuffed into the holes. The other end was then embedded in the fresh concrete fill poured into the new wall.

Finally, the connection between the concrete foundation and the house itself was accomplished by bolting down the pressure-treated sill plate—usually a 2x6 laid on its side—and a sill sealer under the plate, using the half-inch bolts that had been anchored in the wall as it was constructed. In earthquake zones, threaded rods also may be set in the wall for hold-downs that bolt to the wall studs.

A 2x4, placed with a laser guide and supported by stakes, marks the footer height.

Rebar, bent for the corner, hangs by wires that will be cut after concrete is poured.

Spacing between bars and the number used affects final foundation strength.

Overlapping and intersecting rebar in the foundation wall form is wired together.

Rebar, in diameters from ⅜ to 2¼ inch, is bent with an electrohydraulic tool.

Twenty-foot lengths of rebar are easily cut with a special electric snipper.

Each cubic yard of concrete in the Napa house contains...

1,720 pounds of ¾-inch rock
1,678 pounds of sand
22 gallons of water
470 pounds of Portland cement (five 94-pound sacks)
22 ounces of Polyheed 997 (helps concrete flow)

A CONCRETE PRIMER

Before the twentieth century, residential foundations were primarily masonry, composed of stone, brick or granite. Concrete was available in the nineteenth century, but was considered ugly. When it *was* used, concrete was often cast in molds to make it look like stone.

By about 1906, when the Duffy house was built, architects had begun to stress functionalism over ornamentation. With its boxy shape and unadorned woodwork, the Duffy house fit that mode perfectly. It was part of the first wave of American homes with monolithic concrete foundations.

Concrete is a complicated mixture. With sophisticated additives, it will set up even in freezing weather, dry quickly in a downpour and stay moist long enough to cure in a desert. Nevertheless, in residential construction the ratios of cement, sand and gravel remain the most important parts of the mix.

In most of the jobs that Tom Jinks—the Green Valley concrete contractor who worked on the house—has done in last 20 years, he has used what is called a five-sack mix (see recipe at left). It is made with ¾-inch gravel-rock that will fit through a screen with one-inch openings. He used the five-sack mix on the footing for the Duffy house. The foundation walls were done with a six-sack mix and ⅜-inch gravel. The concrete pump used for the walls could not accommodate the larger aggregate; an extra bag of cement was added to the mix to make up for the smaller gravel.

Sand in concrete has several complicated functions: it keeps the gravel in suspension; it is the key ingredient in keeping the amount of cement in balance; and it helps determine texture—too little and the surface is impossible to trowel flat. The amount of sand in the mix also helps to determine the pressure per square inch (psi) the mix can support when cured—usually 2,500 psi in residential work.

The most critical variable is water: too much makes concrete weak, too little makes it difficult to pour. Rather than specifying gallons per yard, contractors specify a slump. In performing a slump test, a contractor fills a cone 12 inches high and five inches wide at the base with fresh concrete, inverts it onto a board, removes the cone and then measures how far down the concrete slumps from the original height of the cone. For filling concrete block cores, a contractor would probably specify a loose nine-inch slump. But for a foundation wall, a four-inch slump might be necessary to prevent the mix from oozing under the forms.

Contractor Jim Nolan (right) consults with Steve and Norm.

Nevertheless, contractors rarely perform slump tests. Jinks says the mixing computer at the concrete plant he uses is as accurate. He says the only time he does an on-site slump test is for a high-stress, low-tolerance project such as the walls of a bank vault. Still, Jinks concedes it's possible to get a bad batch of concrete. Pat Hennin, founder and owner of the Shelter Institute, a homebuilding school in Bath, Maine, tells her students to say that a slump test will be done when they order concrete—just to keep their supplier honest.

Nineteen yards of concrete were used in the Duffy house; ten for the footings and nine for the foundation wall. Each yard cost $59.50.

Residential foundation walls like these on the Duffy house are usually 10 inches wide. Bolt ends, which will be fastened to the wood sill, stick up. Brackets will be attached to 4x4 posts. Both add strength by tying the framing to the foundation wall.

SERIOUS TROUBLE

ONE DAY IN JANUARY, the contractor's foreman took a shovel and jabbed at the old foundation of the Duffy house in Napa: "As I poked experimentally at the corner under the kitchen, it just crumbled into gravel. I was amazed. I've done a lot of renovation work over the years, and I've never seen a foundation in that kind of condition."

Few houses can stand up to everything Mother Nature dishes out. Even a foundation of solid granite set on piers that reach down to bedrock can be cracked wide open by an earthquake. Sooner or later, serious foundation repairs will be in order for most houses.

Cracks in foundation walls can and should be patched as soon as they appear, and water must be kept away from the foundation at all times. But if the foundation is leaning, heaved up or sunk down, repairs may not be enough. Tempting high-tech devices, like steel piers screwed into the ground, will fortify foundations, but many contractors are wary of reinforcement and prefer to replace a damaged foundation.

When Nolan needs to replace one, he calls a house-moving company with computer-controlled hydraulic jacks. First the house is disconnected from the old foundation—sill plate nuts are removed, plumbing pipes and electric lines are cut. Then jacks are placed under the framing and the whole unit creaks upward a fraction of an inch at a time, all by remote control. "It's pretty slick," Nolan says. With the house in midair, the old foundation is ripped out and then a new one is poured in place.

Nolan asked a moving firm to bid on lifting the Duffy house kitchen, but the company didn't want to do a partial job. So workmen inserted old-fashioned screw jacks under the kitchen floor joists and began cranking. The jacks simply screwed themselves into the ground. So a trench was dug under the kitchen, a 4x6 beam was laid sideways in the trench, and the jacks were put on top of the beam, spreading the load. Up went the kitchen, leveling its floors, and out went the old foundation in five chunks.

Above, the old foundation under the Duffy house was so weak that only mild force was necessary to break it up. Left, digging an access trench under the kitchen was a nasty job but necessary to get at beams that needed bracing.

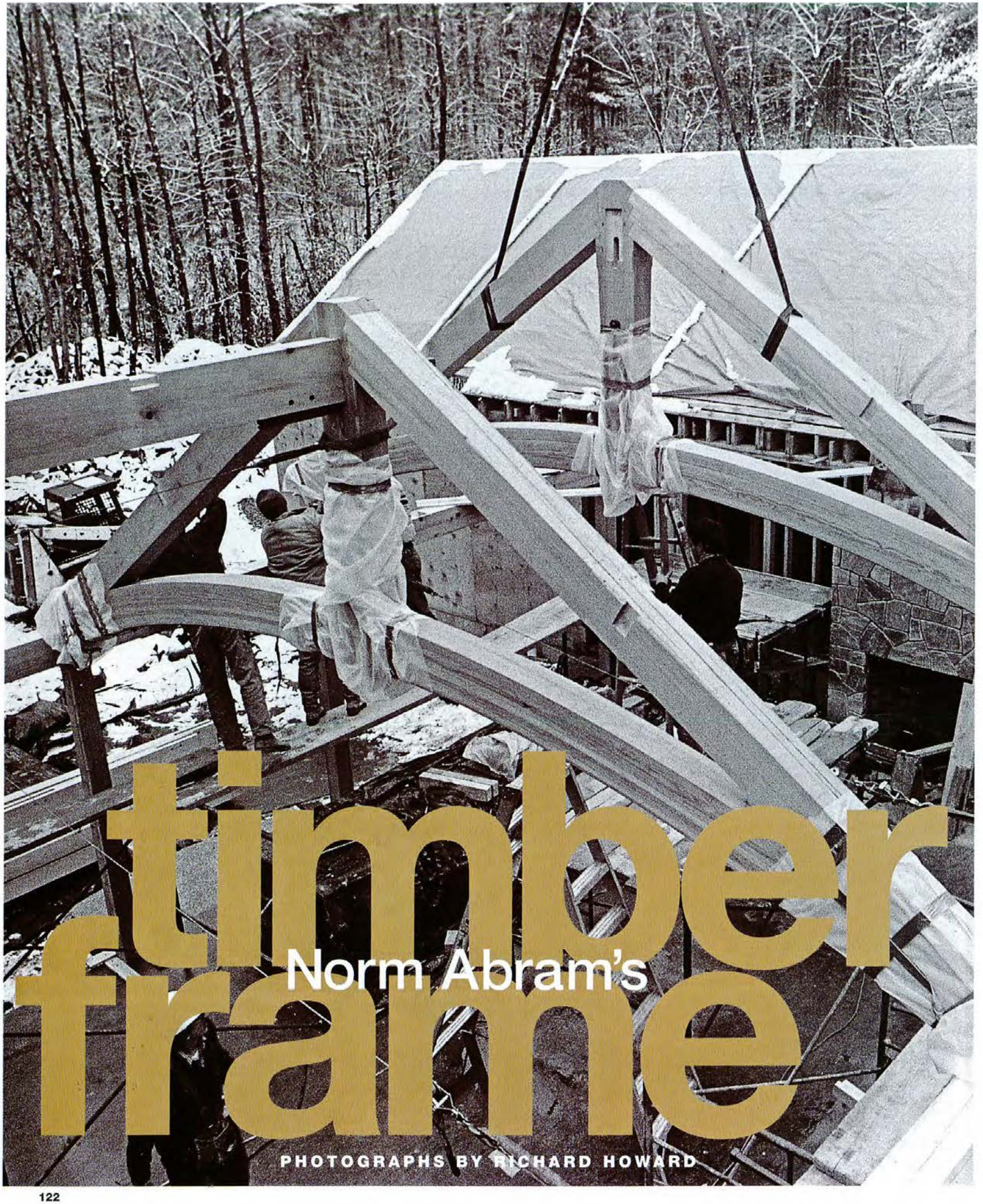
Because Napa is in a region of earthquake activity (see photo at right), special brackets are used to tie the new foundation wall to the house. In earthquakes, houses may slip completely off their foundations. For residential construction, long foundation bolts of up to 1¼-inch diameter are sunk into the wet concrete wall. They pass up through the sill plate and bolt to hold-down clamps attached to vertical structural members, such as columns or posts, that are also clamped to the upper floor decks and the roof.

Some earthquake specialists suggest brackets are not enough. Designers have experimented with base-isolated buildings that move independently of their foundations, but the technology is not yet appropriate for residential construction.

Left, workers spent an entire week fiddling with jacks, screwing them up a quarter inch at a time, one by one, day after day. Right, each yellow circle overlaid on this satellite photo of the San Francisco Bay Area represents an earthquake epicenter from 1972 to 1989. The smallest circles show tremors of 2 on the Richter Scale; the largest are quakes of magnitude 7.1.

♦ *See Directory,* on page 134, *for lists and addresses*

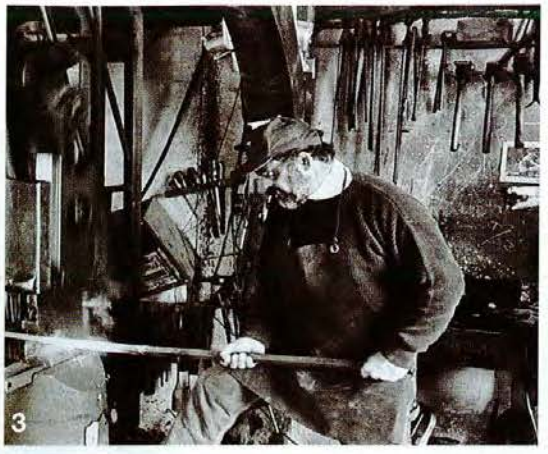
IMAGE COURTESY ENVIRONMENTAL RESEARCH INSTITUTE OF MICHIGAN, ANN ARBOR, MI. EARTHQUAKE DATA FROM U.S.G.S.



timber frame

Norm Abram's

PHOTOGRAPHS BY RICHARD HOWARD



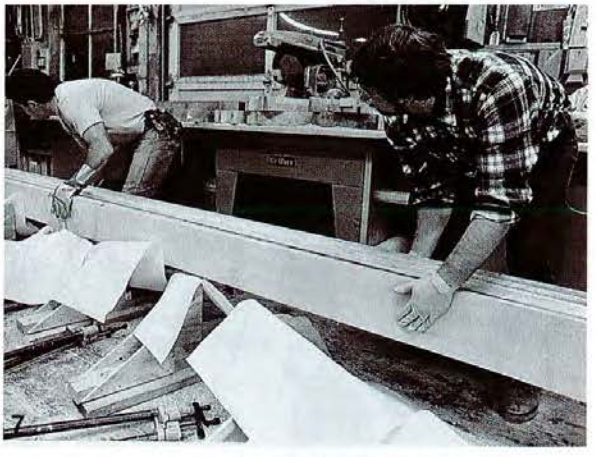
1. The massive trusses of Sitka spruce are brought to rest on the plate beams of Port Orford cedar. At the center of each truss, the king post is mortised to accept a section of the ridge beam. 2, 3, 4, 5. Where the king post met the bottom chord of the truss, the joint had to be reinforced so it would hold if additional loads, such as snow, added weight to the roof system. Metalsmith Dimitri Gerakaris fabricated the iron stirrup brace. 6, 7, 8, 9. Timber framer Tedd Benson invited Norm to work with the Beam Team to laminate the arched bottom chord of a truss. One-inch-thick strips of Sitka spruce, supple enough to bend without steaming, were rollered on both sides with a generous coat of epoxy, then quickly clamped together against the curving form. After drying, the laminated arch was unclamped, planed and sanded to a creamy finish. All parts of the timber frame would receive two coats of citrus-based oil before delivery. 10. The trusses arrived at the site on a massive logging truck.

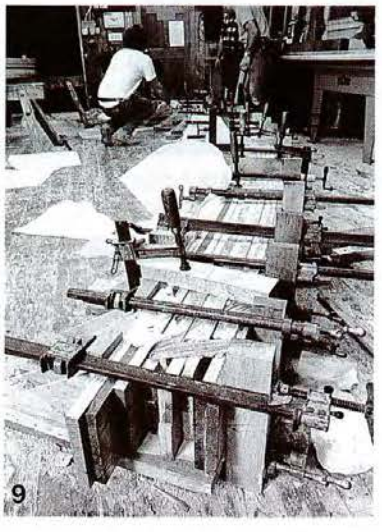
Adapted from *Norm Abram's New House*

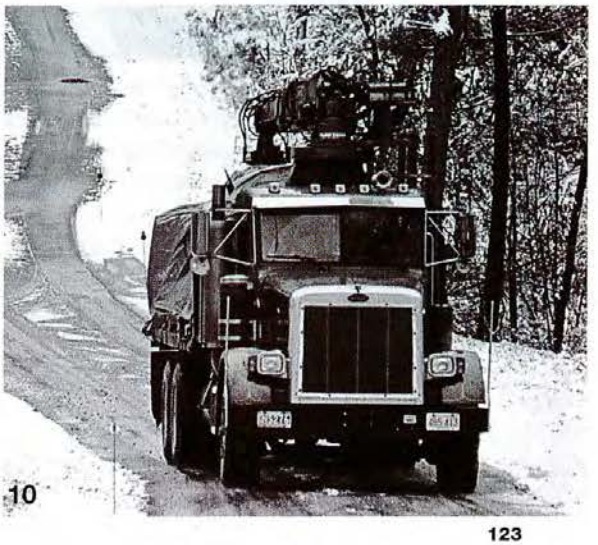
TO BE PUBLISHED BY LITTLE, BROWN AND COMPANY, JUNE 1995.

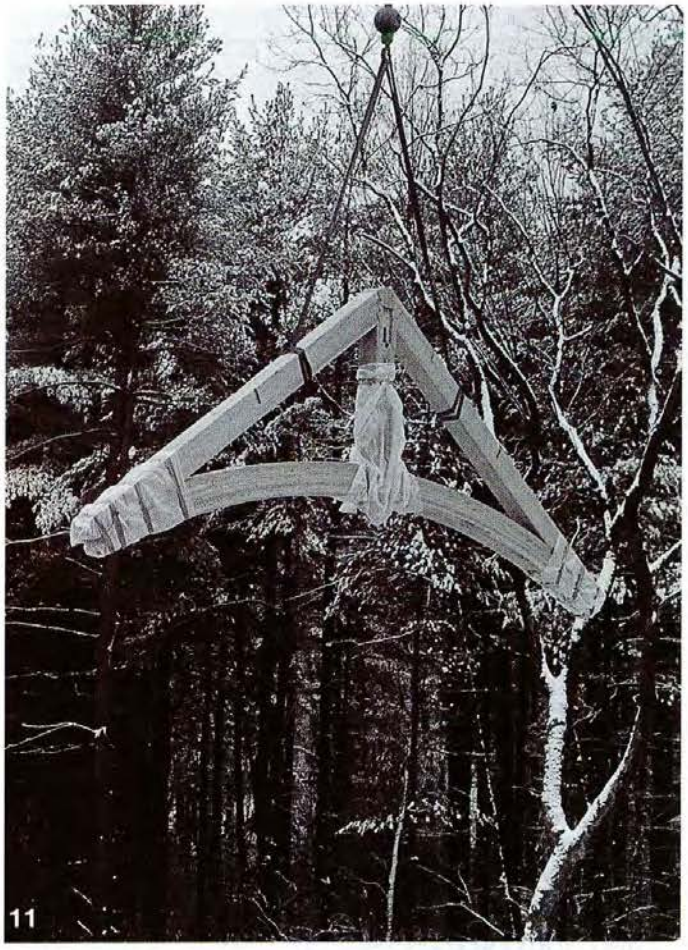
WHEN NORM AND LAURA ABRAM set out to build a new house in rural Massachusetts, they planned it in three parts. The main house and a garage-office wing were built conventionally of both engineered wood products and standard dimensional lumber. These two buildings were linked by a single room enclosing a kitchen, a dining area and a family room. Looking at the first drawings for this great room, Laura asked Norm to "country it up." "Before we knew it," says Norm, "we were dreaming of exposed timber-frame construction. It became the most dramatic section of the house."

"Timber framing is an older technique than stick framing," he explains. "It uses a few very strong posts, beams, joists, rafters and other components to make a basic wood frame sturdy enough to bear the weight of the house." Regular viewers of *This Old House* recall timber frames from watching the 1989 Concord barn rebuilding. Norm chose the same framer, Tedd Benson, for his own home. "If I have a personal creed about carpentry and woodworking," says Norm, "Tedd's affection for simple, classic shapes used in New England for centuries expresses it."

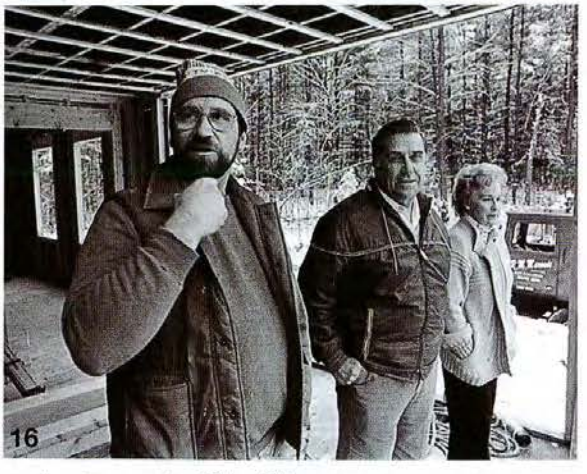








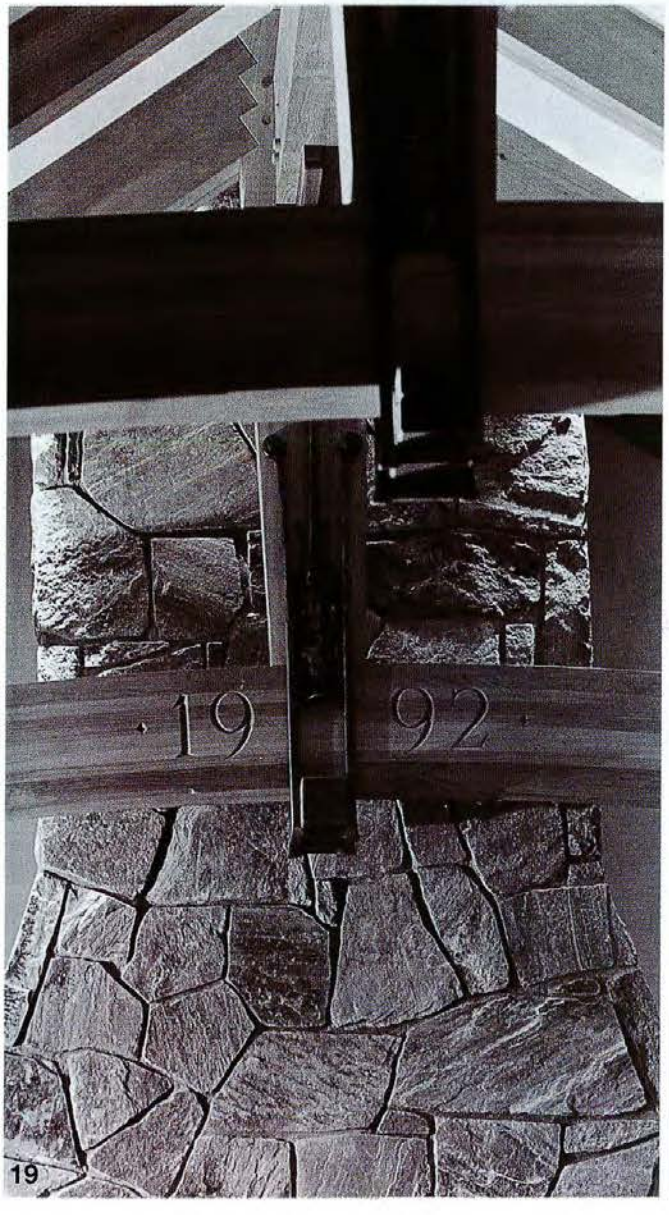
11. It snowed the night before the framers arrived. 12. Truss and rafter installation began at the end of the great room, and proceeded westward toward the office wing. 13. When the crane lowered a truss down on the plate beams, a tenon at each end of the truss fit into a mortise on top of the plate. 14. The frame was closed in with stress-skin panels—sandwiches of oriented-strand board (outside) and plasterboard (inside) enclosing an insulation layer of 3½ inches of polyisocyanurate. 15. "Tedd Benson and his Beam Team are among the best timber frame craftsmen in America," says Norm. 16. Norm's parents watched for part of a day.



"In all of house building, nothing quite matches the drama of raising a timber frame," says Norm. "Our mental images often spring from Amish barn raising, where craftsmen gather and measure and cut the wood members using only hand tools. They assemble the frame in sections on the ground; then the sections are raised into place by human strength. Our timber-frame raising differed in many ways. The four major trusses arrived at the site, already assembled, from Tedd Benson's shop in New Hampshire. A mobile hydraulic crane lifted them as if they were sections of a doll's house. The frame rose in one day, and it had an elegant skeleton that no other part of the house came close to matching."

Norm and Laura's timber frame, installed, with insulated stress-skin panels on the exterior, cost about $30,000. With roofing, windows and doors, flooring, masonry, cabinetry and countertops, plumbing, electrical work and so on, the 22-by-36-foot one-story great room cost them $100,000 by itself. It was an extravagance—close to twice as much per square foot as the rest of the house. But as Norm explained, "It was the right time, we believed, to move into the major house of our life, a house that would shelter us together through grandparenthood and on into retirement years. Since I first began working with my carpenter father in the summer of 1965, I have renovated and built houses to fulfill many people's dreams. I knew by now what I would most like to build for my family, following the example of my father, who built the house of his dreams in which he and my mother still live." It seems especially appropriate that Norm's dream house contains the ultimate work of carpentry: "A beautiful timber frame exposed for us to enjoy looking at every day we live in the house."

17. When the frame is complete, the traditional pine bough or small fir is placed at the ridge. The Benson team asked Norm to perform this "topping off." As he hoisted himself up to the ridge beam, Norm lost his footing and fell sixteen feet to the deck in front of the new fireplace. Norm was unhurt, but "Richard didn't take a single photograph," he said jokingly. 18. After Tedd and Kurt Doolittle removed the plastic covering from Dimitri's brace, they tapped opposing cherry wedges into the stirrup. Norm can tap the wedges tighter whenever weather changes alter the wood of the truss. 19. Since it would rest on a king post, Dimitri designed the brace to look like a crown. The heads of the bolts fastening the brace resemble jewels; each one is unique. 20. The house's designer, Jock Gifford, ran a row of transom lights all along the south wall of the great room, above the windows, comfortably blending a very contemporary glass wall into the "colonial" house. 21. Looking into the great room from the garden: a kitchen occupies the northeast quadrant; the family dining area is south of the kitchen; and the entire western half is a family room dominated by a massive stone fireplace.



low-country porches

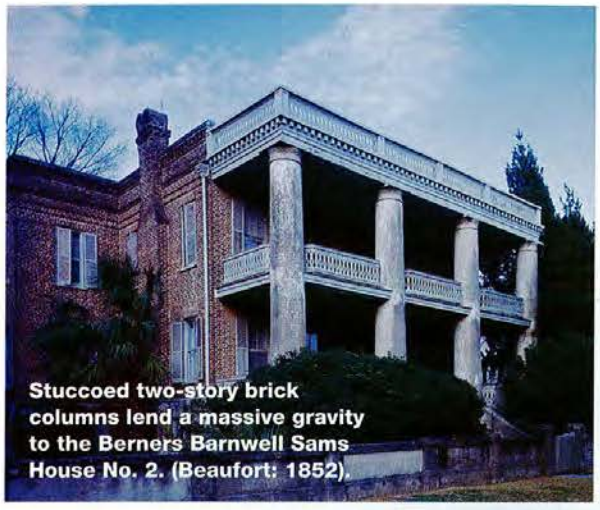
THE PORCH HAS many antecedents: the porticos of ancient Greece and Rome, the verandas of India, even the simple overhanging roofs of traditional African and West Indian dwellings. But nowhere was the porch adopted more widely and integrated so fully into house design than in nineteenth-century America.

In the Low Country, the coastal plain stretching from the Charleston area to the Savannah River, porches blossomed into magnificent, two-story structures that virtually enveloped the house. These shaded colonnades, which were placed on the south side of a house whenever possible to catch prevailing breezes, also reduced heat buildup within the house and made it possible to leave windows open when it rained.

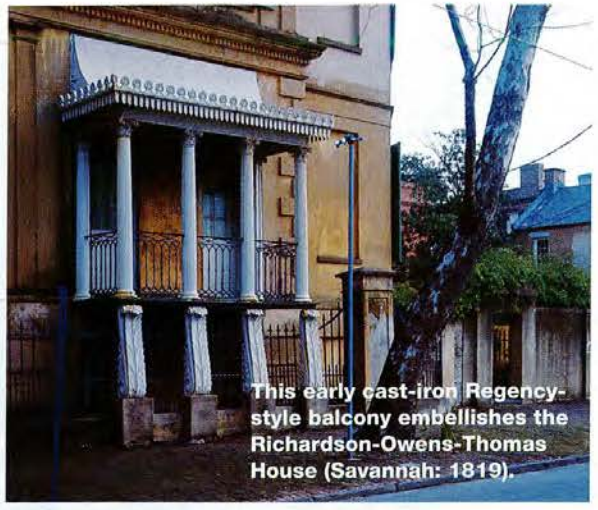
Porches became perfect vehicles for the decorative display that architects used to define a home's individuality. (Contrast the spare classicism of Beaufort's antebellum porches with the ornate excesses of those in Victorian Savannah.)

Although air conditioning and traffic noise have pushed us indoors or into the backyard, the front porch remains a quintessential feature of American architecture, an evocative reminder of our slower-paced past.

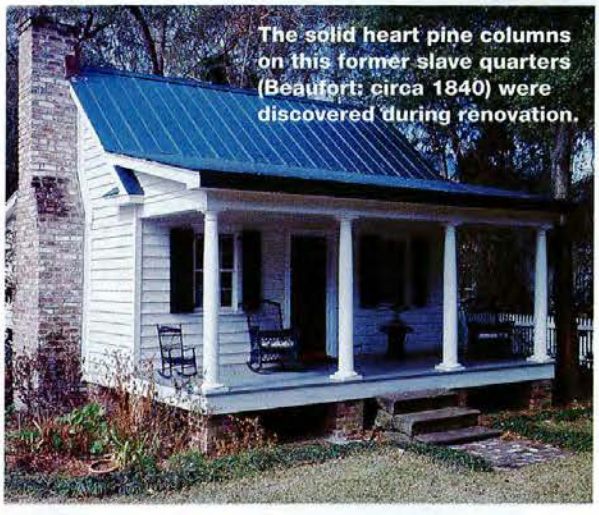
Photographs by ANDREW BUSH



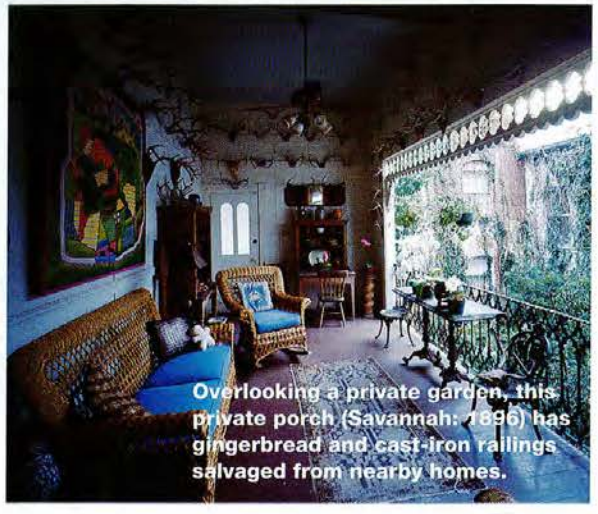
Stuccoed two-story brick columns lend a massive gravity to the Berners Barnwell Sams House No. 2. (Beaufort: 1852).



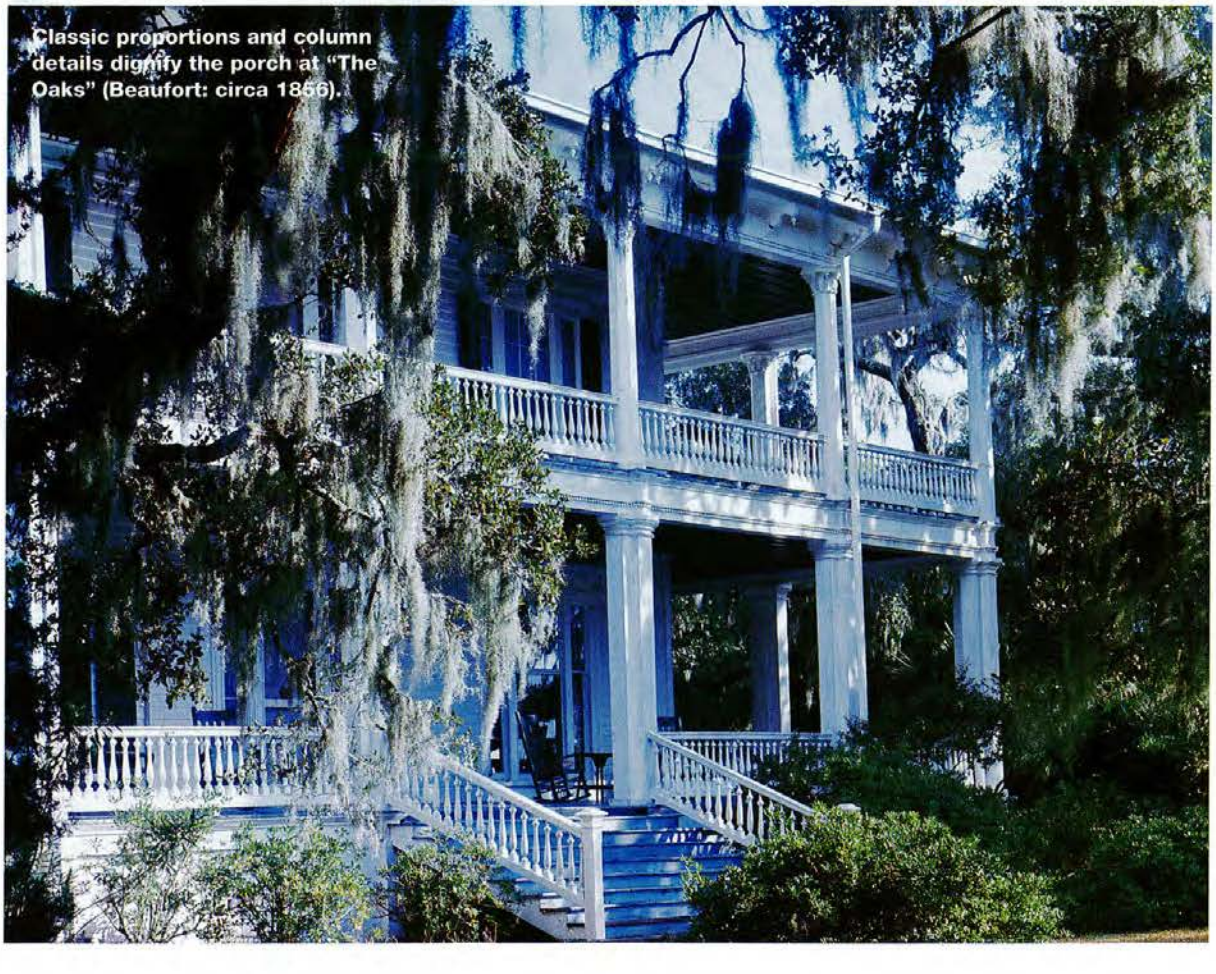
This early cast-iron Regency-style balcony embellishes the Richardson-Owens-Thomas House (Savannah: 1819).



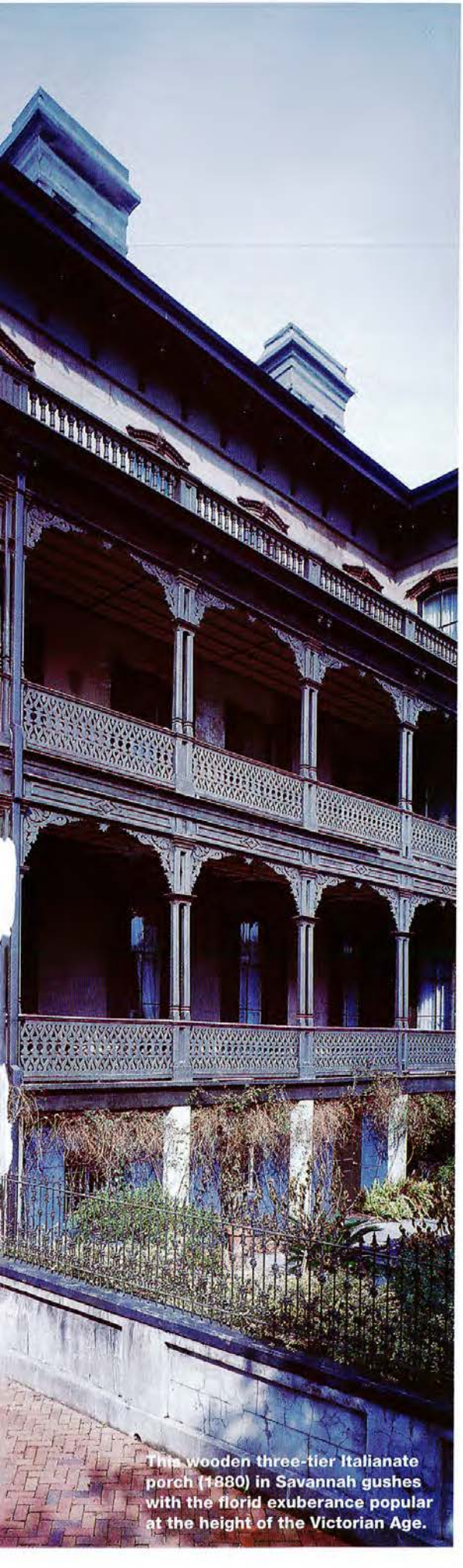
The solid heart pine columns on this former slave quarters (Beaufort: circa 1840) were discovered during renovation.



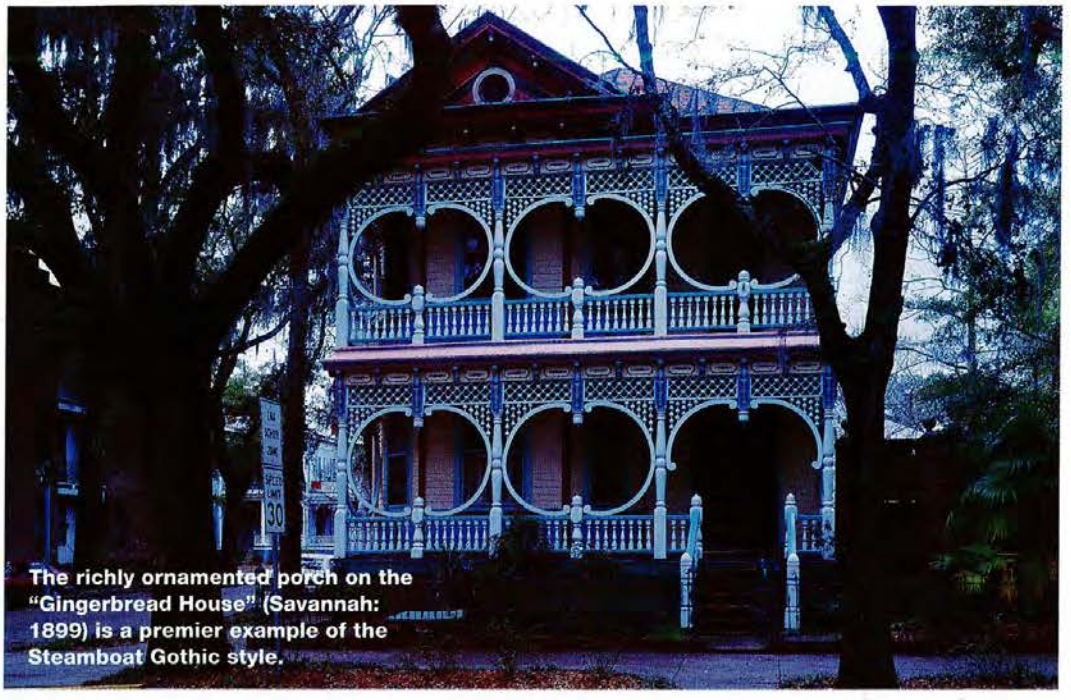
Overlooking a private garden, this private porch (Savannah: 1896) has gingerbread and cast-iron railings salvaged from nearby homes.



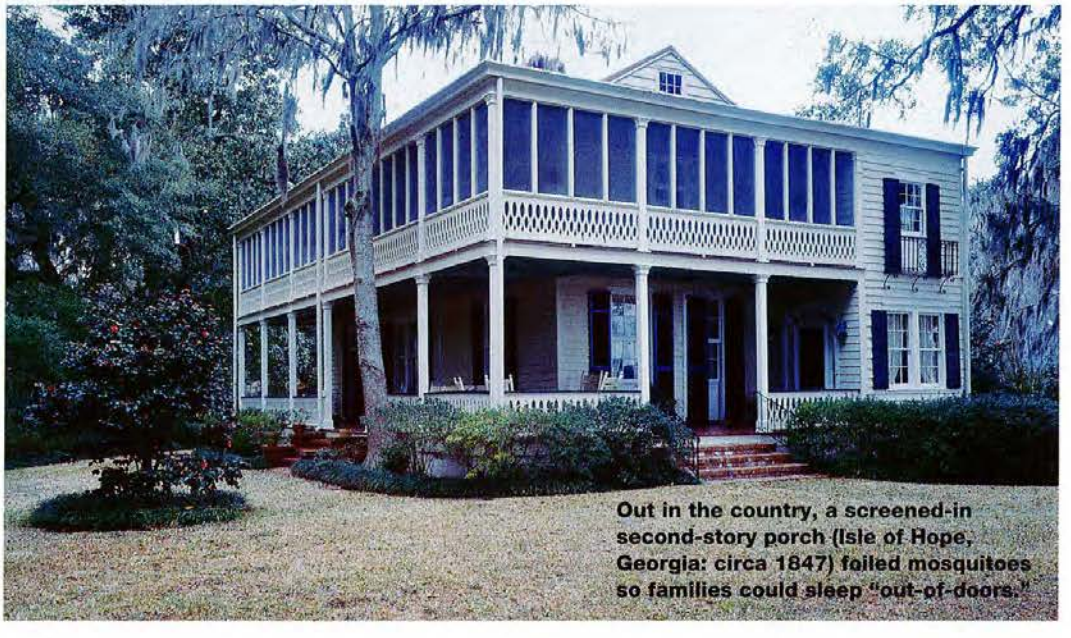
Classic proportions and column details dignify the porch at "The Oaks" (Beaufort: circa 1856).



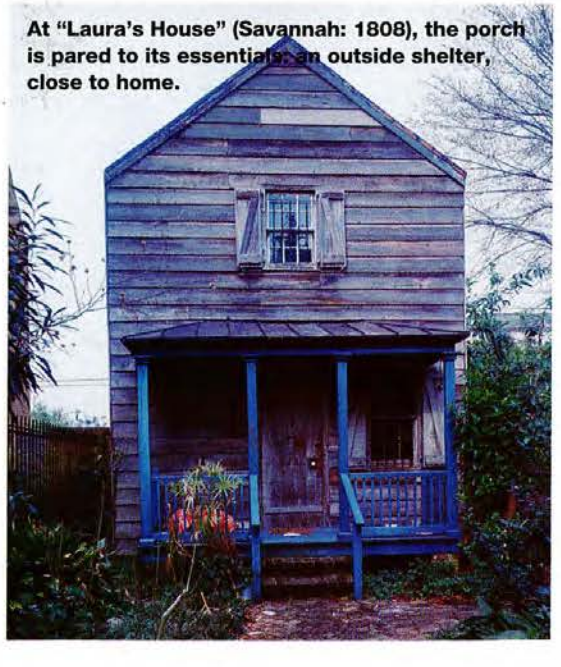
This wooden three-tier Italianate porch (1880) in Savannah gushes with the florid exuberance popular at the height of the Victorian Age.



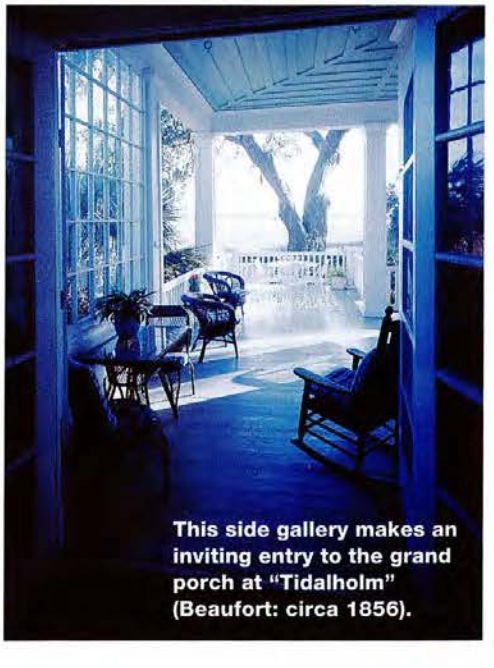
The richly ornamented porch on the "Gingerbread House" (Savannah: 1899) is a premier example of the Steamboat Gothic style.



Out in the country, a screened-in second-story porch (Isle of Hope, Georgia: circa 1847) foiled mosquitoes so families could sleep "out-of-doors."



At "Laura's House" (Savannah: 1808), the porch is pared to its essentials: an outside shelter, close to home.



This side gallery makes an inviting entry to the grand porch at "Tidalholm" (Beaufort: circa 1856).

...no feature of the house in a southern climate can be more expressive

Framed by ancient live oaks, Tidalholm's double-deck porch embraces three sides of the house. Cotton-grower Edgar Fripp's wealth from the second cotton boom (1858–60) allowed him to build this summer house in Beaufort. With his family, he escaped the heat and outbreaks of yellow fever on his lowland farm. Every part of the porch—frame, deck, columns, balusters—was fashioned from resinous, rot-resistant heart pine. Brick piers elevate the hip-roofed porch above storm surges and offer a commanding view of the river and marshes beyond.

of easy, comfortable enjoyment than a spacious veranda.

Lewis Allen,* Rural Architecture, *1852

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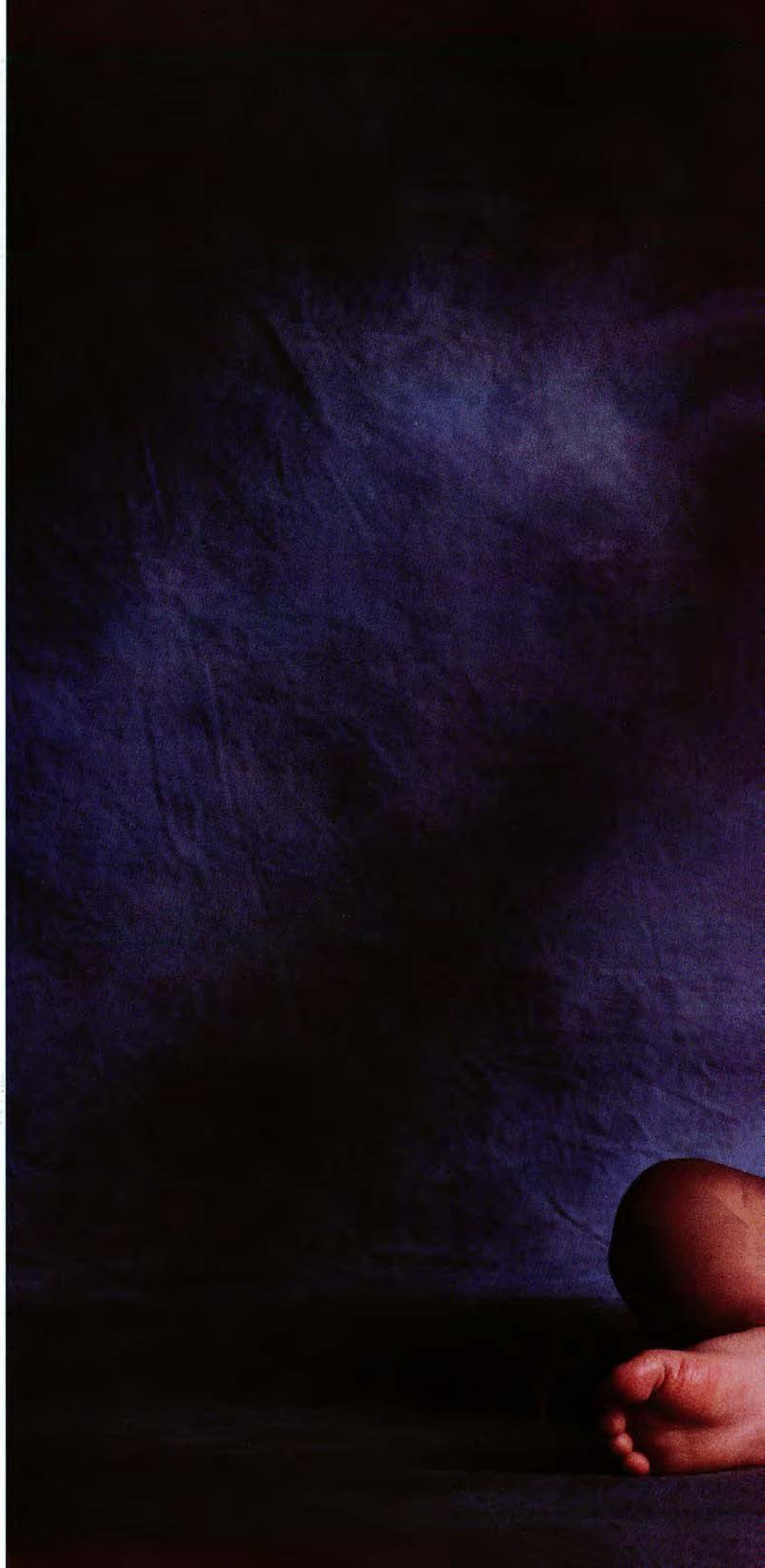

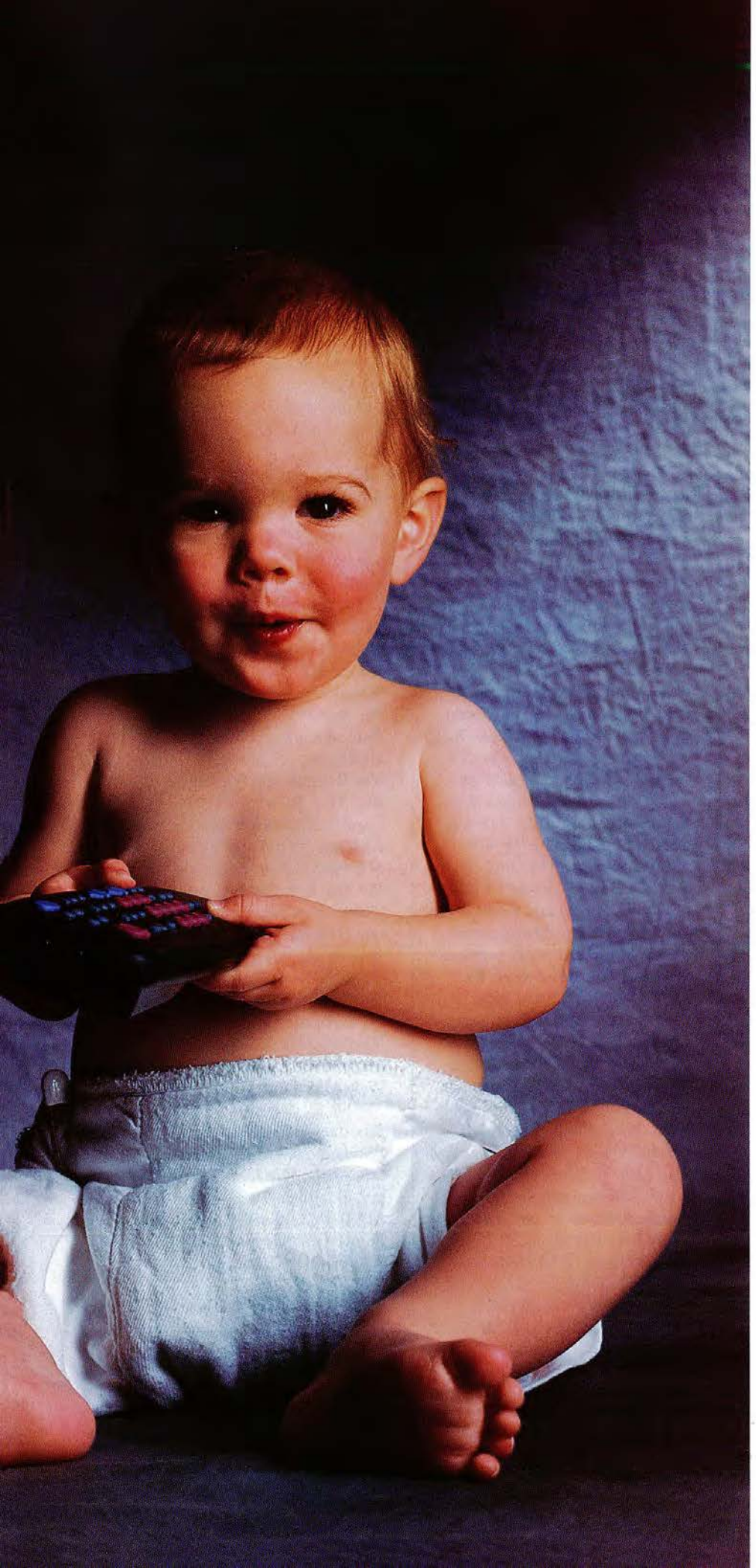

been "a bright light in childhood's sky." Offering preschoolers a safe haven to voice their truest feelings, fears and curiosities.

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If PBS doesn't do it, who will?

directory

a listing of goods and services

Additions & Extras *pp. 29-37*

p. 29—**Garden house:** *Heritage Garden Houses, 311 Seymour St., Lansing, MI* 48933; 517-372-3385. "Tiny Houses" by Lester Walker, 1987, 224 pp., $29.95, Overlook Press, Lewis Hollow Rd., Woodstock, NY 12498; 914-679-6838. **Tube Sale:** Pamphlets detailing how the National Energy Policy Act of 1992 will affect products: "Federal Energy Policy Guide," *GE Lighting, 800-626-2000.* "Relamping America: A Guide to the Energy Policy Act of 1992," *Osram Sylvania Inc., 100 Endicott St., Danvers, MA 01923; 800-LIGHTBULB.* "National Energy Policy Act 1992," $1; *Steve Goldmacher, Director of Government and Public Affairs, Philips Lighting Co., PO Box 6800, Somerset, NJ 08875-6800, 908-563-3000.* **Triangle-face hammer:** *Ted Hammers, Inc., 6152 Mission Gorge Rd., Suite G., San Diego, CA 92120-3146, 800-645-2434.*

p. 30—**Playground surfaces:** Fibar Wood Fibre, 3-cubic-foot bag of shredded wood, $6.50; Amdex rubber mat (with adhesive), FX55, $6.65 sq. ft.; *Fibar, Inc., Suite 300, 80 Business Park Drive, Armonk, NY 10504-1705; 914-273-8770; Fax: 914-273-8659.* "Green" **paint strippers:** Citristrip, 32-oz. bottle, $12; *Specialty Environmental Technologies, 4520 Glenmeade Lane, Auburn Hills, MI 48326; 810-340-0400.* Woodfinisher's Pride, 32-oz. bottle, $12; *W.M. Barr & Co., 2105 Channel Ave., Memphis, TN 38113; 901-775-0100.*

p. 32—**Recycled building materials:** *Urban Ore, 1333 Sixth St., Berkeley, CA 94702; 510-559-4460.* "John Brookes Garden Design Workbook," 1994, 72 pp., $15.95; *Dorling Kindersley Publishing, Inc., 95 Madison Ave., New York, NY 10016; 212-213-4800.* "The Book of Garden Design," by John Brookes, 1991, 352 pp., $45, *MacMillan Publishing Co., 866 Third Ave., New York, NY 10022; 212-702-2000.* **Epoxy** (used by Society for the Preservation of New England Antiquities on This Old House): Seep n' Seal, 1-gallon kit, $44.64; *Castall, Inc., Weymouth Industrial Park, E. Weymouth, MA 02189; 617-337-6075.*

p. 33—**Pathway materials:** Concrete pavers, *Concrete Paver Institute, 2302 Horse Pen Rd., Herndon, VA 22071; 703-713-1900; Fax: 703-713-1910.* Patio Pal, 20 sq. ft., $8.95; *Argee Corp., 9550 Pathway St., Santee, CA 92071; 619-449-5050; Fax: 619-449-8392.*Grass Pavers, about $2 sq. ft.; *Invisible Structures Inc., 14704-D East 33 Place, Aurora, CO 80011; 800-233-1510; Fax: 303-344-2232.* **Wire screening:** Bronze, 18x14 bronze, 36-inch wide, $2.12 sq. ft. (no minimum order); *Jamestown Distributors, 28 Narragansett Ave., Jamestown, RI 02835; 800-423-0030.* Bronze, copper, stainless steel, brass, etc. ($100 minimum order), *Gerard Daniel & Co. Inc., 5 Plain Ave., New Rochelle, NY 10801; 800-232-3332; or City Wire Cloth, 13900 Orange Ave., Paramount, CA 90723; 310-630-8050.* **Our thanks to:** *Air-Tite Manufacturing, 33519 SR2 Sultan, WA 98294; 206-793-3435.* Maker of wooden screen and storm doors.

p.34—**Interchangeable-tip screwdriver:** Model MR-502; *Latshaw Tools, 11020 Ambassador Dr., Suite 310, Kansas City, MO 64153; 800-833-3125.* **Triangle sanders:** Fein Model MSx 636-1 (with carrying case), $295; *Fein Power Tools, 3019 W. Carson St., Pittsburgh, PA 15204; 800-441-9878.* Bosch 7000, $122; and Bosch 7001, $156; *S-B Power Tool Co., 4300 W. Peterson Ave., Chicago, IL 60646; 312-286-7330.* **Finials:** Pressure-treated pine: *Universal Forest Products, PO Box 389, Windsor, CO 80550; 303-686-9651.* Vinyl: *Heritage Vinyl Products, Hwy. 45, Box 460, Macon, MS 39341; 601-726-4223.* Redwood: *The Wood Factory, 111 Railroad St., Navasota, TX 77868; 409-825-7233.* Iroko (comes with post cap): *Country Casual, 17317 Germantown Road, Germantown, MD 20874-2999; 800-284-8325.* Hemlock: *Constantine's, 2050 Eastchester Road, Bronx, NY 10461; 800-223-8087.* High-density polyurethane: *Georgia-Pacific, PO Box 1763, Norcross, GA 30091; 800-284-5347.* Cast iron: *Lawler Foundry Corp., PO Box 320069, Birmingham, AL 35232; 800-624-9512.* Mahogany: *Boston Turning Works, 42 Plympton St., Boston, MA 02118; 617-482-9085.*

p. 35—**Retaining walls:** Concrete wall blocks, $4 to $7 sq. ft.; *Versa-Lok, PO Box 9220, North St. Paul, MN* 55109; *800-770-4525.* **Square-drive screws:** *McFeely's, 1620 Wythe Rd., Lynchburg, VA 24501; 800-443-7937; Fax: 804-847-7136.* **Summer vacations:** Habitat for Humanity International Inc., *121 Habitat St., Americus, GA 31709-3498. Eastfield Village, PO Box 539, Nassau, NY 12123.* Bear Mountain Outdoor School, *Hightown, VA 24444.* Yestermorrow Design/Build School, *RR 1, Box 97-5, Warren, VT 05674.* Cape Cod School of Blacksmithing, *13 Captain Doane Way, Orleans, MA 02653.* Historic Knight & Co., *PO Box 158, Sutter Creek, CA 95685.* Fox Maple School of Traditional Building, *PO Box 249, West Brownfield, Maine 04010.* Heartwood School, *Johnson Hill Road, Washington, MA 01235.* Center for Furniture Craftsmanship, *125 West Meadow Road, Rockland, ME 04841.* Thomas Jefferson's Poplar Forest, *PO Box 419, Forest, VA 24551.* Marc Adams School of Woodworking, *RR 2, Box 121A, Franklin, IN 46131.* One Cottage Street School of Fine Woodworking, *1 Cottage St., Easthampton, MA 01027.* **Retrofit insulation:** Pour Foam, *Icynene, Inc., 376 Watline Ave., Mississauga, Ontario, CN L4Z 1X2; 416-890-7325; Fax: 416-890-7784.*

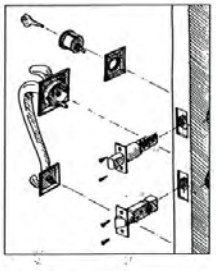
Treated Wood *pp. 39-41*

Cedar: *Western Red Cedar Lumber Association, 1100-555 Burrard St., Vancouver, BC V7X 1S7; 604-684-0266.* **Redwood:** *California Redwood Association, 405 Enfrente Drive, Suite 200, Novato, CA 94949; 415-382-0662.* **Cypress:** *Southern Cypress Manufacturers Association, 400 Penn Center Blvd., Suite 530, Pittsburgh, PA 15235; 412-829-0770.* **Treated wood:** *American Wood Preservers Institute, 1945 Old Gallows Rd., Suite 550, Vienna, VA 22182; 703-893-4005. Western Wood Preservers Institute, 601 Main St., Suite 405, Vancouver, WA 98660; 206-693-9958.* **ACQ-treated lumber:** *Quality Forest Products, Inc., Box 369, Glen Gardner, NJ 08826; 908-638-5534.* Boardwalk materials: **Fiberglass pilings and rail supports:** *Trimax of Long Island, 2076 Fifth Ave., Ronkonkoma, NY 11779; 516-471-7777.* **CCA-treated yellow pine:** *Georgia-Pacific Corp., PO Box 105605, Atlanta, GA 30348; 800-BUILDGP.* Trex **plastic/wood composite decking:** *Mobile Chemical Co., Composite Products Division, 800 Connecticut Ave., Norwalk, CT 06856; 800-BUY-TREX.* **Further reading:** "Pressure-treated wood: How bad is it and what are the alternatives?" Jan./Feb. 1993 issue, $10; *Environmental Building News, RR1, Box 161, Brattleboro, VT 05301; 802-257-7300.* **Our thanks to:** Riverhead Building Supplies, 303 Ostrander Ave., Riverhead, NY 11901; 516-727-3650.

Circular Saws *pp. 43-47*

7¼-inch **circular saw:** Model #447 with electric brake, $245; *Porter-Cable, PO Box 2468 Jackson, TN 38302; 901-668-8600.* 6 ½-inch **masonry blade,** #28001, $4.55; 7¼-inch **plywood blade,** #25270, $8.95; 7¼-inch **chisel tooth blade,** #26330, $4.35; 7¼-inch **decking blade,** #26880, $16.90; 7¼-inch **general purpose blade,** #27170, $13.55; 7¼-inch **remodeling blade,** #27350, $26.65; *Vermont American Tool Co., PO Box 340, Lincolnton, NC 28093; 704-735-7464.* 7¼-inch **trim blade,** #15230, $21.90; *American Tool, Inc., 92 Grant St. Wilmington, OH 45177; 513-382-3811.* **Clamps:** Vise-Grip locking bar clamp, #310S, $29.20; *Peterson Manufacturing Co., Inc., Dewitt, NE 68341; 402-683-2325.* 50-inch Clamp 'n Tool Guide, CT50C, $39.95; *Griset Industry, 3034 S. Kilson Dr., Santa Ana, CA 92707; 714-662-2888.* **Hearing protector:** E-A-R Ultra 9000, $49; *Cabot Safety Corp., 90 Mechanic St., Southbridge, MA 01550; 800-225-9038.*

Cylinder Locksets *pp. 49-52*



Single-cylinder deadbolt **lockset:** Madison Model #5320-003 with Lifetime Finish, $290.50; *Baldwin Brass, 841 E. Wyomissing Blvd., Reading, PA 19612; 610-777-7811.* 36-inch, six-panel **pine door:** Morgan M-7100, $593.45; *Morgan Manufacturing, PO Box 2446, Oshkosh, WI 54903; 800-766-1985.* ⅜-inch **VSR drill:** #2621, $185; *Porter-Cable, PO Box 2468, Jackson, TN 38302; 901-668-8600.* 12-volt **cordless screw gun:** #DW945K-2, $337; *Continued on page 136*

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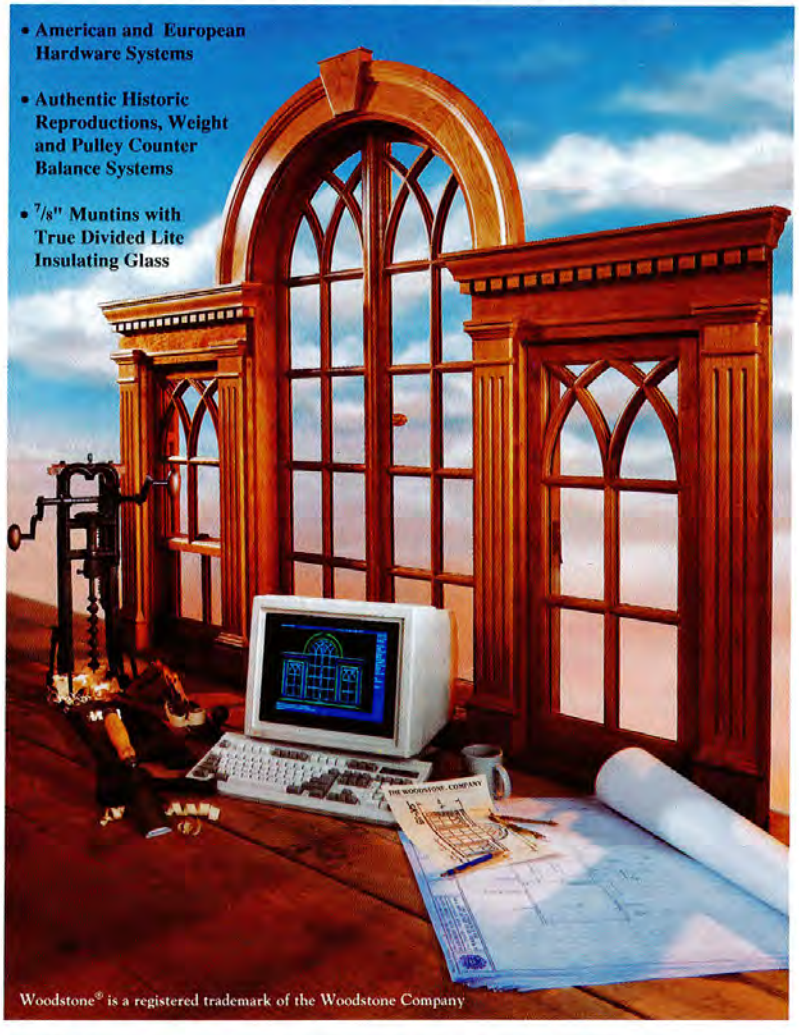

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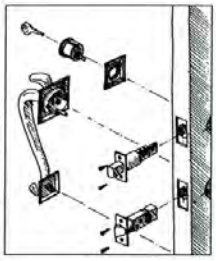
Cylinder Locksets *pp. 49-52 (continued)*



DeWalt, 626 Hanover Pike, PO 158, Hampstead, MD 21074; 800-433-9258. 1½-inch **hole saw:** #49-56-1500, $7.60; *Milwaukee Tool Co., 13135 W. Lisbon Rd., Brookfield, WI 53005; 414-781-3600.* 1-inch **spade bit:** #8816, $3.25; *American Tool, Inc., 92 Grant St., Wilmington, OH 45177, 513-382-3811.* 1-inch bevel-edge **bench chisel,** Marples M444-1, $10.82; *Record Tools, Inc., 1920 Clements Rd., Pickering, Ontario, CN L1W 3V6; 905-428-1077.*

Carpenter: *JayJones, Jones Woodworking, 127 Oakley Ave., White Plains, NY 10601; 914-686-5119.*

Outdoor Lighting *pp. 55-56*

Low-voltage transformer: Model LV345T, $40.92; 16-gauge **low-voltage cable,** 100 feet, $24.48; *Intermatic Malibu, Intermatic Plaza, Spring Grove, IL 60081-9698; 815-675-2321.* Yellow **caution tape:** 300-foot roll, $6; *Ivy Classic Industries, 109 Fairview Park Dr., Elmsford, NY 10523; 914-347-3705.* **For information:** Thomas Wirth, *Thomas Wirth Associates, 2 N. Main St., Sherborn, MA 01770; 508-651-3643.*

Further reading: "How to Design and Install Outdoor Lighting," 96 pp., $9.95; *Ortho Books, 1160 Research Blvd., St. Louis, MO 63132; 800-822-6349.*

Soldering Copper Pipe *pp. 59-61*

Propane torch: Model TS 2000K two-piece, trigger-start kit $31.56; *BernzOmatic, 1 BernzOmatic Dr., Medina, NY 14103; 716-798-4949.* **Solder:** 100% Watersafe, 1-lb. spool, $6.80; *M.C. Canfield & Son., 1000 Brighton St., PO Box 3100, Union, NJ 07083; 908-688-5050.* **Flux:** Nokorode Soldering Paste, 1.7-oz. can, $1.29; *The M.W. Dutton Co., 3 Bridal Ave., PO Box 232, West Warwick, RI 02839; 401-821-1832.* **Fitting brush:** Model 6100, $2; *Mill-Rose Co., 7995 Tyler Blvd., Mentor, OH 44060; 216-255-9171.* **Emery cloth:** 1½-inch x 10–yard roll, $5.95; *Durst Corp., 115 Globe Ave., Mountainside, NJ 07092; 908-789-2880.* **Fittings:** *Nibco, 500 Simpson Ave., Elkhart, IN 46516; 219-295-3000; Elkhart Products Corp., PO Box 1008, Elkhart, IN 46515; 219-264-3181.* **Tubing cutter:** #125, $13.75; *General Hardware Mfg. Co., 80 White St., New York, NY 10013; 212-431-6100.* **Instant patina solution:** Patina Green, 8-oz. bottle, $11.45; *Constantine's, 2050 Eastchester Road, Bronx, NY 10461; 800-223-8087.* **Further reading:** "Plumbing a House" by Peter Hemp, 1994, 224 pp., $29.95; *The Taunton Press, 63 S. Main St., Newtown, CT 06470; 203-426-8171.* "The Copper Tube Handbook," 1995, 50 pp., $4; *Copper Development Association, 260 Madison Ave., New York, NY 10016; 212-251-7200.* **Our thanks to:** Richard Trethewey, *RST, Inc., 19 Thompson St., Dedham, MA 02026;* Wayne Rupert, *Technical Services Manager, Engelhard Corp., 235 Kilvert St., Warwick, RI 02886.*

Is Your Contractor Insured? *pp. 63-66*

Certificate of liability **insurance forms:** Acord 25-S, (available only through insurance companies); *Acord Corp., One Blue Hill Plaza, 15th Floor, Pearl River, NY 10965-8529; 800-444-3341.*

AIA Document G715, 50 sheets, about $8; *American Institute of Architects, 1735 New York Ave. NW, Washington, DC 20006; 202-626-7300.*

Choosing Kitchen Materials *pp. 74-81*

Computer-aided design (CAD) systems: HOK Xanimate and HOK drawVision (proprietary virtual-reality design programs), *Hellmuth, Obata, Kassabaum, Inc., One Metropolitan Square, 211 N. Broadway, St. Louis, MO 63102-2733; 314-421-2000.* AutoCAD release 13, $3,795; *Autodesk, Inc., 111 McInnis Parkway, San Rafael, CA 94903; 800-964-6432.* 3D Home Architect, $59.95 on diskettes (requirements: 20-Mhz 386SX PC, 486 preferred; 4MB RAM; 6MB free on hard drive; Windows 3.1; mouse; VGA, SVGA recommended); $69.95 on CD-ROM (requirements: 20-Mhz 386SX PC, 486 recommended; 4MB RAM; 6MB free on hard drive, 10MB preferred; MPC-compliant sound card; VGA, SVGA with 256 colors recommended). *Brøderbund Software, Inc., 500 Redwood Blvd., PO Box 6121, Novato, CA 94948-6121; 800-521-6263.*

Counters (pp. 76–77) Note: In countertop listings, one lineal foot is a 25-inch-deep section of counter one foot wide. **1. Stainless steel:** $75 per lineal foot, for fabrication only; installation can run to $1,000 for 8 hours of work by a two-man crew with metalworking gear. *Modern Stainless, 33395 Railroad, Union City, CA 94587; 510-471-9191.* **2. Man-made slab:** FireSlate; $23 sq. ft. *FireSlate–2 Inc., 47 Hamel Rd., Lewiston, ME 04240; 800-523-5902.* **3. High-pressure laminate:** Formica in Saffron 7024-58; $3–$3.50 per lineal foot for laminate only; $12–$15 per lineal foot, installed. *Formica Corp., 800-FORMICA (800-367-6422).* **4. Stone slab:** Verde Maratonka granite, 1½-inch slabs, $45 sq. ft.; Travertine marble, 1½-inch slabs, $35 sq. ft.; Premier bluestone, 1¼-inch slabs, $12.05 sq. ft. Additional cost for all edge finishing. *Bergen Bluestone, 404 Route 17, Paramus, NJ 07652; 201-261-1903.* **5. Concrete:** Custom fabricated pigmented concrete countertop; $85 sq. ft., plus shipping & freight costs from the west coast. *Ann Sacks Tile & Stone Inc., 5 E. 16th St., New York, NY 10003; 212-463-8400.* **6. Wood:** Butcherblock slab fabricated from scrap by Jon W. Brayshaw. **7. Soapstone:** Approx. $140 per running foot (25" depth) installed. *Vermont Soapstone Co., Box 168, Stoughton Pond Rd., Perkinsville, VT 05151; 802-263-5404.* **8. Exotic metals:** Copper, $125 per lineal foot; zinc, $45 per lineal foot, both for fabrication only; installation can run to $1,000 for 8 hours of work by a two-man crew with metalworking gear. *Modern Stainless, 33395 Railroad, Union City, CA 94587; 510-471-9191.* **9. Ceramic tile:** Top, LS Obidos in blue, 5⅛ x 5⅛ inches; Bottom, RO Bordeaux in red, 5⅛ x 5⅛ inches. *Country Floors, 15 E. 16th St., New York, NY 10003; 212-627-8300.* **10. Solid surfacing:** Formica Surell in Pinedust; $80–$120 per lineal foot (25" depth), installed. *Formica Corp., 800-FORMICA (800-367-6422).* **Fabrication work** on stainless steel, laminate, wood, exotic metals and solid surfacing by *Jon W. Brayshaw, 66 W. 82nd St. # 2A, New York, NY 10024; 212-769-4884.*

Duffy House – Cabinets: *American Cabinet Concepts, Inc., 1021 Columbia Blvd., Longview, WA 98632; 800-531-4466.* **Appliances:** Sealed-burner **gas cooktop:** KGCT365BBL-2, $689; thermal-convection **ovens:** KEBN107YWHO, $l,539 each; microwave oven, $299; built-in side-by-side **refrigerator:** KSS42DBW00, $3,899; **dishwasher:** KUDS230B, $759; undercounter **trash compactor:** KUCS181T, $629; slide-out **vent hood:** KWVU265YBA, $509; *KitchenAid, 701 Main St., St. Joseph, MI 49085. 800-422-1230.* **Countertop:** Avonite, $135.41 *Continued on page 138*

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Choosing Kitchen Materials *pp. 74-81 (continued)*

sq. ft.; *Avonite, 1945 Highway 304, Belen, NM 87002; 505-864-3800.* Triple-compartment **sink:** black Bon Vivant K-5910, $902.40; metal-frame, one-compartment **sink:** black Mayfield K-5964, $297.15; **sink strainer:** K-8801, chrome, $38.20; single-control pull-out spray Epicure **faucets:** K-6996, $594.50; *Kohler Co., 444 Highland Dr., Kohler, WI 53044; 414-457-4441.* Pacific Filler **wood putty,** $25 gallon; Pacific High Build water-based **sealer,** $43 gallon; Pacific Strong Silkmat semi-gloss and gloss water-based **urethane floor finish,** $75.50 gallon; *BonaKemi USA, Inc., 14805 East Moncreiff Place, Aurora, CO 80011-1207; 800-872-5515.* 5/16-inch **white oak flooring:** $3 sq. ft.; **Peruvian walnut border trim:** $1.10 linear foot; *Saroyan Lumber Co., 6230 S. Alameda St., Huntington Park, CA 90255; 213-589-5704.* **Undercounter wine storage unit:** Model 15WC, $789; *U-Line Corp., 8900 N. 55th St., PO Box 23220, Milwaukee, WI 53223; 414-354-0300.* **Architect:** Robert Livingston and Jon Lail, *Architectural Associates, 1126 Adams St., St. Helena, CA 94574; 707-963-1565.* **General contractor:** Jim Nolan, *James Nolan Construction, Inc., PO Box 90, St. Helena, CA 94574; 707-963-3222.* **Flooring contractor:** Ron Spiteri, *Spiteri Bros. Hardwood Floors Co., 1729 Action Ave., Napa, CA 94558; 707-226-7543.* **Kitchen designer:** *Novato Kitchens & Baths, 1066 Machin Ave., Novato, CA 94945; 415-897-8504.* **Solid-surfacing installer:** Kara Raymond, *Surface Technology Corp., 250 Industrial Way, Suite A, San Carlos, CA 94070; 415-595-2976.*

Floors (pp. 78–79): 1. Hardwood: Sterling Strip oak flooring in Natural (C-720); 2¼ inches wide by ¾ inches thick in varying lengths; approx. $6.00 sq. ft. All installation extra. *Bruce Hardwood Floors, 16803 Dallas Parkway, Dallas, TX 75248; 800-722-4647.* **2. Ceramic & Stone Tile:** Top, San Miniato Relief terra cotta tile, 10 x 10 inches. *Country Floors, 15 E. 16th St., New York, NY 10003; 212-627-8300.* **3. Linoleum:** Marmoleum Dual in Calico (# 713) and Firedance (# 775), approx. $3.50 sq. ft., installed. *Forbo Industries Inc., Humboldt Industrial Park, Box 667, Hazelton, PA 18201; 800-233-0475.* **4. Vinyl tile:** Classic Touch Grand Mosaic in Raintree/Teal (GR-98), 12 x 12 x ⅛ inch; $3.50 per tile. *Congoleum Corp., 3705 Quakerbridge Rd., Box 3127, Mercerville, NJ 08619; 609-584-3000.* **5. Sheet vinyl:** Sensation Courtyard in Light Blue Spruce (55020) and Terra Cotta (55021), $26–$29 per square yard, installation cost varies. *Congoleum Corp., 3705 Quakerbridge Rd., Box 3127, Mercerville, NJ 08619; 609-584-3000.* **6. Cork tile:** Unfinished (# 6300) and Wax (# 200) finishes, 12 x 12 x 5/16 inches, $2.78 and $3.44 sq. ft., respectively. *Dodge-Regupol Inc., 715 Fountain Ave., Box 989, Lancaster, PA 17608; 717-295-3400.* **7. Terrazzo tile:** Neptune Style N546 (light grey), $2.64 sq. ft.; New Rustic N544 (darker tile), $3.05 sq. ft. Each tile is 11 13/16 inches square by ¾ inch thick. *Wausau Tile Inc., Box 1520, Wausau, WI 54402; 800-388-8728.* **8. Rubber tile:** Cerrito Collection Red (# 186), $4.41– $4.73 sq. ft.; Cerrito Collection Seafoam (# 115), $3.57–$3.83 sq. ft.; both Vantage Profile Raised Circular Design (5/32 inch high with profile). Slate (# 175) Parquet Design (3/64 inch high with profile, 19 11/16 inches square, $3.57–$3.83 sq. ft. *Roppe Corp., 1602 Union St.—Box X, Fostoria, OH 44830; 800-537-9527.* **9. Carpeting & area rugs:** $19.99 per square yard. *Shaw Industries Inc., PO Drawer 2128, Dalton, GA 30722; 800-441-7429.* **10. Epoxy:** Permatop Liquid Binder with Color Quartz in QS8 (red) and QS3 (brown); approx. $5–$9 sq. ft., installed. *Permagile Industries Inc., 101 Commercial St., Plainview, NY 11803; 800-645-7546.*

For information: *National Kitchen and Bath Association, 687 Willow Grove St., Hackettstown, NJ 07840; 908-852-0033.* Certifies kitchen and bathroom designers. **Further reading:** "This Old House Kitchens: A Guide to Design and Renovation" by Steve Thomas and Philip Langdon, 1992, 288 pp., $24.95; *Little, Brown and Co., Inc., 34 Beacon St., Boston, MA 02108; 617-227-0730.*

Salvaging Antique Lumber *pp. 82-89*

River-recovered **heart pine lumber:** *Goodwin Heart Pine Co., Rt. 2, Box 119-AA, Micanopy, FL 32667; 904-466-0339; Fax: 904-466-0608.* **For information:** *Association for the Restoration of Longleaf Pine, PO Box 141464, Gainesville, FL 32614-1464.* Provides photocopies of out-of-print books on the ecology and history of longleaf pine. Also sells 32-page calendar ($8) containing a book's worth of information on longleaf pine.

Exterior Painting *pp. 90-95*

Stain-blocking **primer:** Kilz Total One, $30.22 gallon, *Masterchem Industries, Inc., PO Box 368, Barnhart, MO 63012; 800-325-3552.* **Airless sprayer:** *Graco Inc., PO Box 1441, Minneapolis, MN 55440; 800-367-4023.* Flat exterior **latex paint:** Moorlife #105, $26.95; *Benjamin Moore & Co., 51 Chestnut Ridge Rd., Montvale, NJ 07645; 800-826-2623.* 3-inch straightedge **siding brush,** XL-Elasco trim, $16.99; *Purdy Corp., PO Box 83097, Portland, OR 97283; 800-547-0780.* 2-inch angled **sash brush** (Aboff's series), $6.49; *Aboff's, 209 Main St., East Setauket, NY 11733; 516-751-4012.* 2½-inch straightedge **trim brush,** Brandywine #0-182444-00, $14.98;, *Bestt Liebco, Joseph Lieberman & Sons, Inc., 1201 Jackson St., Philadelphia, PA 19148; 800-523-9095.* **Painting contractor:** Fred Elie, *J & J Services, 14843 Southwest 65 Terrace, Miami, 33193; 305-386-7651.* **Further information:** *Paint Quality Institute, Rohm & Haas Co., PO Box 1348, Philadelphia, PA 19105-9965.* **Our thanks to:** Warren Wood (Goulds, Florida).

A Better Backyard Barbecue *pp. 96-101*

Hand-forged, stainless-steel **grill:** $250; *Custom Iron Works, 155 S. Sixth Ave., LaPuente, CA 91744; 818-369-9697.* Drop-in **gas barbecue:** Fire Magic #3120-66, $470; **smoker oven:** #3630, $249; **rotisserie:** #3600, $125; *Robert H. Peterson Co., 530 Baldwin Park Blvd., City of Industry, CA 91746; 800-332-3973.* Manufactured **stone veneer:** Cultured Stone, Earth Blend River Rock texture: $3.85 sq. ft. for flat stones, $5.75 linear ft. for corners; Manufactured **cap stones:** Cultured Stone, Blond Driftwood hearthstone, $15.50 for a 19x20-inch piece; *Stone Products Corp., PO Box 270, Napa, CA 94559; 800-225-7462.* **Firebrick:** 74 cents each; *Pacific Clay Products, PO Box 549, Lake Elsinore, CA 92330;* 909-647-2131. **Pottery:** $10 to $45; *Tom Swanson, 1848 Perdue Ave. #7, Los Angeles, CA 90025; 310-444-1944.* **Mason:** *Bartholomy & Sons Masonry, 755 W. E St., Ontario, CA 91762; 909-391-4282.* **Our thanks to:** Jim Huber, *Huber Masonry, 5163 Eastside Rd., Redding, CA 96001; 916-246-7801. Bob's Masonry and Landscape Supply, 13525 Central Ave., Chino, CA 91710; 909-627-8568 and* Chris Holter (Topanga, CA).

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How to Sail a House *pp. 102-103*

House movers: *Robbins & Co., 818 SW 142nd St., Seattle, WA 98156; 206-244-1023.* Our thanks to: *International Association of Structural Movers, PO Box 1213, Elbridge, NY 13060; 315-689-9498.*

Long-Lived Trees *pp. 104-111*

Further reading: "Plant a Tree: Choosing, Planting & Maintaining This Precious Resource," by Michael A. Weiner. 1992, 304 pp., $18.95; *John Wiley & Sons, Inc., 605 Third Ave., New York, NY 10158; 212-850-6000.* "The Tree Book," 34-pp., free; *National Arbor Day Foundation, 100 Arbor Ave., Nebraska City, NE 68410; 402-474-5655.* $10 membership includes 10 free tree seedlings. **For information:** *American Forests, PO Box 2000, Washington, DC 20013; 800-368-5748.* Maintains National Register of Big Trees, a list of 799 trees that are the largest of their species. List of trees by state and species, $7.95; annual tree calendar, sponsored by Davey Tree Expert Co., $6.95 plus $1 shipping. *American Forests Famous and Historic Trees Program, 8555 Plummer Road, Jacksonville, FL 32219; 800-320-8733.* Free booklet describes trees grown from seeds of trees that stood through famous events or were grown by famous people. Seedlings from George Washington's tulip poplar, a Walden Woods weeping willow, Martin Luther King's water oak, and others, $35, plus $7 shipping and handling. **Our thanks to:** Warren Wood, *Mango Creek Nursery, PO Box 724, Goulds, FL 33170; 305-258-5605.*

Foundations *pp. 112-121*

Diamond **rebar cutter:** DC-20XH, $1,916; *Benner Nawman, Inc., 3070 Bay Vista Ct., Bencia, CA 94510; 800-992-3833.* **Foundation contractor:** Tom Jinks, *Green Valley Concrete Contractor, 1159 Green Valley Rd., Napa, CA 94558; 707-224-0506.* **Engineer:** Juan Escudero, *E-P Engineers, 101 S. Coombs St., Suite B, Napa, CA 94559; 707-226-5470.* **For information:** *Shelter Institute, 38 Center St., Bath, ME 04530; 207-442-7938.*

Our thanks to: Chet Widom, *Widom, Wein, Cohen, 2020 Santa Monica Blvd., Suite 400, Santa Monica, CA 90404.*

Norm Abram's Timber Frame *pp. 122-125*

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Low-country Porches *pp. 126-131*

Further reading: "A Guide to Historic Beaufort," 112 pp., $9.45; *Historic Beaufort Foundation, Inc., 801 Bay St., Beaufort, SC 29901; 803-524-6334.* "Historic Savannah," 300 pp., $15; *Historic Savannah Foundation, PO Box 1733, Savannah, GA 31402; 912-233-7787.* "The Beaufort Preservation Manual," 168 pp., $15, and "The Beaufort Preservation Manual Supplement." 88 pp., $15; *Planning Department, City of Beaufort, Beaufort, SC 29901; 803-525-7011.* These two manuals are filled with detailed information on how to repair nineteenth-century homes. **Our thanks to:** Cynthia Jenkins (Beaufort, SC).

Save This Old House *p. 148*

Our thanks to: Mike Page, Zoning Inspector, City of Grand Rapids, 345 State St., Grand Rapids, MI 49503; 616-456-3451.

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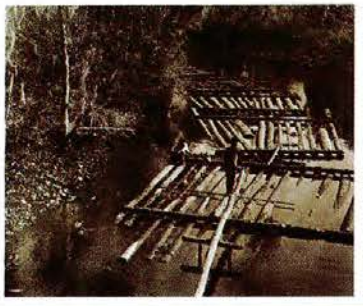

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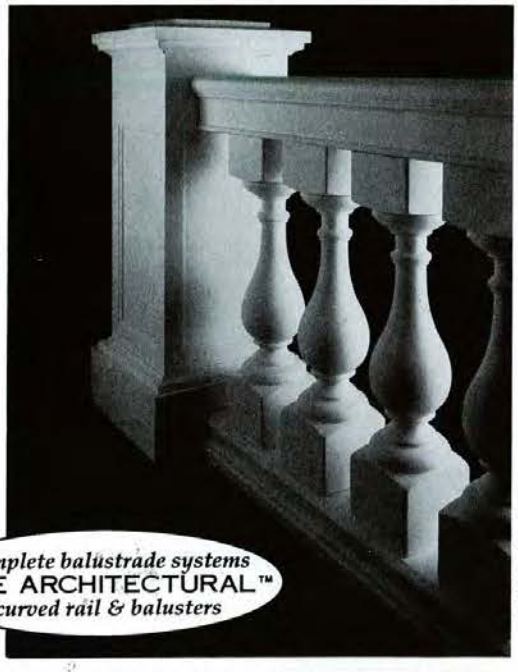

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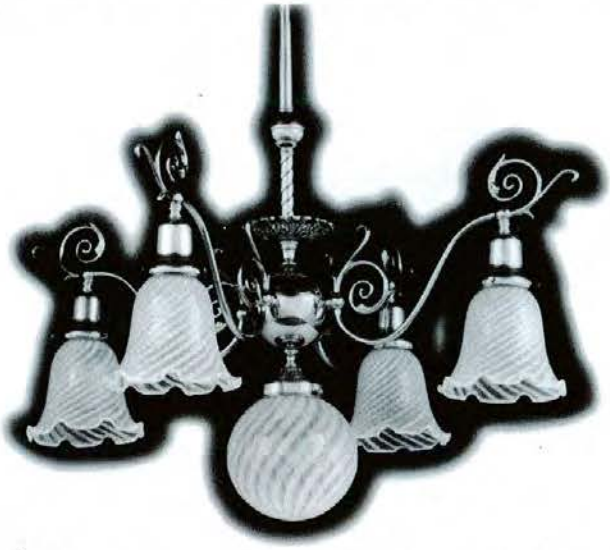

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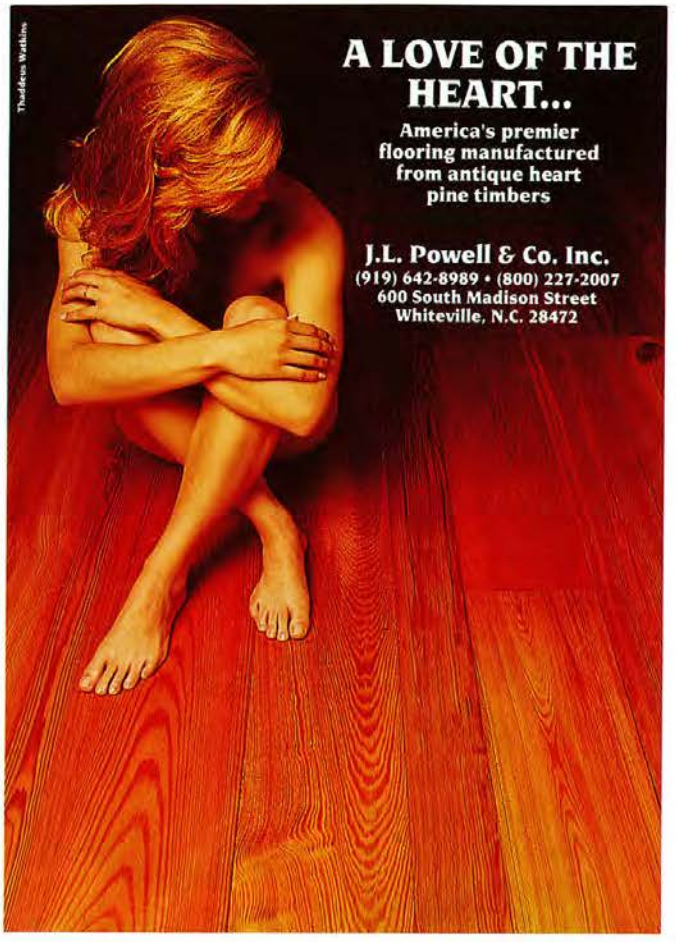

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