NOVEMBER/DECEMBER 1997

This Old House®

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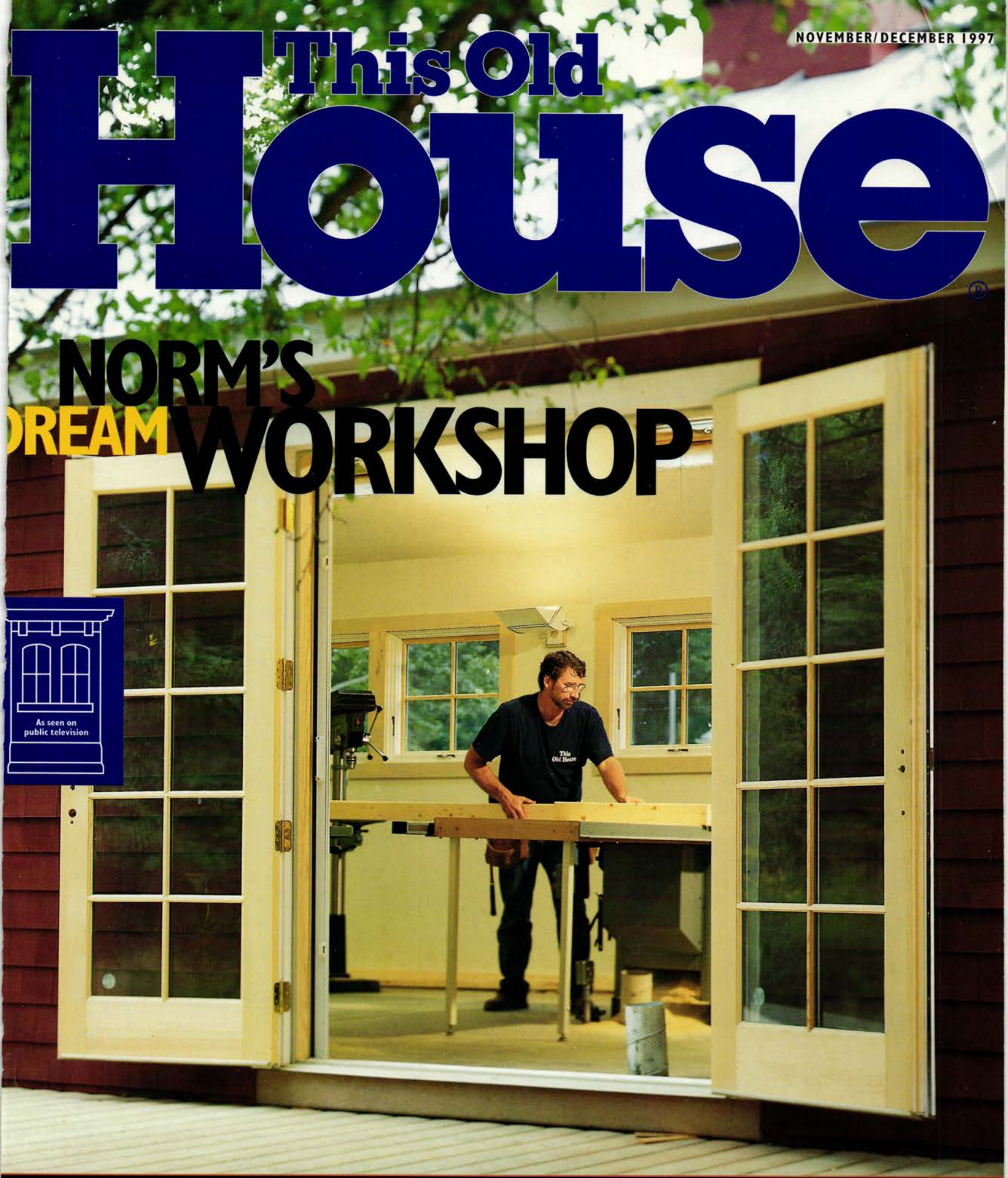

As seen on public television

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AN EXTRA BEDROOM • ADDING DORMERS • MOVING REALLY BIG TREES • KITCHEN COUNTER INTELLIGENCE

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GETTING IN AND OUT OF YOUR PICKUP

SHOULDN'T BE ONE OF THEM.

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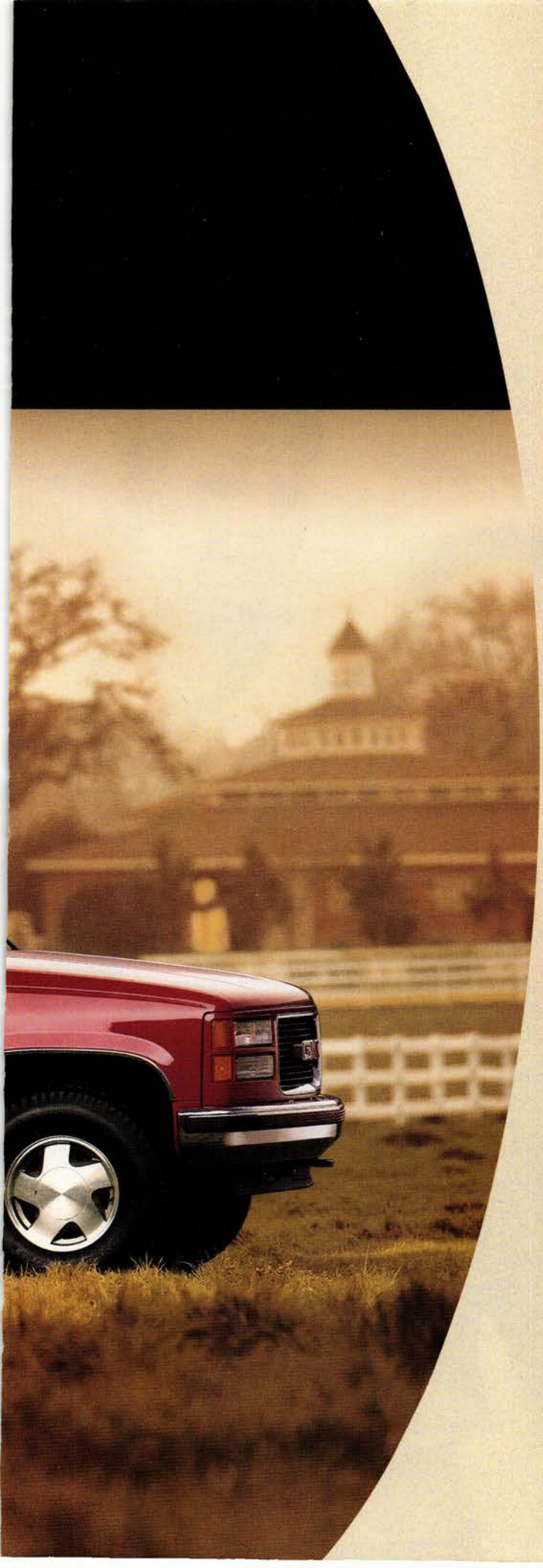

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THANKS TO HOME DEPOT THIS MARRIAGE

GARY & DAWN
GIBSON

May 2, 1996

Dear Home Depot—

Having all the answers about home improvement is one thing — but who would've thought we'd ever come to you for wedding advice.

Let me explain.

We wanted to build a deck at our new lake house so we could get married there. Thanks to your employee John Nerland, we pulled it off. From suggesting the right wood, to recommending a speed square that saved us time and money, John was great.

We literally drove the last nail hours before the wedding and everything went off without a hitch (sorry). The deck looks terrific, and John's advice made all the difference. Next to the minister, he was the one person we couldn't have gotten married without.

Sincerely,

Dawn Gibson

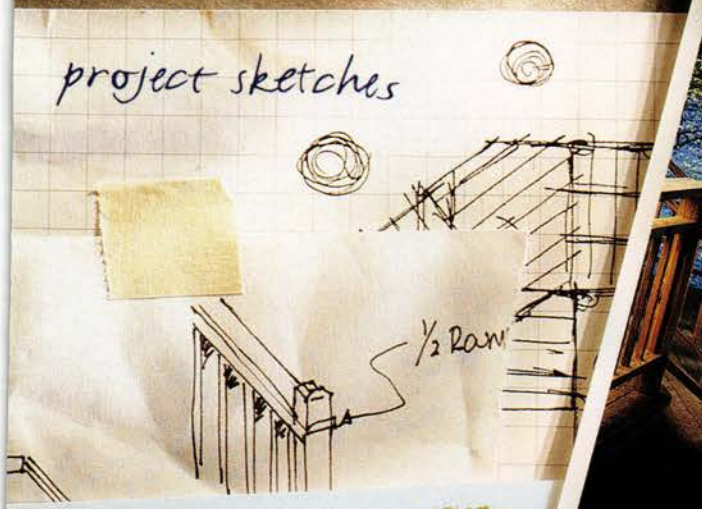
P.S. Pictures are enclosed.

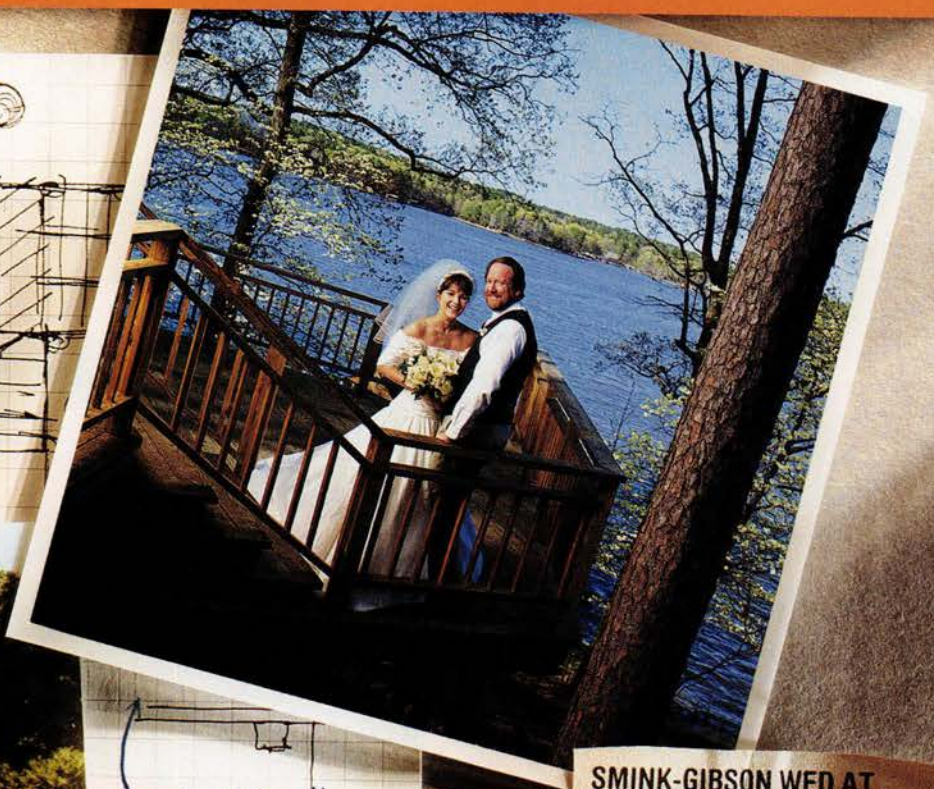
RECEIVED
MAY 6 199

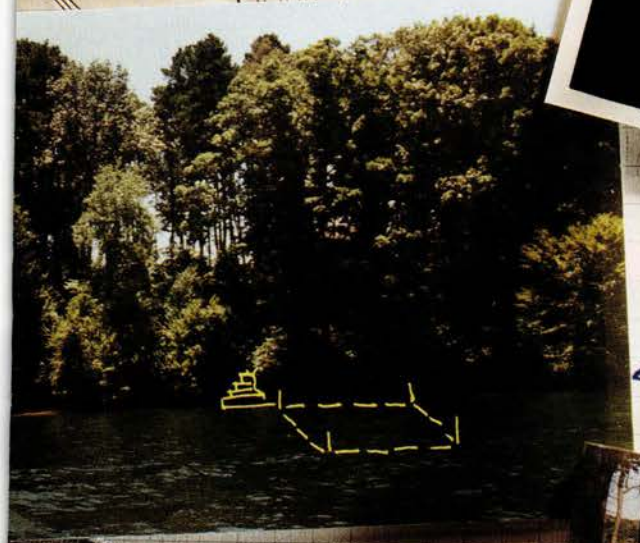
The finished deck

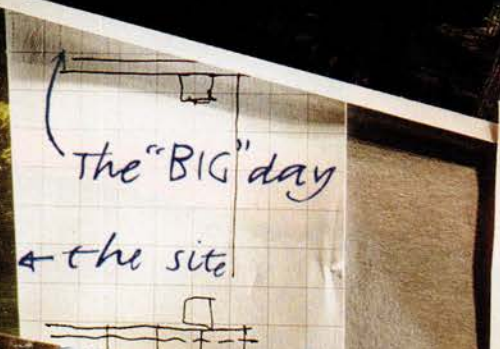
Have a Home Depot story? Call us at 214-891-7777.

STARTED OUT ON A FIRM FOUNDATION.









SMINK-GIBSON WED AT LAKE CYPRESS SPRINGS

Mt. Vernon, TX—The former Ms. Dawn Smink and Gary Gibson were wed Saturday, March 23, 1996 outdoors at the site of their soon to be completed lake home located on Lake Cypress Springs, near Mt. Vernon, Texas.

The couple invited 100 friends and family members over for an afternoon of boating, skiing, fishing and swimming, then surprised everyone with an impromptu

...ony was Justice ...nd his wife, Myra, ...er of Mr. and Mrs. ...las, Texas. She is ...unt Hotel. Mr. Gib- ...ne Richards Group, ...y located in Dallas. ...d by Sandman's Bar-

THE HOME DEPOT

CUSTOMER NAME Dawn & Gary Gibson

LOCATION Mt. Vernon, TX | PROJECT deck

EMPLOYEE NAME John Norland | store # 0550

DATE 5/14/96 | ARCHIVE NO 96-3247

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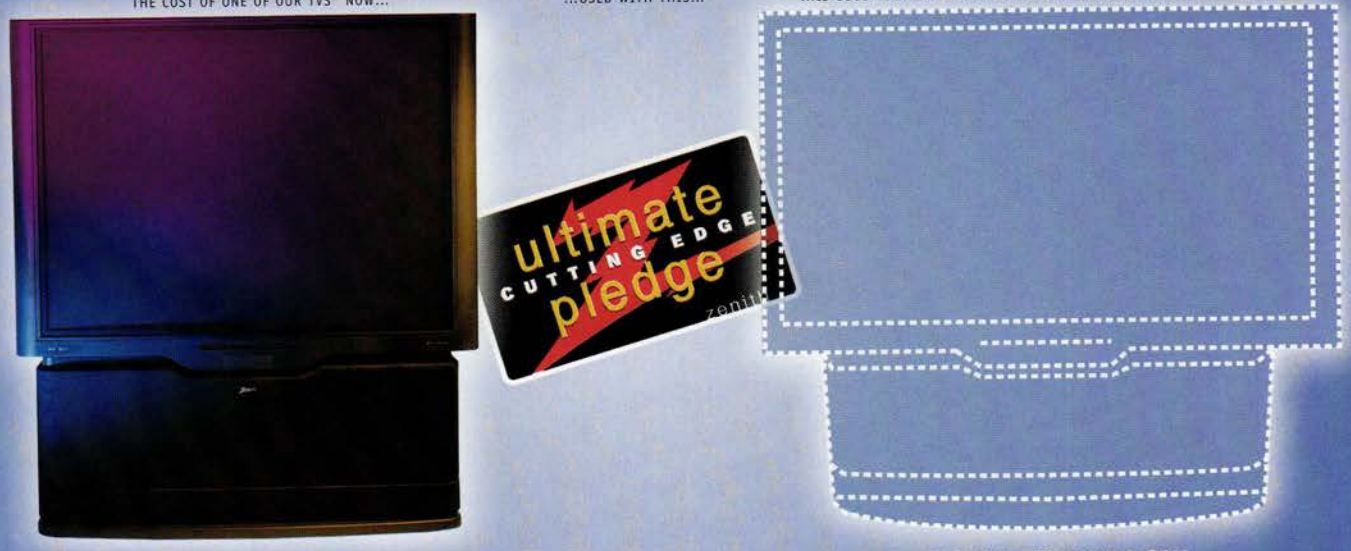

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CUTTING EDGE PLEDGE

WE THOUGHT OF EVERYTHING

NOVEMBER/DECEMBER 1997

The Poster Handsaws

From a reversible gent's to a Japanese keyhole to a French flush cut, a well-balanced, sharp-toothed handsaw can turn your arm into a wood-devouring shark. By Jeff Taylor P. 141

FEATURES

THAR SHE THROWS, P. 122

BACK IN THE DAY, P. 128

TOOL SCHOOL, P. 112

COVER PHOTOGRAPH BY KELLER & KELLER

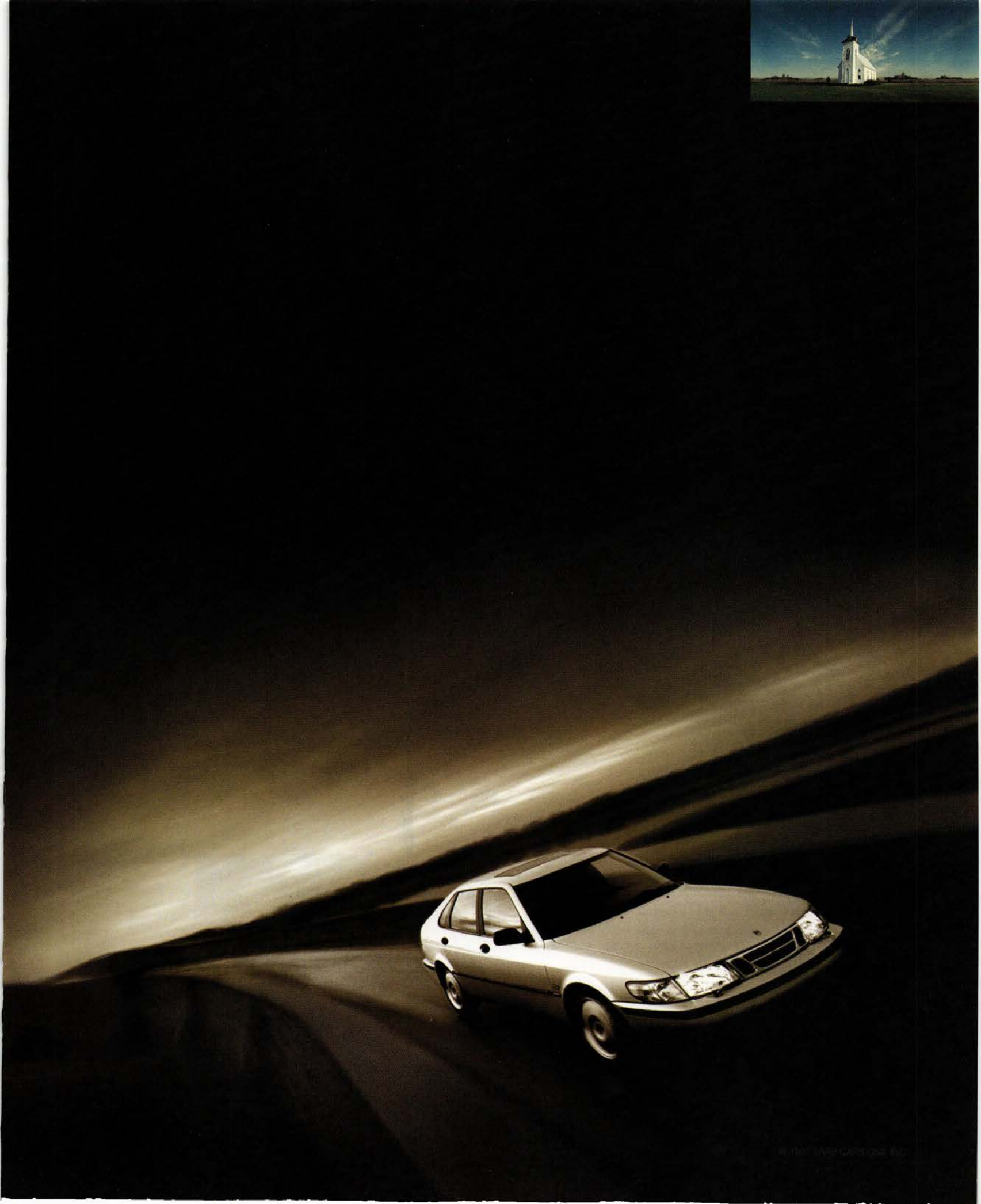
PHOTOGRAPHS, TOP TO BOTTOM, BY BILL WHITE, KELLER & KELLER, THE DEVINE FAMILY, ALISON ROSA

(Continued on page 10)

SAFETY MARRIES PERFORMANCE. THEY ELOPE.

Are these two well-suited for each other? Do opposites really attract? Put yourself in a Saab 900 SE on a freeway entrance ramp with a semi bearing down in your side mirror. Touch the accelerator and the turbocharged 185-horsepower engine makes a powerful argument for this marriage. Now imagine the same Saab in a tight hairpin turn on the sheer-drop side of a mountain. Feel the car clench the road? Of course you do. Because its center of gravity is positioned near your hips, where you first sense lateral movement. Performance and safety, always hand in hand. With you, a devoted chaperone.

SAAB



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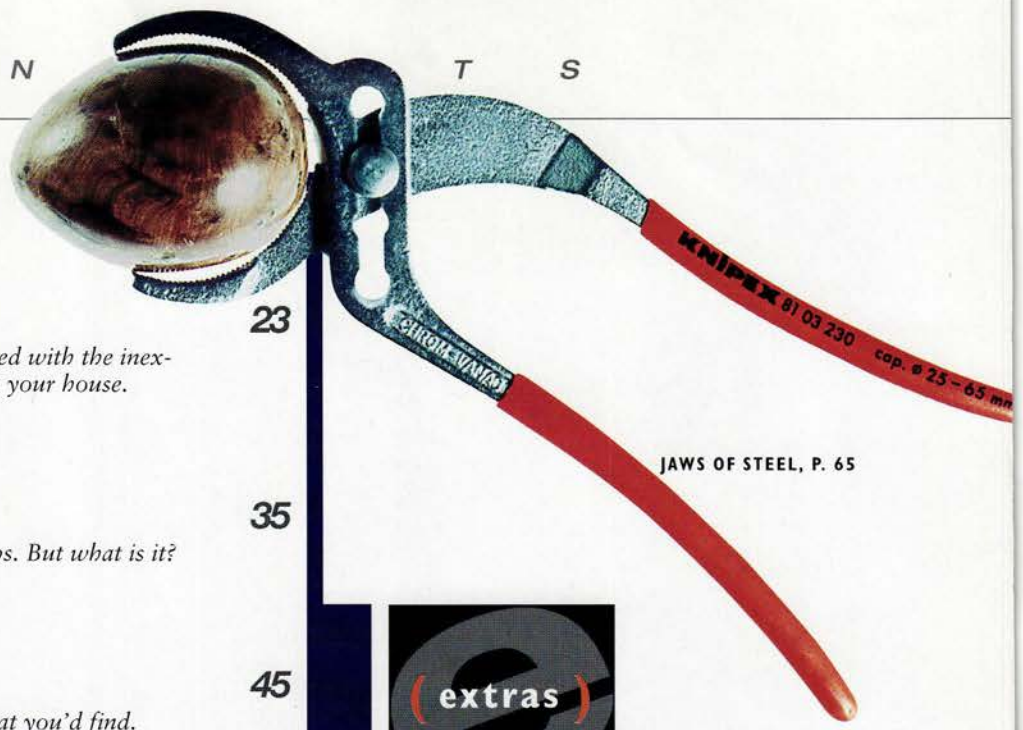

JAWS OF STEEL, P. 65

UP FRONT

extras

CHRISTMAS CUTTING, P. 27

SOLID SURFACING, P. 35

PLUS

PHOTOGRAPHS, TOP TO BOTTOM, BY JIM COOPER, KELLER & KELLER, KOLIN SMITH

MOM HAD A KITCHENAID DISHWASHER.

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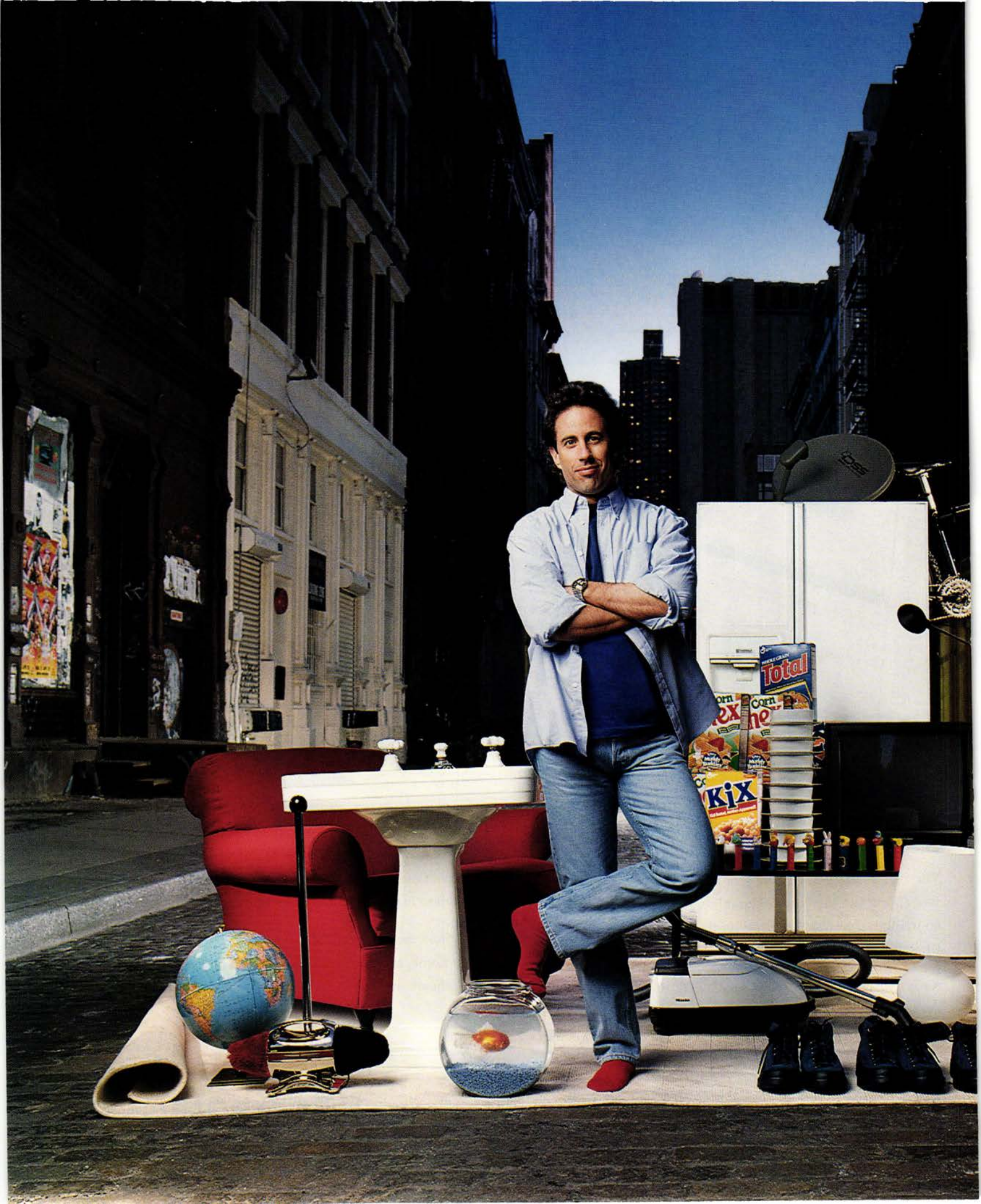
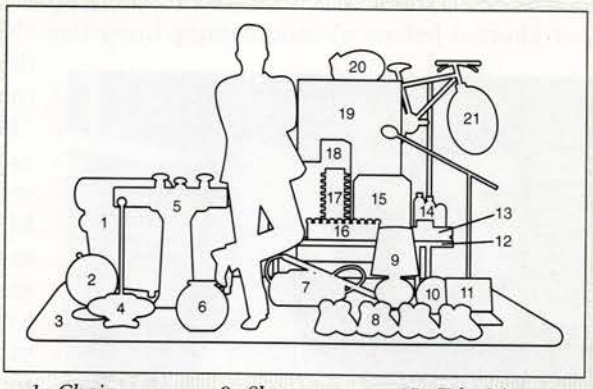

Total
KIX

A Cardmember Goes Shopping

JERRY SEINFELD

{Comedian, Author, Cereal Lover}



1. *Chair*
2. *Globe*
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10. *Basketball*
11. *Computer*
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13. *Video Game*
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15. *Television*
16. *Pez Collection*
17. *Cereal Bowls*
18. *Cereal*
19. *Fridge*
20. *Satellite Dish*
21. *Bike & Stand*

The American Express® Card is welcome at all kinds of places. Just ask Jerry, who uses his Card for everyday items, as well as for the things that make him, well, Jerry. In fact, it's so widely accepted, Jerry uses it wherever he goes. No kidding.

{You can find items like Jerry's at these establishments:}

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{And if you're in Jerry's neighborhood, New York City:}

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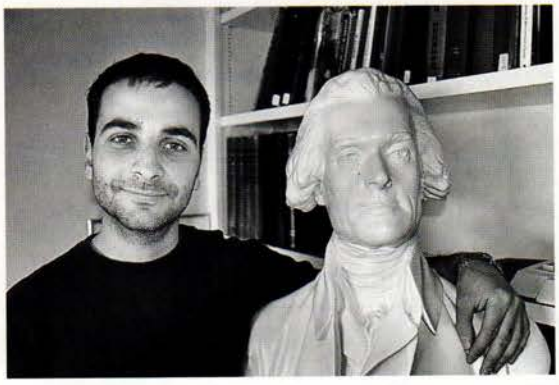
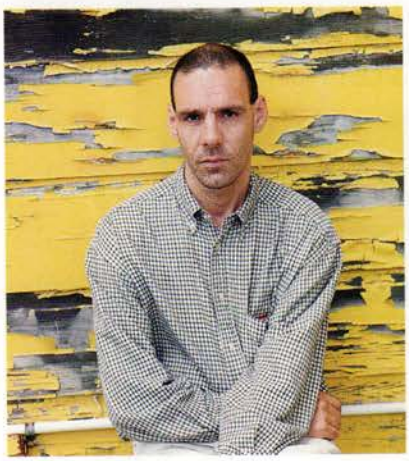
Heroes of the American Revolution are hardly a popular subject in England, where, according to photographer **GRANT DELIN,** "Some people still call America the colony and want the tax money." So when *This Old House* hired the London-born Delin to shoot Thomas Jefferson's mountaintop home (see "Monticello"), he read up on the third U.S. president. "He was a true Renaissance man," Delin says. "Monticello was the first American house to depart from English-style architecture." To portray Monticello as it would have looked in Jefferson's time, Delin used only natural light for his pictures. Now a resident of New York City, Delin says that this, his first assignment for *TOH,* recalls happy memories of Delin Wall Fashions, a full-service hardware store his family operates in east London. "At age 12, I was the paint-mixing boy. I made all the special colors," Delin says. "And I could tell how much wallpaper a room needed just from looking at it." When business was slow, Delin practiced photography inside the store with a manual Olympus camera his grandmother gave him. In 1992, he won the Kodak Young Photographer of the Year contest, a European competition.



The architectural details of the Milton home reminded **DANIEL S. LEVY** (writer, Milton house history) of a museum collection. "In one room there was Georgian-era raised-pine paneling, and in the next there were Federal-style little columns and delicate dentils." A reporter for *Time* magazine since 1986, Levy has a master's degree in historic preservation from Columbia University. As an editor, Levy worked on *Time*'s "American Visions," a special issue about art in the United States, written by critic Robert Hughes. He also helped install the Metropolitan Museum of Art's American Wing; the project included the reassembly of a loggia rescued from Louis Comfort Tiffany's abandoned, fire-damaged house. Another of Levy's interests, studying the life of adventurer Morris Cohen—a Polish-born Jewish immigrant to England who became a general in the Chinese army in 1931—takes the form of his recently published biography, *Two-Gun Cohen* (St. Martin's Press).

In photographing plaster-ornament maker Lorna Kollmeyer (see "Plaster Master"), **STEFANO MASSEI** discovered a "whole new fascinating world—I never knew there was an artistic process like hers." Massei, a native of Tuscany who moved to the United States in 1981, found the plaster moldings serendipitously relevant to what he calls his "own personal quest to study sizes and shapes through still-life photography." When not on assignment for clients such as Williams-Sonoma, Hugo Boss, the Gap, Esprit, and Japan's World Company, Massei also likes to make black-and-white portraits of friends—and strangers. "When I see a face with character, someone who intrigues me, I take a picture," he says. "It could be anyone ranging from a bum to a celebrity." Massei now lives in San Francisco and operates Studio Massei along with his wife, Karen, who styles his photographic shoots.



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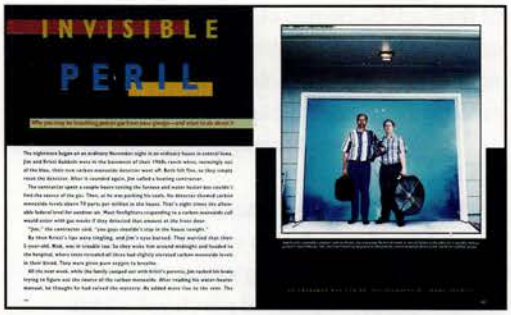

POISONS AMONG US

The stack effect of air movement within a home ["Invisible Peril," Sept./Oct. 1997] has been a concern for at least 90 years—even before the Model T appeared. In its February 1907 issue, *The Inland Architect & News Record* reported: "In the autumn, winter and spring months, and during the nights, even in summer...the air in our houses is warmer than that contained in the soil beneath. The house acts like a suction pump in such cases, sucking up...the poisonous gases and germs with which it is infested." The article advised the installation of flues to vent basement air out above the roofline.

BETSY GURLACZ, *Western Springs, IL*

DÉJÀ VIEW

Are videos of the television show available for purchase by mail?

FRANK FULTON, *St. Paul, MN*

You can order individual episodes (or entire series) of relatively recent *This Old House* broadcasts from WGBH Educational Foundation by calling 800-255-9424. Choose from among the Napa (California), Nantucket (Massachusetts), Salem (Massachusetts), Savannah (Georgia) and Tucson (Arizona) projects. On the phone, you will need to provide the project name or episode number announced at the end of the broadcast (information available from the Audience Services department at WGBH: 617-492-5706).

DIDN'T CATCH THE FLUE

Once, some time ago, *This Old House* installed a stainless-steel chimney liner in a brick chimney. I need more information on this product. Can you tell me whom to contact?

ROYCE LARSON, *via E-mail*

Flexible stainless flue liners for chimneys prevent flue gases from condensing and damaging both mortar and bricks. For more information, contact Z-Flex Inc., 20 Commerce Park North, Bedford, NH 03110-6911; 800-654-5600.

LOW THRESHOLD

We recently purchased an antique front door for our house. It is in pretty good shape except at the bottom, where the ⅛-inch-thick oak veneer has bubbled up from the base. What would be the best way for me to reglue it?

STEVEN R. CARTER, *via E-mail*

To flatten bubbles and curls, Tom Silva recommends applying hot, moist towels (heated in a microwave). Change them often until the veneer is pliant, being careful not to soak the wood. Then clamp the veneer flat. After it's dry, apply a two-part exterior glue between the veneer and the substrate and reclamp. When clamping, always protect the surface with a piece of scrap wood.

GLAD BAGS

I have been a very big fan of *This Old House* for many years, along with Norm's *New Yankee Workshop.* I also subscribe to *This Old House* magazine and just recently received the *Source Book.* In the introduction, I noticed a mention of Spag's hardware store. Back in the late 1970s and mid-1980s, I delivered products to the store on Route 9 in Shrewsbury, Massachusetts, from here in New Jersey. "Spags No-bags" is one of a kind. Keep up the great work.

BRUCE BARMORE, *Plainfield, NJ*

HELP

LETTERS TO THE EDITOR
Got a problem? We can help. Got a gripe? We're listening. Have a happy experience with a supplier or manufacturer? Share the kudos. Contact us via E-mail at Letters@toh.timeinc.com or write to Letters, *This Old House* magazine, 1185 Avenue of the Americas, New York, NY 10036.

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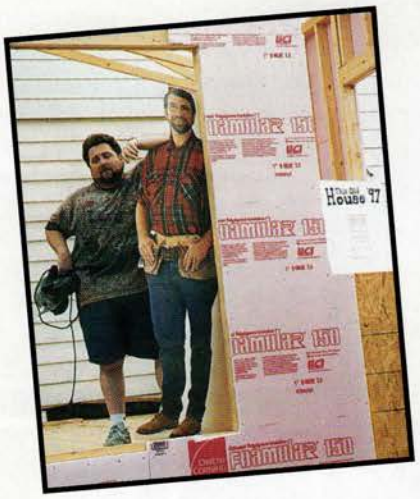

BEYOND THE NORM

This summer we began a renovation that included adding a great room to our 1928 house. We would have loved to have Norm, Steve and the gang take on this project with us, but we knew it couldn't happen. But thanks to our building supplier, who gave us an advertising display, we were able to have Norm on hand in spirit to oversee the operation. Norm's "presence" was the secret to a very successful project.

THOMAS R. SKAGGS, *Champaign, IL*

WHITE AND WRONG

I have recently had the interior of my house painted "linen white." Is this a standard color, and will paint with the same name from another manufacturer match?

CAROLYN SPIELER, *New York, NY*

Linen white is a common name for an off-white color, but it is unlikely that paint from one manufacturer will match the color from another. Different companies use mixing bases that vary slightly in brightness, so test for a match by swabbing some of the new paint on top of a swatch of the old and comparing them once they have dried. This technique may save you a trip back to the store to have your paint adjusted.

PORCH PONDERING

As for why porch ceilings are painted blue ["Extras," May/June, July/August], here in the Southwest the Pueblo people have for centuries painted the front door and window trim of their adobe homes blue to ward off evil spirits. Of course, the blue is also a lovely contrast to the brick color of the adobe and reflects the sparkling blue cloudless sky.

JEANNE CAMERON WASHBURN, *Albuquerque, NM*

With 50 years of proof backing him, my grandfather Friday Ralph of Clifton, Texas, swears that a blue ceiling keeps the mud daubers away—as his old porch will attest.

MIKE TAYLOR, *San Antonio, TX*

My Ohio grandparents told me that their porch ceiling was painted light blue to mimic the sky, not to repel flies. Apparently they (and others as well, I presume) believed that painting a ceiling blue improved the distribution of sunlight in what might have otherwise been a dark porch.

KATHY LE CONTE LUPTON, *Pana, IL*

Editor's note: Blue may give the impression of a sunny day, but white has a higher light reflectance (which will give you brighter adjoining interior rooms). Because immaculate white paint is a relatively recent inven-

tion, our forebears may have preferred crisp blue ceilings to the dingy off-whites that were available back then.

ROLLING RECYCLABLES

In "From Warehouse to Your House" [July/August], you said that pallets are used once or twice, then shipped to a landfill. Not so at Target Products in Burnaby, British Columbia. Target, where I work part-time, hires two to four guys to come in every Sunday and repair pallets dating back to 1993 or earlier. Pallets cost $15 each, and a company can save a lot of money by repairing them instead of shipping them off to wood-chip heaven.

MIKE DAUNCEY, *Surrey, British Columbia*

SEAL APPEAL

I was intrigued by the waterproof, highly reflective roof-coating material shown on *This Old House*'s Tucson series. Would you let me know the name of the product and who sells it? I'm really tired of having my roof hot-mopped with tar every four to five years.

ANNE WRIGHT, *Tacoma, WA*

Mirrorseal is available from Innovative Formulations Corp., 1810 South Sixth Avenue, South Tucson, AZ 85713-4608; 520-628-1553 or 800-346-7265.

ANCESTRAL INTRIGUE

As you can deduce from my name, I read with great interest your article on the "John Crehore" house ["A New England Wonder," July/August]. He was a third-generation Crehore, and I am a 10th generation. Our family history lists several other Crehore homes in Milton. I'd appreciate hearing from anyone interested in, or knowledgeable of, Crehore history [E-mail: CCreshay@aol.com].

CHARLES M. H. CREHORE, *Paradise Valley, AZ*

MISTAKE OF THE MILLENNIUM

Like Bill Boland ["Letters," July/August], I hate to quibble, but I am a stickler for accuracy. Bill is off by one year regarding the beginning of the millennium. The current millennium, a period of 1,000 years, will not be completed until December 31, 2000. Therefore, the next millennium begins January 1, 2001.

MARK A. MORTENSEN, *Quakertown, NJ*

punch list

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

- In the Fall Maintenance section of the September/October issue, we omitted the name of the icon illustrator, Nigel Holmes.
- The cutaway filter and cyrptospopridium photograph were incorrectly credited in "Pure and Not So Simple" [May/June]. Water filter manufacturer Kinetico provided both: Kinetico Inc., Quality Water Systems, 10845 Kinsman Road, Newbury, OH 44065; 216-564-9111 or 800-944-WATER. Web site: http://www.kinetico.com.
- Highly detailed plans for the *Life* magazine dream house, designed by Taliesin Architects and written about in the September/October "Extras" column of *This Old House*, are available for $500 through a *Life* subsidiary. Call 800-950-7210.

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OFF THE WALL

BY JEANNE MARIE LASKAS

The previous owners did *what*?

One of the first things I noticed about my new house, which is actually a very old house, was the lovely but peculiar set of French doors topped by dramatic arched windows in the living room. Open these two doors and you go nowhere. Unless you want to break an ankle or a knee. These doors open to air. Underneath the air—I mean, way underneath—is my front yard. There is a 5-foot drop from the floor to the ground.

It got me thinking about the people who lived in this house before I did. "What," I said to my fiancé, Alex, who was himself puzzled by the doors-to-nowhere, "what do you suppose they were thinking?"

More and more I've been doing this, trying to come up with the stories that will somehow explain the virtually inexplicable decisions made by all the previous owners of my house in rural southwestern Pennsylvania.

What, for instance, am I to make of the light fixture in the dining room? This is the kind intended to hold a fluorescent bulb. The first time I noticed this light fixture, I thought, "Well, that is a very ugly thing." But that wasn't the point. This fixture hung on the ceiling, about 6 inches from the exterior wall. I thought, "Well, that is a very

ILLUSTRATION BY HUNGRY DOG STUDIO

odd place for a fluorescent light fixture." But that wasn't the point either. This fixture had no wiring attached to it. No electricity going in. No electricity going out. Was this a sculpture of some sort? Fluorescent light-fixture art?

"What," I said to Alex, who was himself dumbfounded by the fixture, "what were they *thinking*?" (You try to imagine the story. Wife goes to Home Depot and sees fluorescent light fixtures on sale, brings one home. Husband grumbles; he does not feel like hooking the darn thing up. He wants to have a beer and scratch his stomach and watch the game. So he quickly hangs the fixture on the ceiling, hoping wife won't notice it doesn't actually work.)

This light fixture had no wiring attached. No electricity going in. No electricity going out. Was this a sculpture of some sort?

Alex took the light fixture off the ceiling. "There," he said. Then he set out to solve the French door situation. He got out his measuring tape and went zip zip zip, making calculations for a set of stringers. He planned to bridge the doors-to-nowhere to somewhere with his own specially designed staircase.

A noble enough pursuit. But I was busy developing a fascination with the lives of the people who had previously owned my house. There was, for example, the matter of water filtration. I mean: I'm not one to defend mineral deposits or, for certain, microscopic bacteria. But an entire water filtration *room*? With colorful tubes winding around bubbling and gurgling tanks that could easily fool guests into thinking we were brewing up chemical-warfare compounds for the Michigan Militia?

At least the previous owners were kind enough to leave us a few drawers full of instruction manuals for this elaborate apparatus. And I'm telling you I really did not sit and wonder what these people were thinking—not until I contrasted their obsession for clean water with their notable indifference toward clean air.

There was no exhaust fan in the bathroom. No window to open. No way to get fresh air. No nothing.

"What," Alex said, on discovering this, "what in the name of raw sewage were they *thinking*?"

The exhaust fan situation had been particularly disturbing to him—especially after he went and installed the wrong kind of fan and ended up having to rip it out and start all over again. But anyway. Let's talk bedrooms. If you were going to add an extra bedroom to your house, what would possess you to put it in a place accessible only through the dining room? And if you were to add a secondary breaker box that would bring new wiring to one wing of your house, why would you place the service panel in the center of an inside wall where there is no access to it?

I know; you cannot answer these questions. You have your own house full of puzzles. Well, I should tell you how Alex's steps-to-nowhere project turned out. He called me outside to look.

"Um," I said. The bottom step was a good 2 feet off the ground.

"Hmm," he said and grudgingly agreed that he needed to rip the whole thing apart and start over with a new, longer set of stringers. He did. I came back.

"Um," I said. "A pretty big step there." The new bottom step was still 2 feet off the ground. It was at this point that we both noticed the problem: a hill. If you build steps down the side of a hill, there can be no landing. Not until you reach the very bottom of the hill. Alex and I looked down. The bottom of the hill was about 50 yards away, in the pond.

"Um," he said. He would have to do something about this. The phone rang. I ran in to get it.

It was my friend Vince, who calls a lot because he is also just moving into a new house that is actually a very old house. He said he wanted some advice on gas log fireplaces, knowing I had some experience with them. I asked him about the condition of his chimney.

"The previous owners closed it up," he said.

"Can you open it?" I asked. He went up to the roof to look while I hung on. He came back and bellowed, "What in the heck were these dolts *thinking*?"

The chimney was not only closed up but also cut off and covered with plywood and shingles.

"I'm trying to imagine the conversation," Vince said. "'Hey, honey, what do you want to do tonight?' 'I don't know, sweetie, how about we chop off the chimney and put shingles over it and ruin anyone's chance of ever having a fireplace here?'"

He was upset—I could tell. I said, "Vince, you're upset."

He went on. It wasn't enough, he said, that there was a toilet placed so close to the wall that you had to sit sidesaddle. It wasn't enough, he said, that the perfectly nice ceramic-tile kitchen floor was covered with...blue indoor-outdoor carpeting. Nor that the carpeting was glued to the tile.

"No, it wasn't enough!" he said. "Now they have to shingle over the chimney too." Alex grumbled a little more while I made a lot of empathy noises.

These discoveries are not easy to take. The decisions of previous owners are the glaring reminders that make one face the unspoken truth: Most houses are hand-me-downs. All that fancy financing you did and all those dreams you had of starting your life over in a new home, a new place, a new era are true only up to a point. In fact, you are moving into someone else's *old* era. Someone else's decisions. Someone else's problem-solving techniques. Someone else's hopes and, let's face it, someone else's dirt (which is always so much dirtier than your own dirt).

Alex hollered. He wanted me to see his solution to the steps-to-nowhere. With his own hands, he had built a little somewhere: a landing. A terrace of sorts, a mini-patio. Well, it was a lump of dirt piled up under the bottom step.

"Um," I said, distracted by a clamor in my head. I was hearing the future. I was hearing strangers. They were standing on this spot near the hill in my yard long after I was dead and gone. They were looking at Alex's landing-terrace-patio-lump-of-dirt, and they had their lips curled up.

They were saying, "What were they *thinking*?" ■

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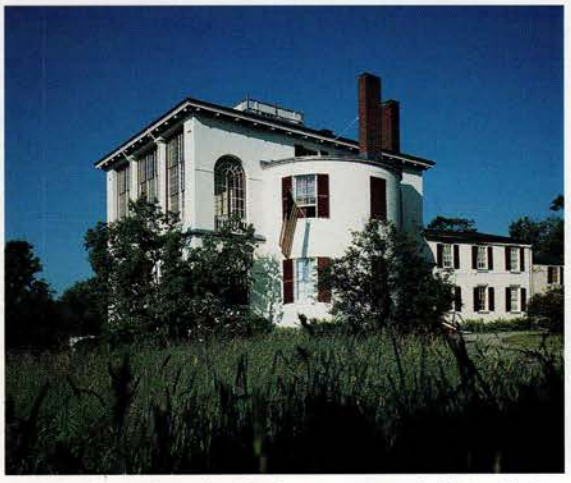
(n/d extras)

Simian Solution

"Most PVC cements are noxious and vile—about two-thirds of the can is a warning label. The fumes almost knock you out," says Mark Singer, president of the Gorilla Group, who plans to introduce an alternative in January. His water miscible formula, which he calls Gorilla PVC, is virtually odorless and fumeless, requires no primer and has a flash point of 203 degrees Fahrenheit. The patented formula—developed in Europe, where the glue has been used for three years—is actually powdered PVC dissolved in a nontoxic base. Once applied to the mating joints, the liquid evaporates, leaving behind only solid PVC.

So Long, Castle Hassle

A billiards room where the same pictures have hung since the 1860s, suites of Victorian furniture, a glassed-in loggia with a sweeping view of the Sheepscot River—these are among the jewels Jane S. Tucker inherited 33 years ago when she took on the stewardship of her family's ancestral home in Wiscasset, Maine. When she moved in, the 17-room Castle Tucker was so dilapidated that local kids called it haunted. Tucker banished the ghosts with a new roof and paint, performing much of the day-to-day maintenance herself. Rather than modernize the interior, however, she chose to preserve it. She closed off the three-story main section during the winter, living in three heated rooms at the back. In the summer, she opened the door to vacationers who asked to peek inside. Eventually, she began giving formal tours, with admission fees going toward an endowment for upkeep. She had planned to will the house and money to the Society for the Preservation of New England Antiquities, but decided this year there was no reason to wait and handed it over. Now she can pass on all she's learned to the next generation of caretakers.



Although Castle Tucker has been renovated, the inside has not changed since Jane S. Tucker's grandfather went bankrupt in a railroad financing venture in 1871.

"It's foolish to keep on owning a house this size when you're my age—almost 80," says Jane S. Tucker.

CHRISTMAS TREE PHOTOS BY KELLER AND KELLER; CASTLE TUCKER BY BRIAN VANDEN BRINK

Tree for All

Every Christmas, Lindsey Abram picks out the tallest and fullest possible tree for her family's living room —to the consternation of her father, *This Old House* master carpenter Norm Abram, who fells the tree, then usually ends up "trimming 8 or 10 inches off the bottom." In many national forests, you too can cut and cart away some holiday cheer for as little as $5. Purchase permits from a local ranger station and start scouting the ideal tree after Thanksgiving. (Or next year, do like hunters in the West; early in the season they tie ribbons to their chosen tree, returning to chop closer to Christmas.) Once you get home, don't make the mistake of thinking your work is done. Freshly cut trees are still alive—sap seals the trunk, which you should trim straight across and stick in water immediately. Forget the ketchup and corn syrup concoctions, and don't bother sousing the stump in vodka; plain tap water is best (1 quart per trunk diameter inch). But watch the reservoir level: Even under ideal conditions—70 degrees Fahrenheit with 40 percent humidity—trees can get dehydrated in as few as four hours and may stop drinking for good. To check for freshness, bend a needle or two. They should produce a moist snap, like a carrot stick.

Norm Abram and his daughter, Lindsey, make their annual pilgrimage to the Christmas tree farm. Norm cuts Lindsey's favorite with a bow saw and they tie the tree to the car top (in lieu of a sleigh). Once home, he crosscuts the bottom so the tree can drink.

(extras)

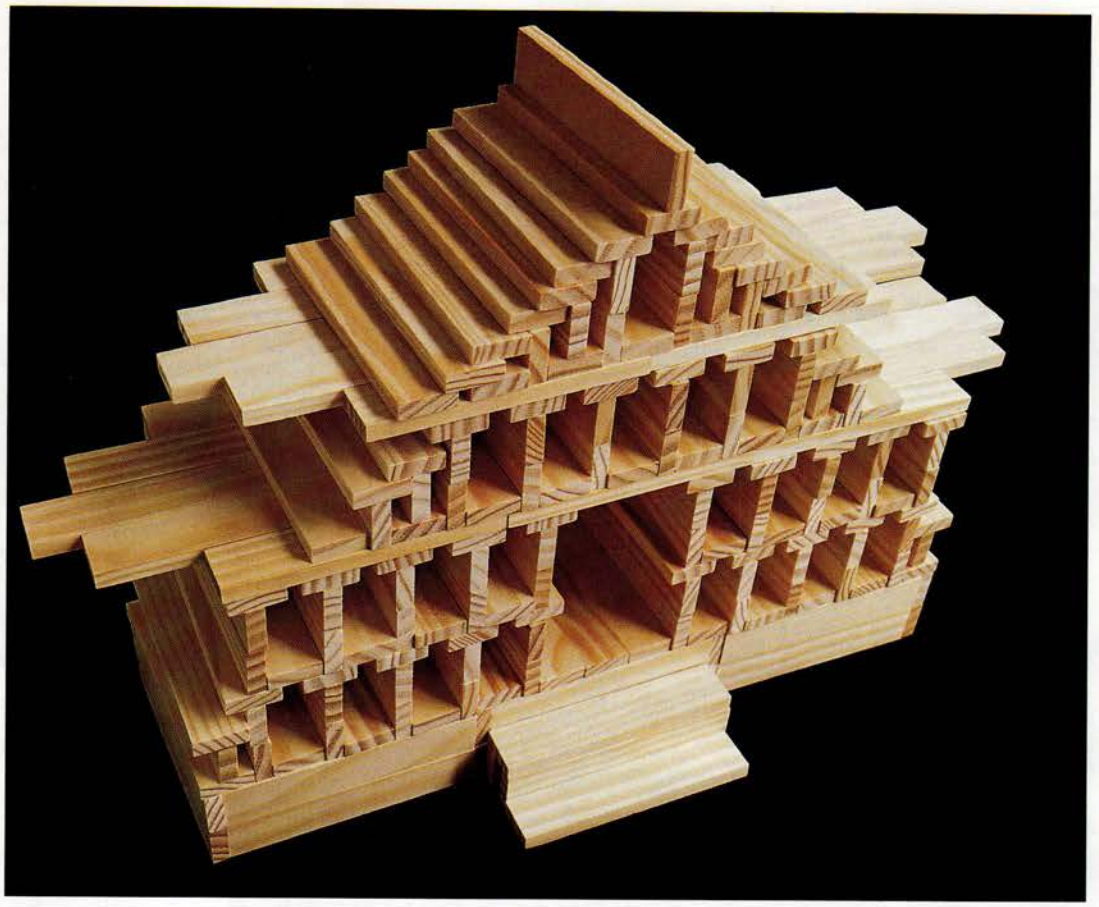
WEB

Ironically, hand-tool aficionados are all over the electronic frontier

www.cs.cmu.edu/~alf/en
The Electronic Neanderthal is both an oxymoron and a Web site for woodworkers who believe electric power tools come from the devil's workshop and who love using hand tools and traditional methods to make sawdust. Besides comprehensive resource guides for unusual wood, tools and supplies, this site offers information on books, events, organizations and places to visit (both real and virtual). For example, to find out the vintage of your bench plane, play the dating game on Jay Sutherland's "page o' lore."

www.iucf.indiana.edu/~brown/hyplan/wood.html
W5: WoodWorking on the World Wide Web provides dozens of links to related sites, as well as listing shareware programs of interest to woodworkers, including download and setup assistance. Among the recent offerings: programs calculating job costs, dimension conversions and wood expansion and contraction.

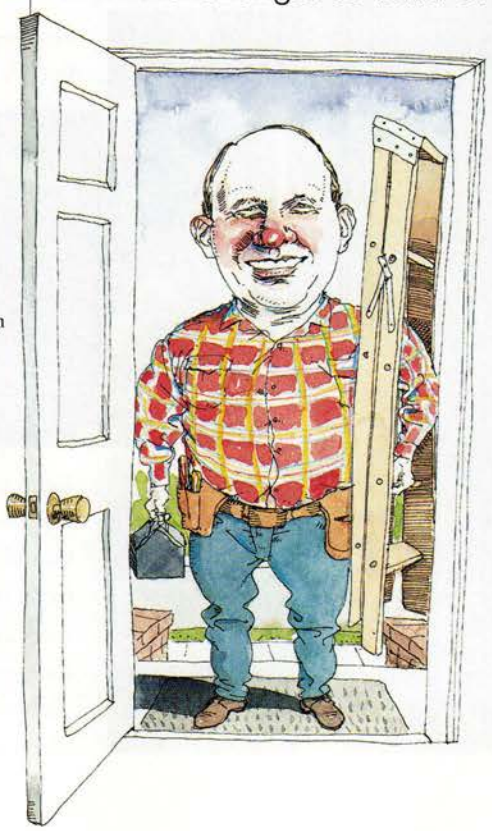
www.antiquetools.com
The virtual Museum of Woodworking Tools provides a "knowledge base of museum-quality tools and techniques that once existed but are now gone," says curator Robert Mathison. Various "galleries" feature exhibits on specific tools, and in the future the site will provide reference material from old catalogs and other ephemera upon request.



HOUSE OF BLOCKS AND BOOKS BY JOSHUA MCHUGH; RENT-A-HUSBAND BY JOE CIARDIELLO; FLOWERS BY KELLER AND KELLER

Plankety Planks

Each Kapla block is a perfectly balanced rectangle, a 4⅝-by-1-by-¼-inch wisp of pine sanded to a velvety finish—and maddeningly simple. The challenge: to build ever more grandiose "pixie plank" sculptures without the aid of glue, fasteners, or pretty geegaws. A teetering Kapla dinosaur or mind-bending spiral is a triumph over sneezes, jitters, gravity and, well, pixies. Eventually, though, what goes up must come tumbling down. "Destruction," notes the brochure, "is part of the game."

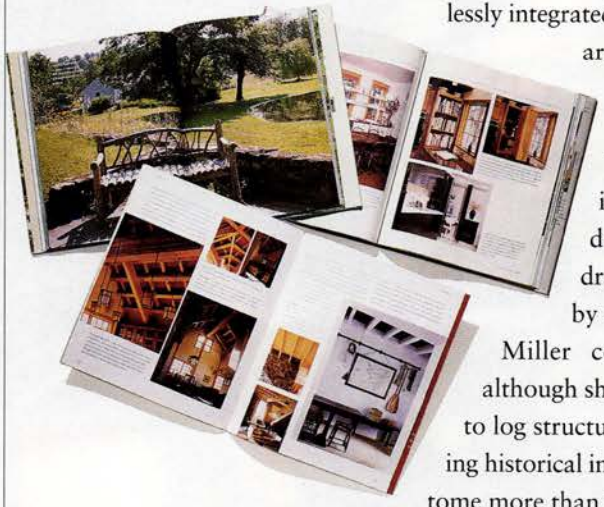


Hubbies for Hire

If the man of the house won't do anything around the house, don't nag him—replace him. At least for a few hours. "Today's Mr. Right isn't necessarily Mr. Fix-It," says Kaile Warren Jr. of Portland, Maine, whose Rent-a-Husband is for anybody who needs a lawn mowed, garage cleaned or leaky faucet fixed (for $20 to $25 an hour). Averaging 120 calls a week so far, he's negotiating franchise agreements nationwide. He boasts a "tall, dark and handy" talent pool, although a few hand men, he concedes, may be short, paunchy and balding. "Still, they're all capable."

WORDS ON WOOD

From country gazebos erected out of gnarled lodgepoles to meticulously constructed built-in trestle tables, three new books explore wood's versatility. *Rustic Garden Architecture* by Ralph Kylloe is a pictorial ode to what one can accomplish with bark, branches, logs and vines. Kylloe, a Tufts University professor, covers the rustic crafts tradition from earliest times to turn-of-the-century Adirondack boathouses to modern-day settees. • A quick flip through *Built-In Furniture* is enough to make you start scrutinizing your own house for underused nooks that might make excellent spots for sly storage cabinets, dumbwaiters or bookcases. Besides providing handsome photos of these pieces seamlessly integrated into the surrounding architecture, Jim Tolpin, a woodworker and writer in Port Townsend, Washington, illustrates the clever designs through simple drawings. • *Wooden Houses* by architecture writer Judith Miller covers a broader scope, although she devotes much of the book to log structures. Miller also provides interesting historical insights and examples from Aspen to Auckland—making this tome more than just a pretty addition to the coffee table.



If You Could Read My Grind

The angle grinder do-si-do—grind, pull back and check the surface, then grind a bit more and pull back again—may be a thing of the past thanks to a new line of abrasive discs and matching backing pads for angle grinders. The fiber-backed discs are more triangular than perfectly round, and feature three evenly spaced holes at mid-radius. As the disc spins, its edges virtually disappear and the holes become one wide transparent ring—like an inside-out doughnut. "I didn't think it would work," says *This Old House* contractor Tom Silva, who fine-tuned an iron bracket with the invention. "But it did—I saw exactly what I was grinding without moving the disc on and off the metal." Tom's excavator then borrowed the tool to bevel the ends of a 6-inch plastic drainpipe and discovered that the work was indeed less of a grind.

Spring Green

Daffodils planted in drifts at the edge of a lawn not only look like they sprouted there naturally but also appear all the more brilliant against the verdant shoots of spring. For a similar effect in daffodils potted this fall, scatter a handful of grass seeds on top of the soil when the leaves appear.

> *The physician can bury his mistakes, but the architect can only advise his clients to plant vines.*
>
> —Frank Lloyd Wright

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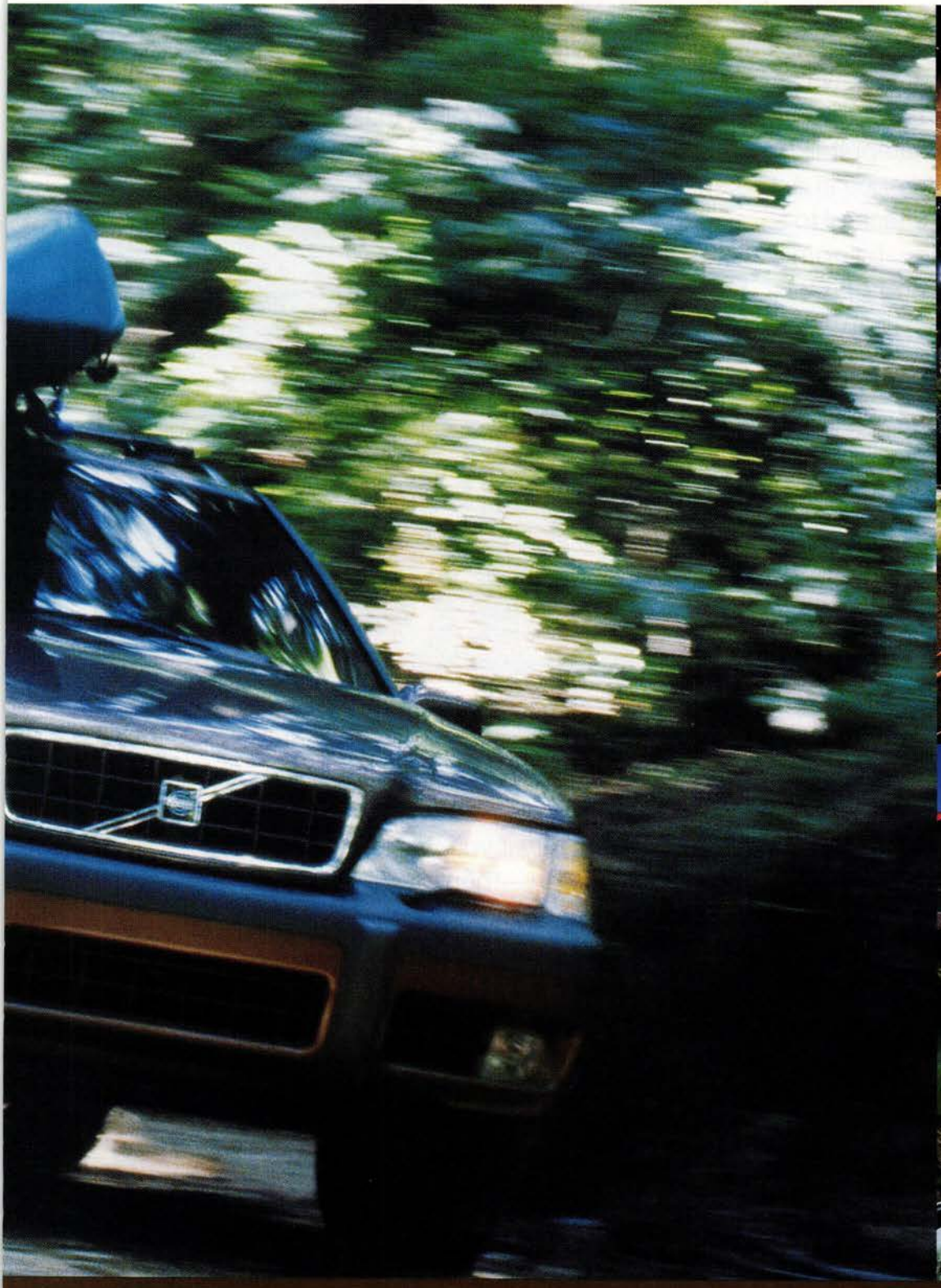

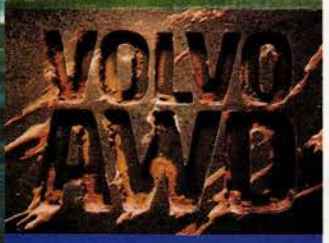

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VOLVO

(extras)

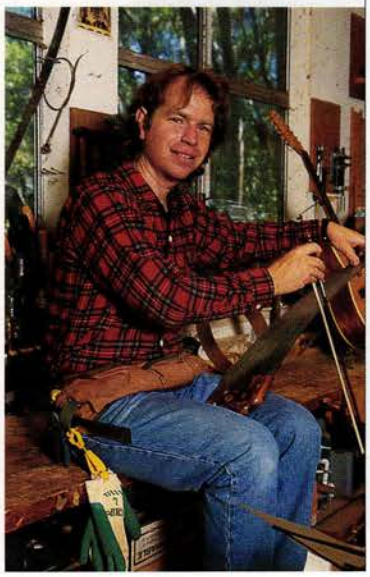
EVENTS & APPEARANCES

STEVE THOMAS

- Nov. 5—Wenham Museum, Wenham, MA; 8 p.m.; 508-468-2377.
- Nov. 8—Borders Books & Music, South Portland, ME; 1 p.m.; 207-775-6110.
- Nov. 15—Stroudwater Books, Portsmouth, NH; (time TBA) 603-433-7168.

NORM ABRAM

- Nov. 15—Home Depot, Nashua, NH; (time TBA) 603-891-4300.



Barry "Woody" Phillips has a tune up.

One Last Fling

Looking for a fun way to demolish your house? Consider the medieval castle-crusher known as the trebuchet. The Timber Framers Guild of North America and the Virginia Military Institute recently built a fearsome reproduction of this catapult-like weapon, which they deployed with gusto at a June TFG conference in Amherst, Massachusetts. First, six cadets cranked a windlass attached to a base, bringing one end of a 24-foot hemlock throwing arm almost to the ground and hoisting a 9-ton box of gravel—the counterweight—that swung from the other end. They then attached a trigger (3 feet of heavy chain with a pin in a shackle) to the arm along with a hemp sling holding a watermelon-sized, 100-pound rock. "Fire in the hole!" yelled a VMI professor, and three timber framers strained to pull the firing pin. Whoosh! The rock hurtled 100 feet up into the air, hanging there for about three seconds—which might seem like eternity if you were in a castle watching it come toward you—then thudded to the ground 600 feet away. Earlier they'd tried flinging bags of limestone, but the forces involved (about 15Gs) ripped the bags apart. "Well," said one timber framer, "at least we fertilized the lawn. We have to find some kind of socially acceptable use for this thing."

> *"There is nothing more pitiful than a house broke down at the side of a road."*
>
> —Rick Bragg, on moving a house

Dance of the Sugarplum Anvil

Folk musician and cellist Barry "Woody" Phillips grew up in a family of floor layers, but it wasn't until 1993, when he was building his Shaker-style den in Santa Cruz, California, that he began hearing music in the clanks, clatters, whirs and bangs of his tools. Over three months, he hammered out *A Toolbox Christmas*, 13 traditional holiday songs that combine the dulcet tones of a pneumatic nailer and an English horn ("The Twelve Days of Christmas"), create harmonies between a drill press and power planer ("Good King Wenceslas"), and explore the musicality of duct tape and nails ("Deck the Halls"). And don't let it be said that Phillips didn't suffer for his art. "The constant repetition of noise drove me insane every other day."

TOOL MUSICIAN BY CHRISTINE ALICINO; TREBUCHET: COURTESY OF TIMBER FRAMERS GUILD OF N. AMERICA; MOUSETRAP: CORBIS-BETTMANN; TREE ANTENNA: JENNIFER NELSON; GATE LATCH: STEVE THOMAS; WINTER VEGGIES: KELLER AND KELLER

A crane lifts a camouflaged cellular-phone tower into place in Franklin Lakes, New Jersey.

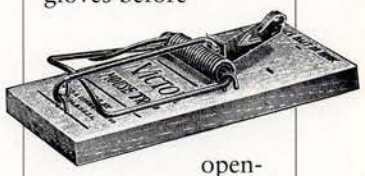
Branching Out

Residents of Franklin Lakes, New Jersey, who were baffled when an 85-foot-tall white pine appeared in their midst overnight, may have been even more shocked to discover that the tree was actually a cellular antenna tower. Arcnet, an architecture company, developed the tree five years ago with three other companies, among them Larson Inc., which makes props for such clients as DisneyWorld. Because the trees cost $1,200 a foot—three times more than monopole antennae—only about 50 have gone up around the country. This tree, however, may prove an economical turning point. Three wireless communications companies have antennae hidden among the branches—the first time competitors have hugged a tree together to cut costs.

Epoxy resin molded like bark coats a steel shaft, and plastic branches fasten on.

Being Nice to Mice

Reluctant to set up in-house death chambers, many homeowners opt for "humane" mousetraps that ensnare—but don't kill—the invading critters. Nice idea, but what do you do when you catch one? Although mice rarely have rabies, rarely bite and are usually terrified of people, you may want to don heavy gardening gloves before



opening the hatch. Release the prisoner in a wooded area as far as possible from your house. Liberated mice typically scram and once ensconced in a new home tend not to venture too far in any direction. If you're tempted to make a pet out of the mouse, think again. Mice are vermin, carriers of disease and parasites. They'll be happier outdoors. And on the subject of being humane, remember that, deprived of food, a mouse can live for only one to three days, so check your traps often.

Gateway of the West

To corral strings of mules in the Flathead River country of northern Montana, pack leaders with the U.S. Forest Service ride ahead and, without dismounting, open the gate by swiveling the ring on this handwrought gate latch. After the rider has led the beasts through, a gentle nudge closes the gate, which latches itself. This ingenious device—which has foiled all but the cleverest of mules—caught the fancy of our roving photographer Steve Thomas on a recent wilderness expedition. "The pin inside the ring is a simple, elegant design that would work in a suburban yard where you need a gate to swing in or out and keep small kids or dogs in."

Cache Crop

Homesteaders once stored winter vegetables in root cellars, but few houses feature those nowadays. Russ Morash, the executive producer of *This Old House*, stores his carrots and parsnips right in the garden. He harvests the crops in late fall, then piles them into one bed. To keep them from freezing, he covers the cache with soil, a thick layer of salt-marsh hay and a plastic tarp. He likes this hay because it's free of weed seeds, but any kind of straw or even fallen leaves work. When it's time for dinner, Morash just reaches under the straw and digs out the veggie du jour.

Russ Morash turns the beet around.

FOR SOURCES, SEE DIRECTORY – PAGE 153

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LASTS A LIFETIME

BY CYNTHIA SANZ

COUNTER INTELLIGENCE

Why do so many people love a solid surface?

Even before *The Graduate*'s Ben Braddock was told to look for his future in plastics, DuPont chemist Don Slocum had a polymer vision of his own. In late 1963, Slocum and a band of fellow scientists were assigned to find uses for the company's plastic technologies in the nation's kitchens and bathrooms. Working in a makeshift lab in an abandoned Delaware tire plant, they combined DuPont's acrylic resins with a filler to create a new kind of countertop material that was repairable, stain and germ resistant, and solid, unlike the popular laminates pasted over chipboard. "We knew right away we had something really special," remembers Slocum, who named the new product Corian, after his daughter, Carrie Ann.

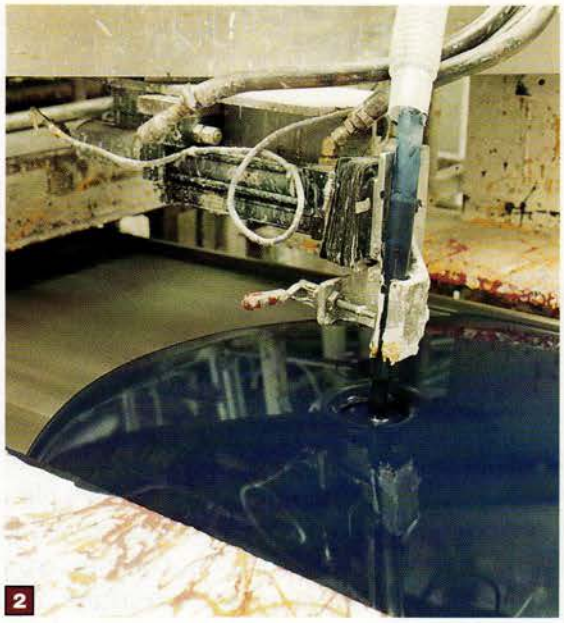
You can't do this with granite. Doug Ward and George Moreo heft a one-piece, 200-pound counter with integral sink atop the cabinets in this Montclair, N.J., kitchen. The two sheets of Corian and its sink were glued together with a two-part adhesive that, when sanded, makes the seam, below, disappear.

Did they ever. Thirty-four years later, minus the fiber, solid surfacing (the generic name for Slocum's creation) has become a $1.1 billion business with sales increasing 20 percent annually. The National Kitchen and Bath Association reports that solid surfacing was the counter covering of choice in about 40 percent of kitchens and baths built or remodeled in 1996, beating out marble, granite, tile and laminates like Formica. "The factories can't even keep up with countertop demand," says Mike Duggan, editor of *SolidSurface Magazine*, the industry's trade journal. "Everyone is in full production."

Although DuPont Corian still rules some 75 to 80 percent of the solid surface industry, since Slocum's original patent ran out in the mid 1980s four other national brands—Avonite, Wilsonart's Gibraltar, Nevarmar's Fountainhead and Formica's Surell—along with some 160 regional manufacturers—have pushed into the market. The bulk of the business is still countertops, but the material is also turning up in everything from furniture and flooring to golf clubs and pet bowls.

So what is solid surfacing? Essentially, it's a combination of two ingredients: a filler, most often alumina trihydrate (ATH), a white powder refined from bauxite ore, and a clear resin binder, either

PHOTOGRAPHS BY KOLIN SMITH



How It's Made

1. *A cursory glance around the factory, with its silos of sugar-fine white powder and clear syrup, its bins of colored sprinkles and its warm ovens, might make one think its chief product is candy. One whiff says otherwise: It isn't confections they're cooking; it's acrylic, the stuff of Corian counters and sinks. The Corian plant in Buffalo, New York, is cooking day and night, seven days a week, to meet customer demand. Supply manager Dave Nickles is the man who helps keep the Corian flowing. At his command are fleets of railroad tank and hopper cars, each loaded with 150,000 pounds of Corian's raw ingredients: pure powdered bauxite or syrupy liquid acrylic. "We keep the railroad plenty busy," Nickles says. Bauxite and acrylic come together inside a giant blender—two parts powder to one part acrylic by weight—where they're mixed into a viscous batter with pigments, colored particles and catalyst.*

2. *The liquid mix pours nonstop onto a stainless-steel casting belt and heads into a long oven. As it moves along, the plastic is kept at a cozy 200-300 degrees, which induces the molecules to cross-link with each other. About 45 minutes after hitting the belt, a ribbon of solid, perfectly smooth plastic emerges.*

3. *Three water-cooled, diamond-tipped saws cut it into 30-inch-wide sheets; then it's stacked for shipping. To Nickles, blending, pouring and baking Corian is no big deal. Much of the line is computerized. The hard part, he says, "is keeping up with all the colors that the marketing folks want us to make"—67 at last count.*

Ingredients

In a typical batch of solid surfacing, alumina trihydrate (ATH) and a clear polyester or acrylic resin make up 98 percent of the product. The remainder is composed of pigments and dyes, which add color, and crushed bits of the colored solid surfacing, which create the dirt-hiding speckles.

acrylic or polyester or a mixture of the two. The colors and speckles are created by adding pigments and tiny bits of the finished product itself. When filler and binder come into contact, they chemically meld into a solid that's waterproof, fireproof, UV resistant, hard enough to resist denting and chipping yet forgiving enough to be shaped and finished with regular woodworking tools.

The same chemical reaction can be used to join pieces together with virtually invisible seams, making possible accent edging, inlays and completely integral sinks and backsplashes. Being nonporous, solid surfacing resists stains, mold and bacterial growth. And because it is the same material throughout, small scratches and burns can simply be buffed out with fine sandpaper or a Scotchbrite pad.

Still, solid surfacing isn't kryptonite. For all its good looks and

Not all solid surfacing comes in sheets. Workers inject the catalyzed liquid mix into a heated mold for 30 minutes or so, then pop out a sink like an oversize Belgian waffle.

INGREDIENTS BY BENJAMIN OLIVER

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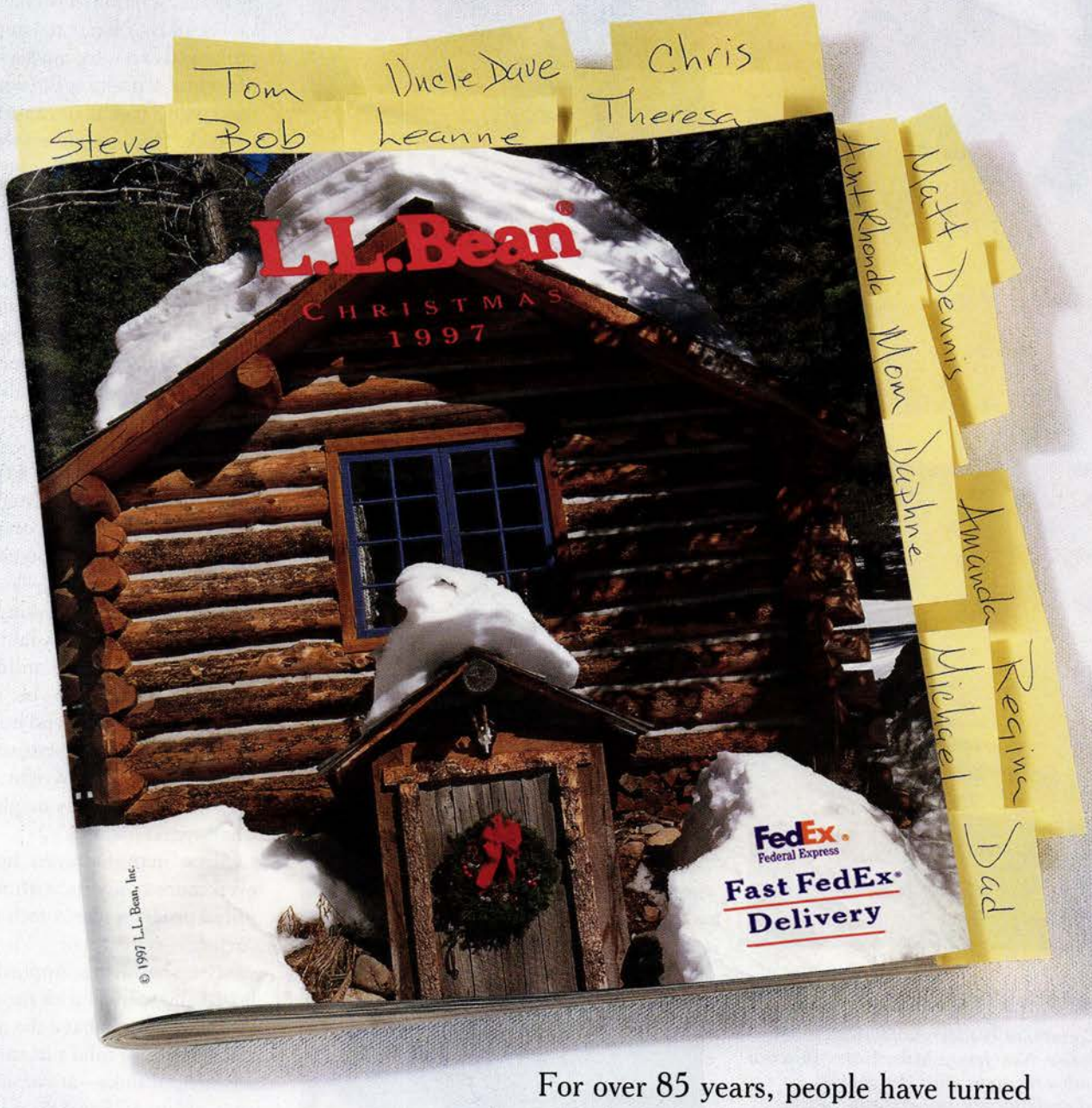

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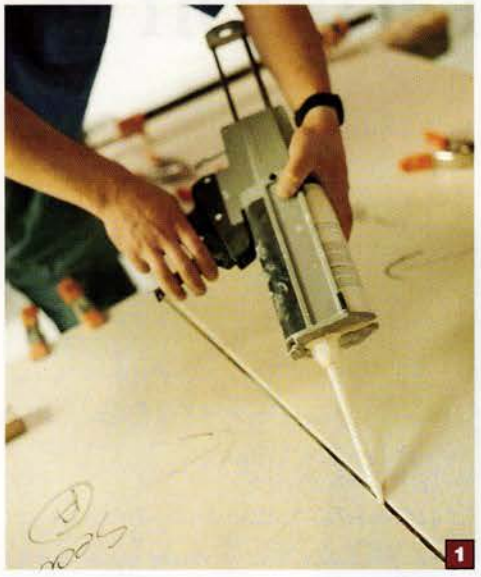

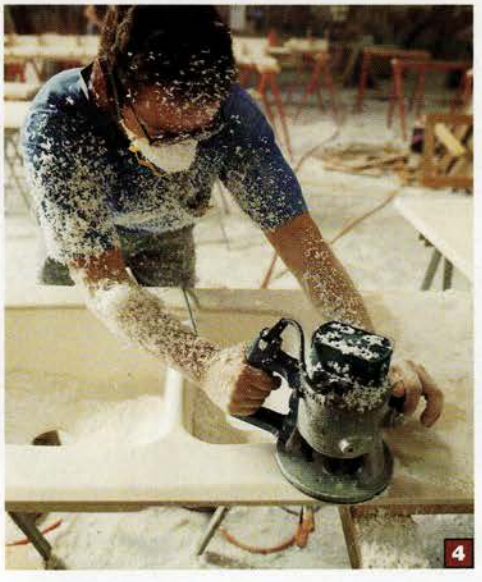

A Countertop Is Born

1. *At Corinthian Products, a fabrication shop in Allendale, New Jersey, Mike Trotter injects a seam with a two-part glue. His double-barreled caulking gun automatically mixes catalyst and resin in the nozzle.*
2. *Before the glue sets, in about 45 minutes, Trotter bar-clamps the sheets together and taps them flush with a dead-blow hammer.*
3. *Strips glued to the countertop's front edge give the illusion of thickness. An army of clamps ensures a tight bond.*
4. *After the sink is stuck to the counter, Trotter routs the edges. Solid surfacing can be cut and shaped using off-the-shelf woodworking tools fitted with carbide-tipped bits and blades.*
5. *The coutertop's top and edges are smoothed with a random-orbit sander and 220-grit sandpaper. A final hand polishing with an extra-fine Scotchbrite pad produces a low gloss matte finsh that's easy to care for.*

easy care, it is, after all, a plastic; it doesn't have the heat resistance of granite or tile. While brief contact with a hot saucepan isn't likely to cause damage, prolonged exposure can leave an indelible white scorch mark (which can be fixed with a patch), or cause the counter to crack. "It sounds like a shot [when it cracks]," says Ed Wright, owner of INcounters, in Abilene, Texas. Like most fabricators, Wright routinely leaves a piece of leftover countertop with the consumer so any future repairs will be color-matched. "Solid surfacing expands and contracts based on temperature the way wood does based on water," Wright says. "You have to treat it very carefully when it comes to heat."

It isn't cheap, either. Countertops cost between $100 and $150 a linear foot installed, about three times the cost of Formica and comparable to granite or marble. If you add the integral solid-surface sink—as most consumers do—the cost jumps another $600 to $800. Even so, fabricators say they're serving more middle-income clients. "It used to be a product reserved for the high-end homeowners; now people in less expensive homes are demanding it," says Wright. "They say, 'My friend has it; my neighbor has it. That's what I want.'"

Some manufacturers hope to win even more converts with new lower-priced products like ⅛-inch-thick solid-surface veneer or 1/16-inch-thick spray-on surfacing. Applied over fiber board and seamed with the same adhesive, the veneers have the appearance and features of solid surfacing—including integral sinks—at considerably less cost, about $75 to $80 a linear foot. "As far as looks and performance, it's the same," says Alison DeMartino, public relations manager for Wilsonart, which introduced the Gibraltar solid-surface veneer nationally in 1986. "The only difference is you can't do some of the high-end features, like routed-in drainboards, carved edges and inlays."

And you can't make deep cuts in a veneer, says *This Old House* contractor Tom Silva. "It's like using a wood-veneer floor. You can sand it so many times and then you're through the

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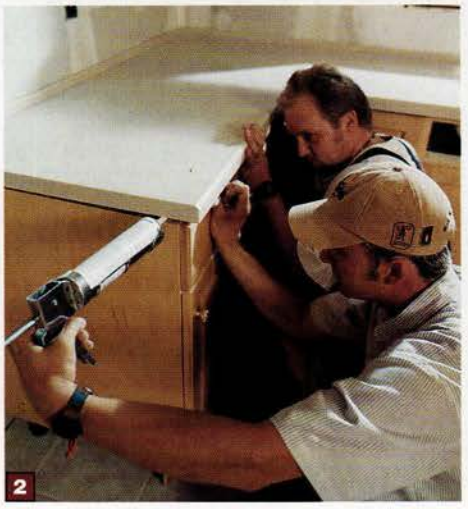

New Counter in an Hour

Because much of the work has been done in the shop, installing a solid-surface countertop in the home is speedy and simple.
1. *Once the counter is in place atop the cabinets, installer Doug Ward cuts the faucet openings in the sink top with a hole saw. A plumber will come in later to hook up the fixtures and drain.*
2. *While George Moreo lifts the countertop, Ward guns a thin bead of silicone between the top and the cabinets, locking the top into place.*
3. *To allow the solid-surfacing space to expand and contract with temperature changes, installers must leave a 1/16-inch space between the countertop and surrounding walls. Ward seals the gap with silicone. From start to finish, the entire process takes about an hour.*

veneer." Tom says anyone who scrubs a countertop that much would be better off with granite.

Though he has yet to use it, Tom thinks a veneer could be "a great alternative for someone who can't afford regular solid surfacing." Still, some who work with *solid* solid surfacing remain wary of the cut-rate newcomers. "It ought to be less expensive; it's 75 percent less material," says INcounters's Wright. "Logic tells you that if it's ⅛-inch thick, it's not going to perform the same as ½-inch-thick material. We think the jury is still out on it."

Fabricators also disagree over the merits of the various ½-inch brands as well. Although they look and cost about the same, there are some significant chemical differences in their makeup. Some use an acrylic resin as their binder. Others use polyester, or a poly/acrylic blend. Avonite has a product that omits the ATH filler altogether in favor of pure polyester resin, which permits strikingly deep, near translucent colors and larger chips of color. Other fabricators say the acrylic-based products, while not as lustrous, are stronger and easier to work with. Polyester resists acetone and citric acids better than acrylics, but if it has no ATH, which acts as a fire retardant, it can burn.

So how to choose? Often it comes down to aesthetics. Solid white, the most popular color, is also the cheapest and the least likely to show scratches, until dirt gets in. Speckles, on the other hand, camouflage smudges and crumbs. "They're all basically the same material," says fabricator Dani Homrich of Dani Designs in Rochester Hills, Michigan. "Pick a color you're going to love living with."

And a good countertop maker. Most manufacturers require fabricators to be certified before allowing them to work with a product. (Some warranties cover installation; others do not.) And although DuPont Corian does offer some prefab vanity tops and shower stalls, most consumers still turn to the pros. "We've found we could make a custom one for about the same price [as a do-it-yourself project]," says INcounters's Ed Wright, "and when you're spending that kind of money, you want it done right." ■

Edge Decor

Some like their countertops plain; others go for fancy edge treatments or inlays. To make an inlay, the fabricator routs a design into the surfacing, then squeezes colored resin into the depressions. After the resin cures, the top is sanded smooth. The process is time-consuming and expensive, but the results can be dazzling.

COUNTERTOP CORNERS BY BENJAMIN OLIVER

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OF CHAIRS AND CELLOS

Solid surfacing holds its shape at room temperature, but when heated to 325 degrees, it droops like a Salvador Dalí watch. Cool it again and it will hold that shape. Some fabricators take advantage of this thermoforming property—and of the material's general toughness—to make furniture, walls, floors and building facades. Some others push the envelope even further.

Retro Seat

Created by architect Matthew Hoey, this slinky lounge chair features thermoformed Corian seat, back and armrests attached to a tubular stainless-steel frame.

Colorful Cabinet

This mobile workstation, designed by architect Gaetano Pesce, was made from several sheets of Corian.

Wood-Free Sound

Musician and fabricator Nathan Carlson spent 300 hours thermoforming and assembling a playable, full-scale model of his cello out of Avonite.

Perhaps you wondered: What else is it good for?

Not long after DuPont chemist Don Slocum invented Corian as a kitchen countertop material, he decided to use it as window trim in his lab. It's still there, more than three decades later. "That material hasn't changed an iota," he says. "It looks as good as the day it went up." Slocum's enthusiasm for it hasn't changed either: "The potential still has not been tapped."

Mike Duggan of *SolidSurface Magazine* agrees. "The applications for solid surfacing are exploding," he says. One cutting-edge use is as a cladding for commercial buildings, instead of stone or metal. And why not? It doesn't rust, ultraviolet rays do little damage and it seems impervious to acid rain. What happens in a fire? A hot pot in a kitchen will crack it. Duggan says it won't burn, but on a building, in the midst of a blaze, it will probably soften and sag—an interesting sight to imagine.

On the home front, Slocum thinks it makes a great window sill because it's so unaffected by sun or water. But a solid surface sill needs a 1/16-inch gap on each side for expansion and contraction.

Seamless and easy to maintain, solid surfacing has proven itself a good material for shower stalls and tub surrounds, if you can swallow the price: about $2,000 for a 96-inch tall, three-sided unit—and don't mind the look of dozens of square feet of plastic.

And what do fabricators who work with solid surfacing every day do with the stuff in their own houses? Several we spoke with have made their dining room tables out of it.

CHAIR BY BENJAMIN OLIVER. CELLO BY CHRISTIANSON STUDIOS. WALL UNIT BY GAETANO PESCE

FOR SOURCES, SEE DIRECTORY – PAGE 153

From Hollywood to Main Street, it's being heralded as the beginning of a home entertainment revolution. It's called DVD Video. With a digital picture that's better than laser disc, and state-of-the-art digital audio, DVD is destined to change your home into a, well, you get the picture. Now movies meet the digital age. And Philips Magnavox is there to help make the introductions.

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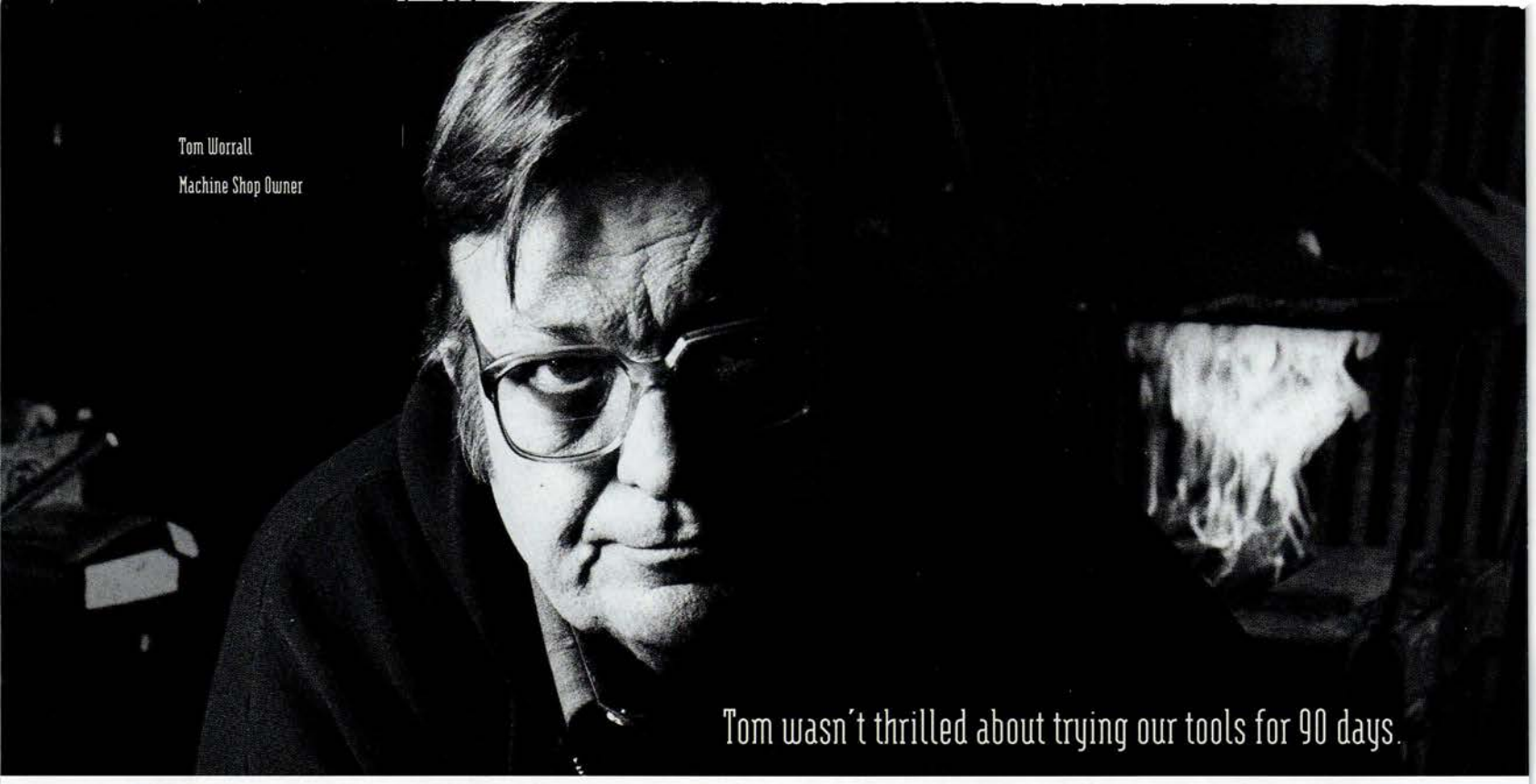

"I've used the same tools for years," he said.

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Tom said, "OK, but this better be worth my time."

After 90 days, we came back.

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We said, "Smile."

He said, "I am."

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BY JOE CARTER

Taking a break from their noisy work, the Duct Dusters crew, top left, doffs their respirators for a breath of fresh air. Sixty years of undisturbed accumulation, right, have left this duct lined with grime. One handful, bottom left, contains billions of particles, everything from dirt to mold spores to skin cells.

DIRTY DUCTS

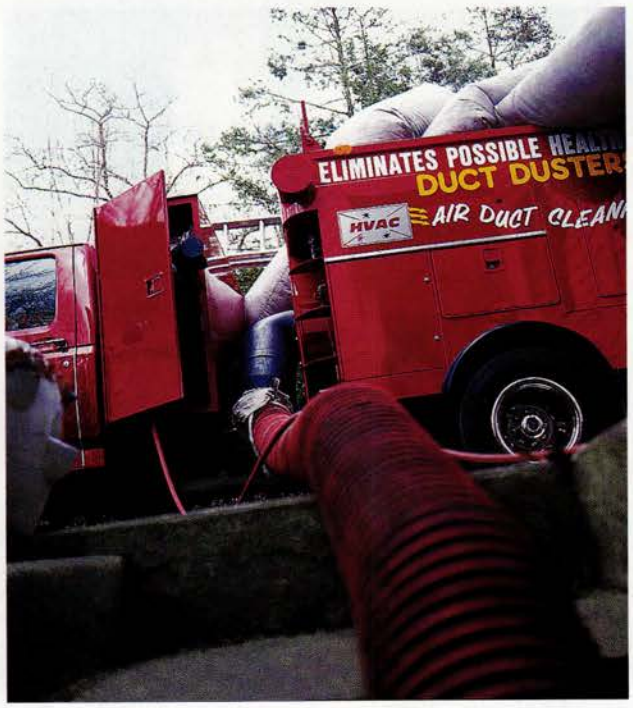
Something else to worry about

The moment Joan and Emanuel Sidler walked into their house after a six-week vacation, they were greeted by an unwelcome surprise: the foul odor of dead animal. Its stench permeated every room of their Scarsdale, New York, home, so they suspected immediately that the critter had expired in their ductwork. Joan picked up the phone and began searching for someone to get rid of the smell.

A couple of calls and a few days later, Frank Troetti, the owner of Duct Dusters, was in her house to work up an estimate. Going from room to room, removing grilles and shining his flashlight into the openings, he saw no carcass, but he did find another problem: thick gobs of dust clinging to the sheet-metal walls of all the ducts in the house. They had not been cleaned for 60 years. "When he showed me the dust," Joan recalls, "I knew it had to be done."

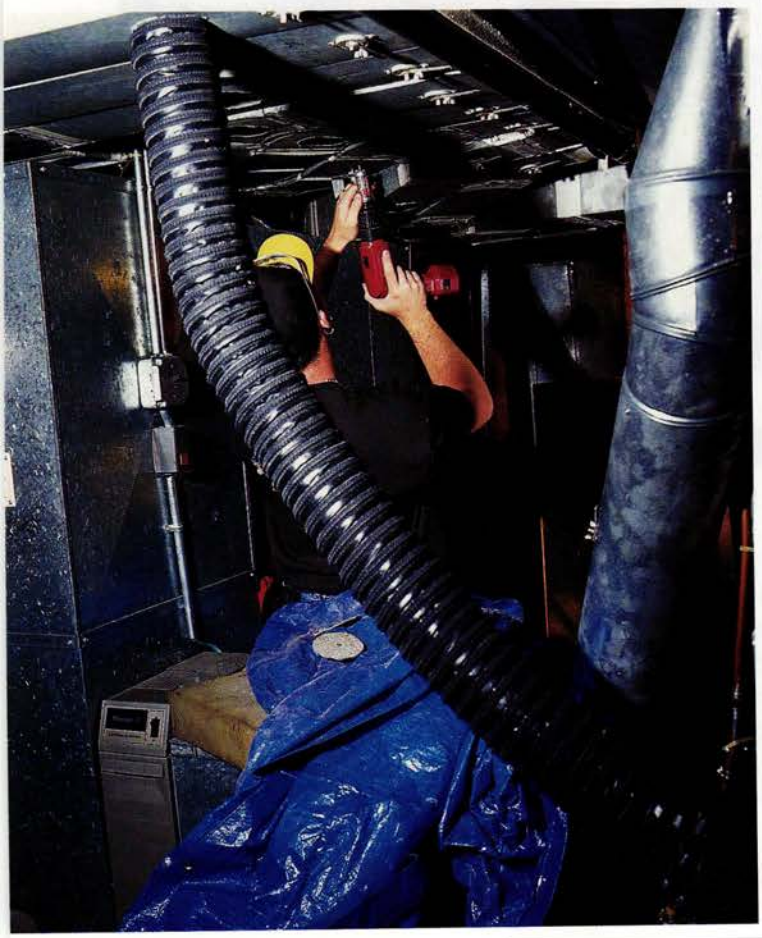
PHOTOGRAPHS BY MICHAEL GRIMM

THE CLEAN MACHINE



Super Sucker

The heavy artillery of duct cleaning, the vacuum truck, guarantees no dust will get loose in the house. With its 350-hp engine working at a maximum 2,000 rpms, it has a suction equivalent to 130 top-of-the-line household vacs. On one job, it nearly swallowed a customer's cat.

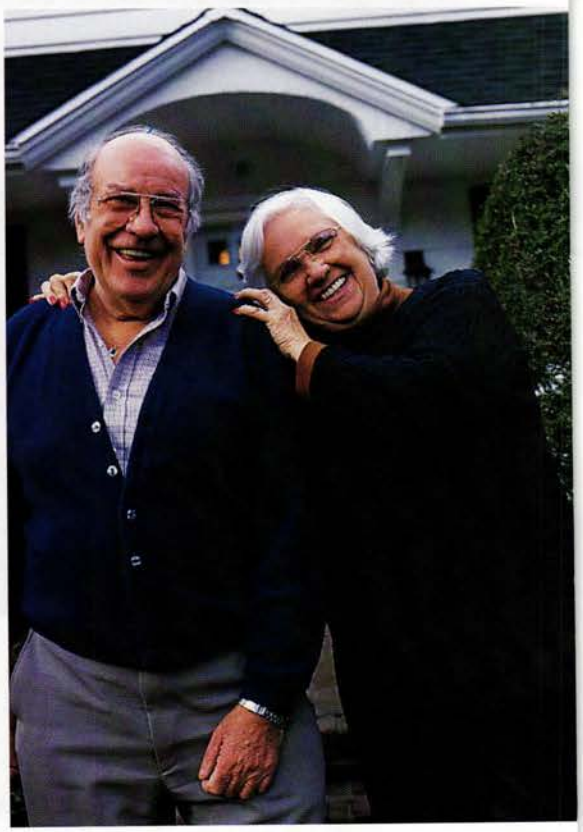


Boring Work

In the basement, a special sheet-metal bit cuts an access hole for the ribbed vacuum hose. As the job progresses, the hose will be moved from duct to duct to concentrate the vacuum's power. For smaller ducts like these, the crew uses a four-inch hose connected to the big eight incher. At job's end, all holes are sealed with sheet metal and foil tape.

The Sidlers are not the only homeowners in this predicament. In 80 percent of the houses in this country, heating and air-conditioning ducts run under the floors and inside the walls. A forced-air system consists of a branching network of supply ducts that leads from the furnace to each room, while another maze of return ducts sends air back to the furnace. As the supply ducts blow air into rooms, return ducts inhale airborne dust and lead it back to the blower. If there's sufficient moisture, the dust becomes a breeding ground for allergy-inducing molds, mites and bacteria, which feast undisturbed on incoming detritus and ride through the rest of the house, unhindered by most furnace filters. (See "The Dust Stops Here," page 50.)

Emanuel and Joan Sidler kept a clean house, but their dirty ductwork may have contributed to Joan's breathing problems.



The fear that dirty ducts represent a health threat has created a big demand for duct cleaning. "It's doubled or tripled in the last ten years," says Glenn Fellman, executive director of the National Air Duct Cleaners Association. "There are anywhere from twenty-five hundred to five

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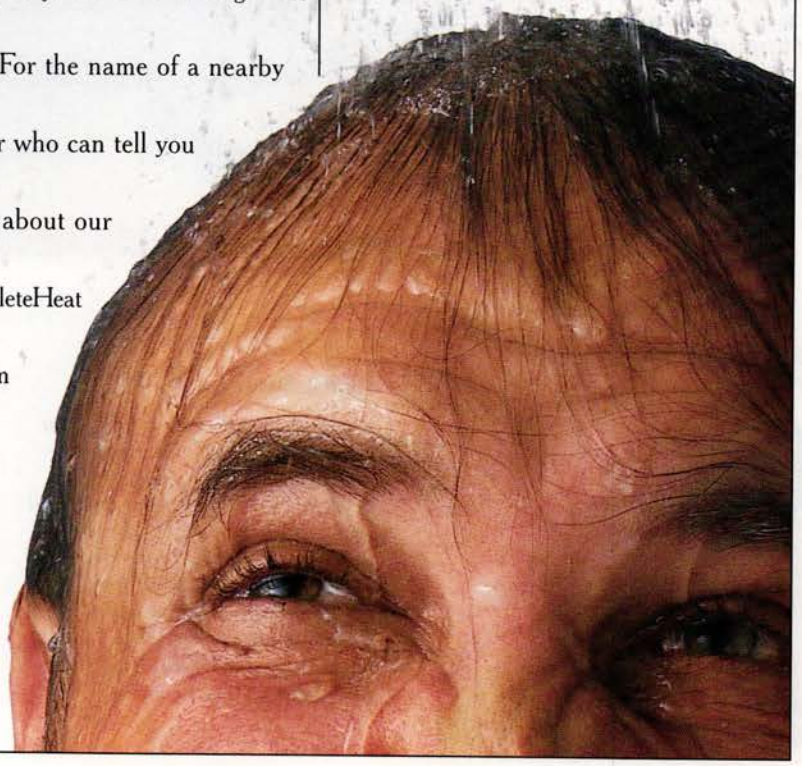

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Blow Out

A workman slowly feeds a compressed air line with a viper tip into an open duct. From any register, the flexible plastic line can reach 25 feet into the ductwork. Whatever the whip knocks loose, the truck vacuum whisks away.

Snake Toil

The viper—18-inches of flexible rubber tubing—is one of several air-powered tools for beating and blowing the dust off metal ducts. Ductboard requires less aggressive brushing methods that won't dislodge bits of fiberglass. Ducts with spun-fiberglass linings should never be brushed; if vacuuming can't clean them, they'll have to be replaced.

HEPA Dusting

Wearing a respirator, a workman hand-vacuums the heaviest deposits, which typically accumulate close to floor and wall registers. The powerful three-hp vac is fitted with a high-efficiency particle arrest (HEPA) filter so all the dust stays in the machine. Before removing the grille, he cuts around it with a utility knife to avoid damaging the paint.

thousand full-time duct-cleaning companies and lots of part-timers." In newspaper and direct-mail advertising, even on their trucks, duct cleaners tout such benefits as cleaner indoor air, longer equipment life, lower energy costs and, often in the boldest type, better health. But right now, there's little scientific evidence to support the cleaners' hype or homeowners' fears.

Last year, in the first study of its kind in the United States, the Environmental Protection Agency analyzed the effects of duct cleaning in nine houses in North Carolina. "We found that using the right techniques improved [the heating and cooling systems'] air flow and overall efficiency," says project head Russell Kulp. "The energy savings over time could pay for the cost of cleaning."

But Kulp didn't find a clear-cut improvement in air quality. "Cleaning had no effect on airborne particle levels," he says. "That's because the biggest source of indoor dust is the infiltration of outdoor dust." Kulp's study also showed that cleaning didn't permanently eradicate mold and bacteria—"They come right back," he says—but it did reduce their numbers. "Cleaning gets rid of the stuff that mold and bacteria grow on," says Kulp. "And less growth means that less of it gets airborne," which should help allergy sufferers.

Joan Sidler is one of them. She hadn't been breathing well in recent years and had long suspected that it had something to do with the air in her house. The Sidlers installed an electronic air cleaner in 1974; then seven years ago a doctor diagnosed her as having allergic bronchitis. "I started wheezing a lot," she says, "and I felt lethargic and out of sorts. It got worse in the winter."

A few weeks after his first visit, Troetti's big red Duct Dusters truck pulled into the Sidlers' driveway. The new Ford looks like any tradesman's pickup, but it's really a vacuum cleaner with four wheels and an automatic transmission. Powered by the truck's 350-horsepower V-8, the vacuum inhales 16,000 cubic feet of air

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SEARCH AND SWEEP

Brush Off

The spinning brush is the fine-tooth comb of duct cleaning. It rides on a remote-control, air-powered tractor equipped with a tiny on-board camera. Guided by the TV monitor, inset, Troetti steers the duct rover, moving it forward and backward in its hunt for dust.

per minute, about eight times the volume of the most powerful furnace blower made. Stick an arm in the inlet and it feels like you could lose your shirt, your watch and your wedding ring.

To put that power to work, Troetti's crew uncoils a 100-foot-long, 8-inch-diameter hose, connecting one end to the vacuum and dragging the other end down to the basement, where they attach it to a freshly cut hole in the system's main return duct. They then stuff foam padding around the blower and the air-conditioner coil to protect them from the soon-to-be-dislodged debris, and they block off registers in the house to concentrate the vacuum's pull.

When the vacuum starts, its turbines rev up to a loud whine. At full power, its nine 6-foot-tall filter bags inflate and rise from the top of the truck, its puffy columns all akimbo and swaying. "This is the only way to do it," says Troetti. The duct cleaners' association agrees; its guidelines stipulate the use of an external vacuum source so the dust flies only one way: straight outside. (See "Who You Gonna Call, and When?" page 51.)

And fly it does. Opening an access panel in one duct reveals an endless parade of crud, everything from fat gobs to fine wisps. It seems that 16,000 cubic feet of air per minute would be enough, but it's not. To do a thorough job, Troetti brings out his in-duct assault tools: vipers and skippers.

"Joey has the viper up there for you, Wayne!" Troetti yells into his combination walkie-talkie, cell phone and

The Dust Stops Here

"Furnace filters are good for furnaces but no good for people." That's the best James Hanley, a senior environmental scientist at the Research Triangle Institute, can say about the thin, cheap filters used in millions of furnaces. His studies showed the best ones stopped only 20 percent of the dust blowing through the system. Others did nothing. By contrast, two-stage electrostatic precipitators (commonly called electronic filters) and pleated-paper media filters, right, trap more than 95 percent of airborne dust. Both types must be professionally installed—prices range from $250 to $450 for media filters and $550 to $850 for electronic units—and both must be maintained. Media filters have to be replaced—about once a year—at a cost of $30 to $50 each. Electronic filters should be hosed off every month or two.

FILTER BY DARRIN HADDAD

A GOOD TRIM MAN IS HARD TO FIND. BUT EASY TO SPOT.

His joints are tighter than Alcatraz. He can add fractions faster than a mathematician. And his tools? Uncompromisingly Bosch.

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Dissecting Dust

"If it's in your house," says Tom Hopen, "it'll be in your ductwork." Hopen, a chemical microscopist, used a polarizing light microscope to examine a dust ball from a Duct Dusters job. Besides the items shown, he also found clothing fibers, plaster and concrete, soot, photocopy ink and flakes of paint and rust.

INSECT FRAGMENT, 340x

SKIN CELL WITH FUNGAL GROWTH, 680x

DUST MITE, 680x

PINE POLLEN, 680x

ASBESTOS, 170x

FIBERGLASS, 340x

Who You Gonna Call, and When?

When dust bunnies show up under the bed, vacuuming day can't be far off. It's not much different with ducts, says *This Old House* heating expert Richard Trethewey. "A visual inspection is about all you can do," he says. Follow the same steps good duct services use: Pull off some supply and return registers and take a look. If a new furnace is being installed, Richard strongly recommends a duct cleaning at the same time. "The new blower will probably be more powerful than the old one," he says, "and it'll stir up a lot of dust."

Finding a good duct-cleaning contractor is the next step. Like any largely unregulated industry, duct cleaning has attracted its share of charlatans. In some states—Arkansas, California, Florida, Georgia, Michigan and Texas—contractors now need a special duct-cleaning license. For his air-quality research, the EPA's Russell Kulp chose only contractors who belong to the National Air Duct Cleaners Association, which established the industry's standards and guidelines. Association members must carry $500,000 of liability insurance.

When interviewing candidates, check references and insurance, and ask them how they'll do the job. Kulp's study contains a checklist of the steps they should follow (see Directory). Finally, beware of anyone with a long list of tasks and a low price. "Doing it right takes two men eight to ten hours," Kulp says. "It costs $800 to $1,000."

beeper to be heard above the din. "You can go all the way, Wayne. Go ahead!" Stationed at a duct opening with its grille removed, Wayne slowly inserts the viper—a short length of rubber tubing connected to a long coil of gray plastic tubing—into the metal passage. Powered by the truck's air compressor, the rubber slaps the duct walls like a whip gone wild, emitting a 250-pound-per-square-inch stream of air that blows the dust loose. The viper is loud; the skipper—a metal ball on the end of the viper that knocks and blows dust free—is even louder, banging about like a rock in a clothes dryer.

As the day wears on, the crew methodically feeds the viper and skipper down every foot of ductwork, cutting more access holes in the basement ducts for the truck's hose. The vacuum stops only for lunch. A short time after work resumes, someone yells up from the basement: "Hey, Frank! Found it!" A stiff squirrel lies in the narrow gap between a foundation sill and a poorly sealed return duct. A crew member gingerly transfers the remains to a plastic bag and drops it into the nearest garbage can. The air starts to sweeten.

"You name it; I think I've seen it," says Troetti of what he's found on the job. "Marbles, cornflakes, baseball cards. Once we found a skunk nest, and another time there was a twelve-foot snake." Even ducts in new houses have problems. "If the duct openings aren't sealed, the workmen use them like garbage cans," Troetti says. "I've pulled out sawdust, plaster, two-by-fours, nails, bottles and coffee cups."

Finally, the vacuum stops for good, and the neighborhood is peaceful again. Troetti's crew is sealing all the holes they cut in the ducts, replacing all the registers, rolling up hoses and packing away tools. Joan sits at the foot of the main staircase, beaming. The smell is all but gone.

In a couple of months, the Sidlers will go ahead with a long-planned interior repainting, not only to change the color scheme but also to erase the dust stains around registers and in wall and ceiling corners.

Joan's breathing woes will pretty much disappear. "When I clean the filter, the rinse water isn't black anymore, just a little dirty," she says. "I can't tell you how much better I feel. This is one of the biggest blessings I've ever had." ■

DUSTBALL BY DARRIN HADDAD, PHOTOMICROGRAPHS BY THOMAS HOPEN/MVA INC.

FOR SOURCES, SEE DIRECTORY – PAGE 153

BY MARK FEIRER

A svelte body and a nose for tight spaces take this detail sander where other power sanders won't go. Most detail sanders have one thing in common: a Pinocchio-like pad that projects forward so the tool body won't bump woodwork.

SAVE US FROM HAND SANDING

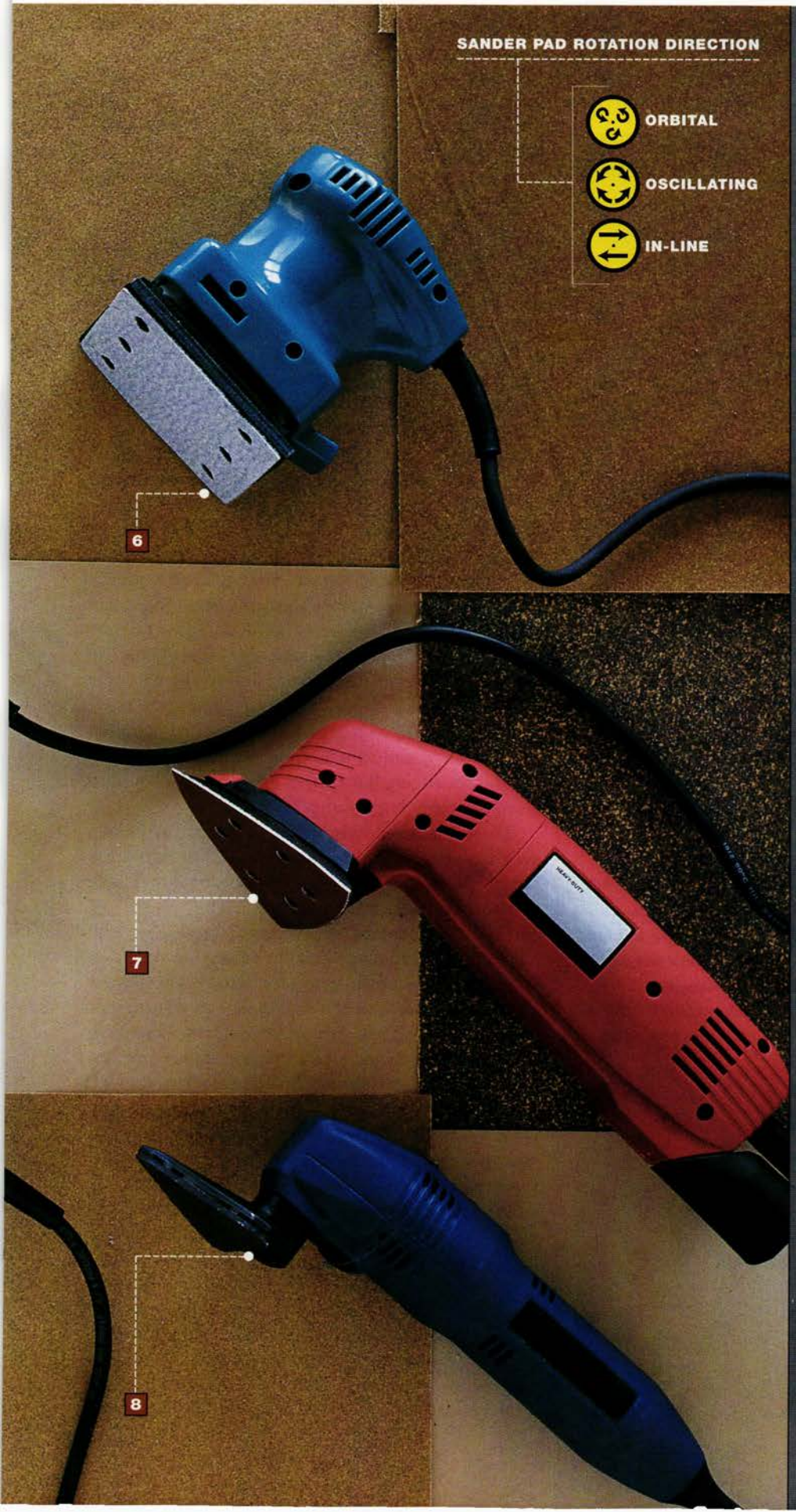
Detail sanders take on the torture

Behold the human hand, a splendid 27-bone marionette strung with tendon and muscle. It can boogie or waltz, crush or caress, speak for the mute and see for the blind. No other biomechanism is so supremely suited—alas—to the singular tedium of sanding. Anyone who has stroked (and stroked) the rolling dunes of a Windsor chair seat, navigated the endless valleys of crown molding, or surrendered to the paint-clogged crevices of a double-hung window has probably prayed for divine assistance (or at least an electric gizmo). That's why most wood shops resemble a sanding Circus McGurkus of motorized big belts, small pads and spinning discs, of sanders that orbit, vibrate and whirl, of hissing air-powered ones and angled, sucking and muscle-bound benchtop ones. Now comes yet another to the troupe, a handheld sander that looks like a platypus, hums like barber's *Continued on page 56*

PHOTOGRAPHS BY ANTHONY COTSIFAS

SMOOTH OPERATORS

Some orbit and others oscillate, but all take the tedium out of hand-sanding fine details. Unlike the square pad and upright posture of a quarter-sheet orbital sander (see No. 6), detail sanders' triangular pads wiggle easily into corners.



1. Black & Decker

Double-barreled rechargeable battery allows maximum mobility. Single-speed tool is best for occasional use. Hook-and-loop abrasive. 5,000 orbits per minute

2. Fein

This tough, industrial tool started it all. Recently updated with electronic speed control and variable speeds. Hook-and-loop or adhesive-backed abrasive. 12,000 to 21,000 strokes per minute.

3. Dremel

Compact and lightweight. Uses hollow rubber profiles with easy-to-rotate non-adhesive sanding sleeves. 4,000 to 8,500 strokes per minute.

4. Porter-Cable

A variable speed machine durable enough for prolonged use. This model has a slightly longer and more aggressive sanding stroke than the single-speed version. Adhesive-backed abrasive. 2,100 to 6,000 strokes per minute

5. Bosch

New gear-driven model with soft-grip top, through-pad dust pickup, and variable speed control. Hook-and-loop abrasive. 13,000-19,000 orbits per minute.

6. Makita

The pad or finishing sander, once the only way to power-smooth wood, puts more sandpaper on the job than a detail sander but needs more elbow room to work. Standard sheet abrasive or hook-and-loop. 12,000 to 14,000 orbits per minute.

7. Milwaukee

Gear-driven, with variable-speed controls. Includes dust port and slide-lock switch. Hook-and-loop abrasive. 7,000 to 11,000 orbits per minute.

8. Ryobi

Inexpensive sander for home use has permanent-magnet DC motor, two speeds and optional dust collection tube. Slender handle is easy to hold. Adhesive-backed abrasive. 9,000 and 12,000 strokes per minute.

It slices, it polishes and yes, even cuts through bone

The muscle-bound metronome we call a detail sander began life as a sealant slicer in Stuttgart. Mercedes-Benz was attempting in 1983 to mount its windshields in polyurethane, but the experiment worked all too well; once the sealant stuck, it clung so tenaciously that replacing the glass was next to impossible. So Mercedes turned to the Fein Tool Co. Fein created an oscillating tool that swung a knife through 21,000 tiny arcs a minute, neatly parting glass from rubber.

Sawing
Fein's slender sawblade cuts chair spindles and dowel pegs flush, but won't slice through flesh.

Oscillation puts the buzz into a barber's clippers and the hootchie-cootchie into tools that rake out the grout between fragile tiles. Surgeons have oscillating saws to make skull cuts; doctors use them to safely slice off casts. The blade burrows neatly through any hard, unyielding surface, but won't cut skin, which wiggles harmlessly in synch with each stroke.

Scraping
This oscillating blade peels off decades of caked radiator paint.

Fein took its little slicer and turned it into an all-around construction tool. Equipped with an arsenal of accessories, it can polish metal, cut wood, vibrate concrete and sand corners. European contractors have adopted the tool as a jobsite necessity. In the United States, however, it's generally regarded as just a sander. Even so, the tool's sanding abilities are so impressive that its arrival here in 1987 sparked a rash of imitators and established detail sanders as a distinct tool. In 1995, Fein and other tool companies sold about 400,000 of them. Fein's version remains by far the most versatile (and expensive) of the lot, surprising even Tom Silva with all it can do. If used only for sanding, it may be, as Tom says, "a niche tool." But fitted with another attachment, it may lead to a different niche worth scratching.

Buffing
A felt pad dosed with buffing compound returns the gleam to old hardware.

Continued from page 53 clippers and makes short work of smoothing small spaces. The detail one.

Unlike bigger sanders, detail sanders have a ferret's talent for nosing into awkward places. Often called corner sanders (for the tight spots they reach) or triangle sanders (for their distinctive pads), they're the sports cars of sanding: nimble and quick in sharp turns but hardly the right ride for heavy hauling.

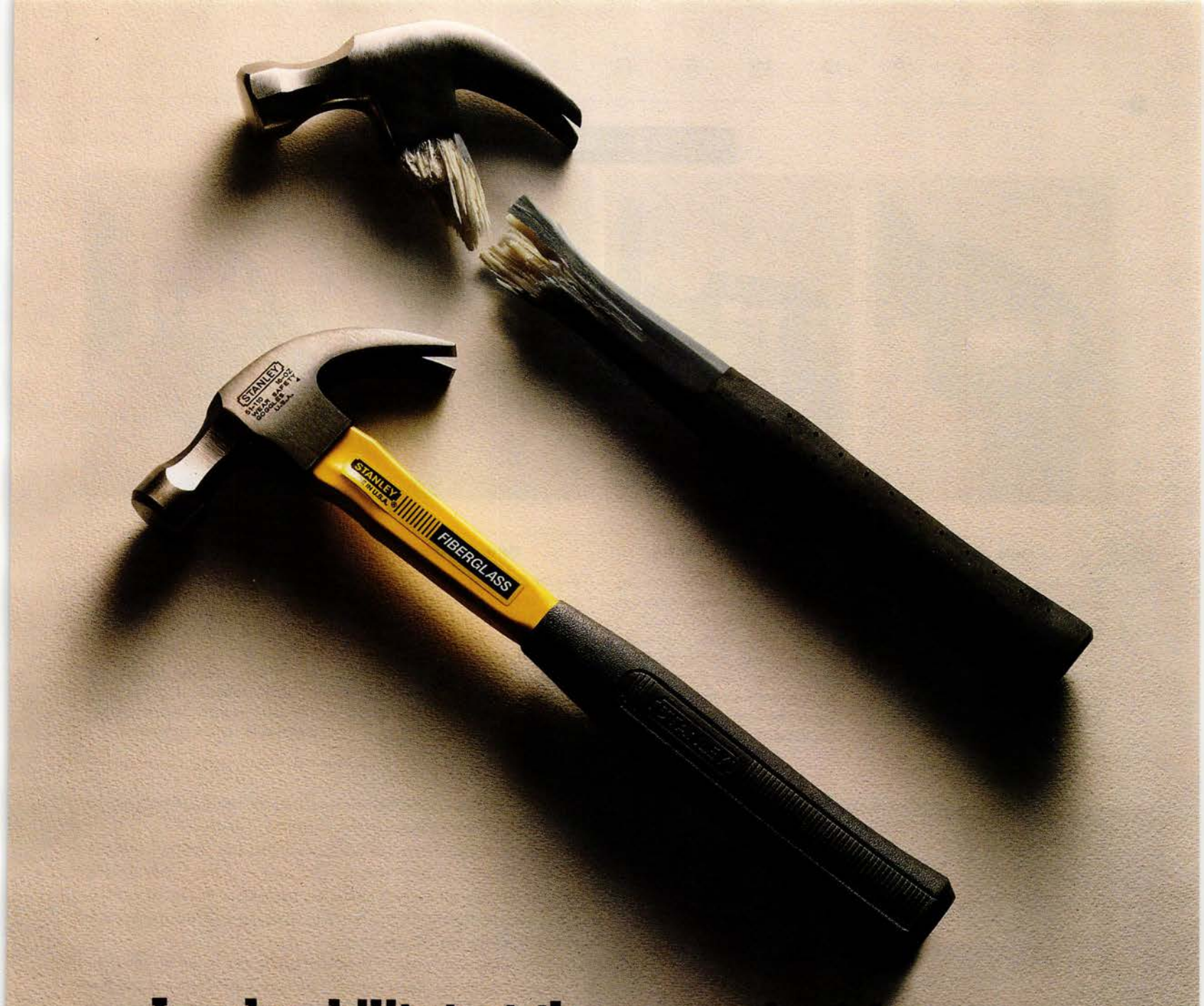
Master carpenter Norm Abram sometimes pulls one out to sand rough spots on assembled drawers, but he hardly finds the tool indispensable. He prefers smoothing with a random-orbit sander before assembly. Detail sanders get the best chance to strut and stroke during remodeling work.

This Old House contractor Tom Silva has two and, though they don't get nearly as much use as his other sanders, they're "definitely handy," he says.

Before the first detail sander came along in 1987, an orbital critter called a palm sander was about the only motorized recourse for sanding into corners. Unfortunately, its square pad couldn't reach all the way in without shivering feverishly against adjacent surfaces. The points of a detail sander's triangular pad meet at less than 90 degrees so they slip easily into corners and along edges. With his detail sanders, Tom can now smooth every nuance of a staircase newel, then slip between balusters to sand steps, and finally work the edges of a riser without chattering against the skirtboard. "They're also great," he says, "for sanding window trim and touching up the corners of windowsills or edging floors right up to the baseboard to clean up where bigger sanders missed."

There are three kinds of detail sanders: oscillating, orbital and in-line. Like a hot tango, a thorough detail sanding takes two: an oscillating or orbital to handle the flats, an in-line for the curves.

The most common type is the oscillating sander, with a triangular sanding pad mounted on a spindle that jitters back and forth at up to 12,000 strokes per minute (spm). If the spindle is attached to the side of the sanding pad, the whole pad pivots back and forth like a high-speed windshield wiper; if it's attached at the center, the pad moves with a twisting Chubby Checkers motion. Either way, the greatest movement—and the greatest wear—is at the tips. Tom prefers fuzzy-backed hook-and-loop papers, which, unlike pressure-sensitive-adhesive-backed (PSA) sandpaper, can be pulled off and repositioned in an instant when one tip loses grit. Even the pad will wear down eventually at the tips, Tom says; he's on pad number three with his five-year-old oscillator. Oscillating sanders inevitably sand across wood grain though the minuscule distance traveled by the pad (barely 1/16 inch at the tips) minimizes scratching—as does the right technique. "Use fine sandpaper, move the sander slowly and use a light touch," Tom says, and the scratches will be invisible. Another tip: Tom eases into



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.*

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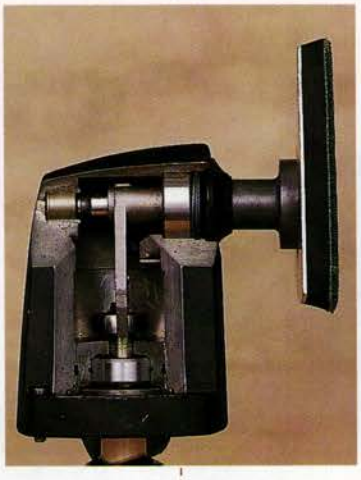
*Overstrike test conducted by striking hammer handle against metal object.

MOTOR CUTAWAYS

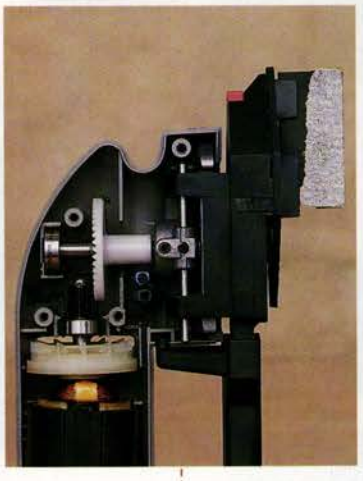
Belt drive

The relatively small motor in this battery-powered Black & Decker sander allows it to be placed at a 90-degee angle to the tool's body, an arrangement that allows a slender, easily grasped handle. A quiet, toothed, fiberglass-reinforced belt links the drive gear to the orbiting mechanism.



Gearless wonder

The wiggle of the Fein's sanding pad starts with a simple bend in the motor's armature shaft. A bearing secured to the shaft orbits in a tight circle, pushing back and forth a steel yoke forged to the sanding pad's shaft. The connection is elegantly straightforward and virtually unstoppable.



Saw motion

On the Porter-Cable, plastic gears connect the motor to the driveshaft. At the end of the driveshaft, an eccentric bearing rides against the inside "corral" of a steel plate, causing the plate to move forward and back, and with it the sanding pad. A pair of parallel stainless rods keep the pad in line.

Into orbit

Unlike an earlier cable-driven model, this new Bosch sander has a sturdier pinion-and-bevel-gear drive. An eccentric driveshaft fits into a bearing on the back of the sanding pad; as the bearing orbits, so does the pad. The shaft is fitted with counterweights to reduce vibration.

Profiles in scourage

Unlike sanders that orbit or oscillate side-to-side, sanders with in-line action can smooth curved surfaces thanks to rubber profiles that give sandpaper its surface-hugging shape. The Porter-Cable uses solid profiles that won't deform when pressed hard and can be whittled to fit unusual shapes. These profiles use adhesive-backed sandpaper that goes on quickly and easily, though it can't be repositioned once removed. Dremel's flexible, hollow-rubber profiles can't be carved to accommodate slight surface irregularities. Sandpaper tubes slip over these profiles; just a turn of the tube exposes fresh abrasive.

the action by letting his sander reach full speed before touching the work. Variable-speed and multispeed sanders make this slow steady approach easier to manage.

Orbital detail sanders look just like their oscillating cousins, but the pad orbits in tight circles at up to 13,000 orbits per minute (opm). This action is less likely to leave cross-grain scratches but can chatter on curved surfaces, making it tricky to control. About the only way to tell an oscillating detail sander from an orbital model is to look for an spm or opm speed listing on the spec tag.

Shinnied up an entirely different branch of the detailer family tree is the in-line detail sander. Instead of oscillating or orbiting, the pad moves in a linear fashion forward and back at speeds (up to 6,000 spm) that would burn calluses off the hardiest hand-sander. These in-line workhorses rely on a battalion of hollow or solid rubber "profiles," each wrapped with PSA paper or tucked into a sanding sleeve, to sand dusty trails over hill and dale. They're ideal for smoothing curves—moldings, stair spindles and any milled profile. Fitted with an accessory flat pad, an in-line detail sander can also smooth narrow boards and edges. Running the tool across the wood grain will carve visible scratches into the surface.

Most detail sanders have bodies that wrap around a heavy-duty motor, making them as awkward to hold as a bottle of cabernet. "You won't want to hang onto it for a long time," admits Tom, but that's rarely necessary anyway—the task, after all, is sanding details, not plywood sheets. Slender sanders are easier to hold, but their smaller motors aren't up to a tough slog on the jobsite. Dust ports for an optional vacuum hose are a useful feature for production work, but detail sanders kick up so little sawdust that Silva rarely wrestles with a hose unless he's sanding paint or the adhesive squeeze-out on a solid-surface countertop.

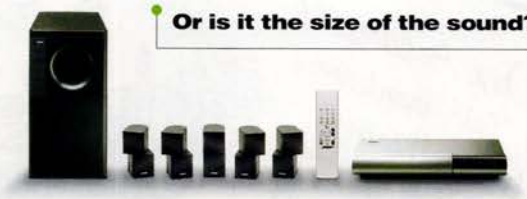
Having hand-sanded details for years, most craftsmen still have the habit of folding or wrapping sandpaper around a scrap block or a dowel. It's a low-tech approach that works fine, albeit slowly. When the road ahead is long and winding, or if patience isn't your virtue, a detail sander beats scraps of grit and a box of Band-Aids any day. ■

FOR SOURCES, SEE DIRECTORY – PAGE 153

As you begin your search for the ideal home theater audio system, ask yourself what's important:

Is it the size of the equipment?

Or is it the size of the sound?



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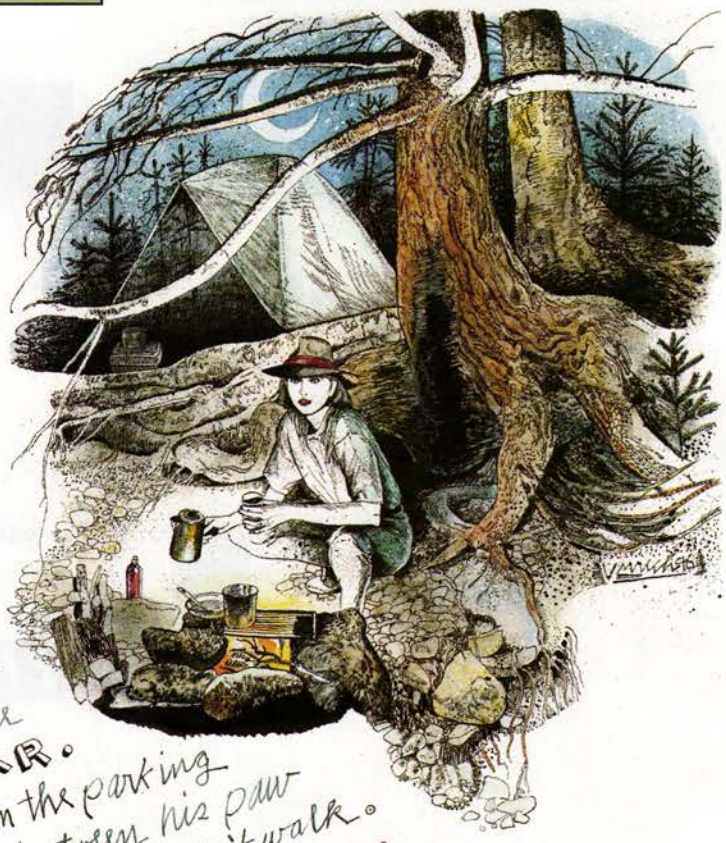
 *From a review of the Lifestyle® 12 home theater system

TOOL TALES

[REAL STORIES OF *LEATHERMAN® TOOLS* AND THE PEOPLE WHO USE THEM.]

№ 11

ALL THAT STOOD BETWEEN ME AND THE HOWLING BEAST WAS A LITTLE PAIR OF SCISSORS.



On a camping trip at Trillium Lake, our Siberian Husky, Teddy, had a run-in with a rather rude adversary. TAR. Somehow tar from the parking area had caked the hair between his paw pads, cementing them together. He couldn't walk. He howled in pain. I sat by the fire, perplexed.

Then I remembered the handy little Leatherman Micra I had just started carrying. I folded out the scissors and snipped away hardened tar and hair. And Teddy took off to play his favorite game, Chipmunk chasing.

Diane Eiden,
Richfield, Minnesota

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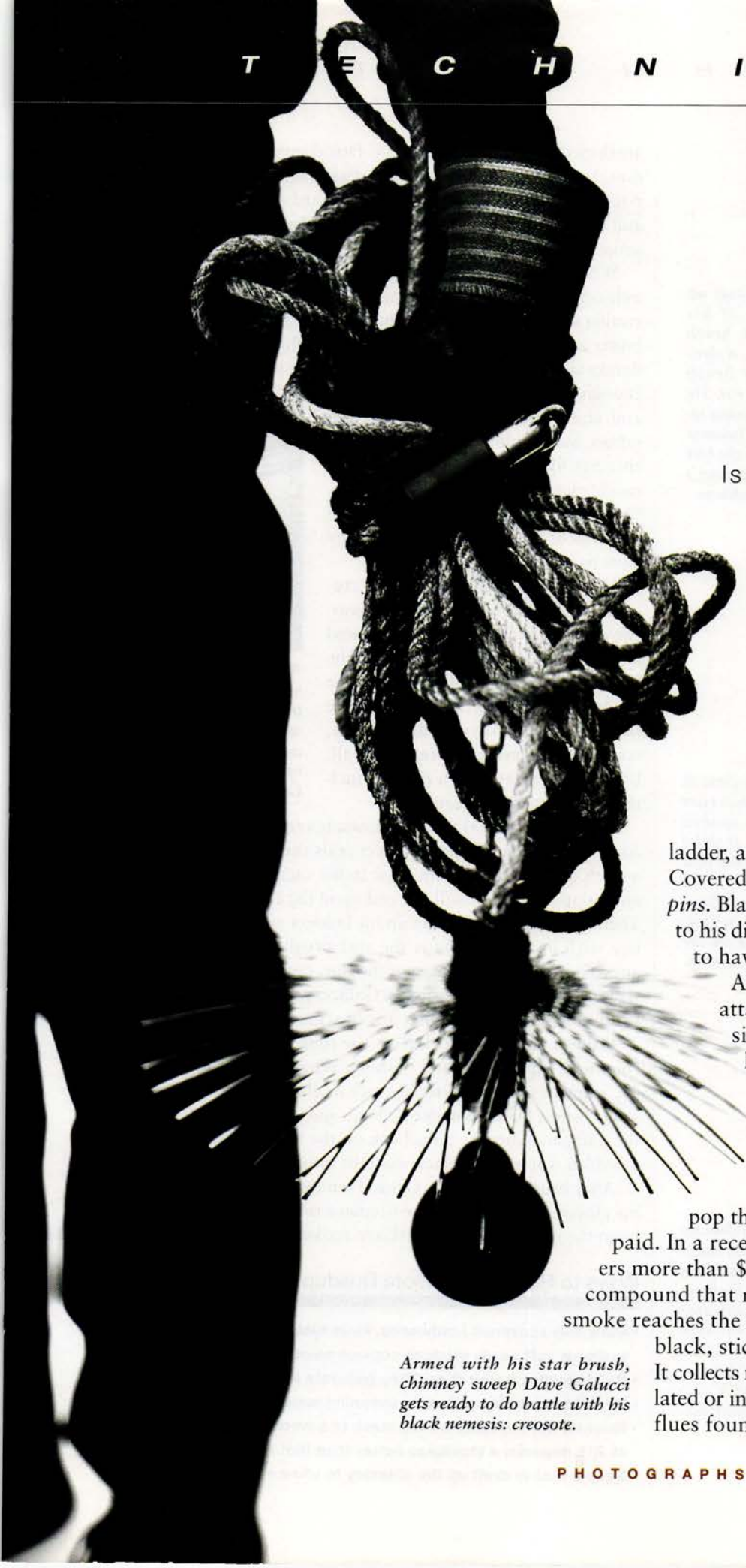
BY BEN KALIN

CLEAN SWEEP

Is your chimney a time bomb?



Armed with his star brush, chimney sweep Dave Galucci gets ready to do battle with his black nemesis: creosote.

Silhouetted by the sun, Dave Galucci climbs down the ladder, a quiver of worn brushes slung over his shoulder. Covered in soot, he looks like a figure from *Mary Poppins*. Black etches every skin crease, from his crow's-feet to his dimpled chin. Even his drooping mustache seems to have been dipped in creosote.

After 14 years of sweeping chimneys, Galucci attacks the black innards of a flue with an intensity born of his experience as a fireman. He knows what a chimney fire can do to a house. "I'm not here to simply clean the chimney. I am making the whole house safer."

Americans are romantically attached to their fireplaces. They burn logs for the rustic smell, the dancing light and the crackle and pop that warm their hearts. But there is a price to be paid. In a recent year, 32,500 chimney fires cost homeowners more than $182 million. Burning wood produces a tarlike compound that rises up the chimney in the smoke. When the smoke reaches the flue's cool walls, the tar condenses to form a black, sticky and flammable substance called creosote. It collects more rapidly on exterior chimneys than on insulated or internal stacks, and it is especially attracted to the flues found on older draft-choking woodstoves. There

PHOTOGRAPHS BY MICHAEL MYERS

MAN IN BLACK

Galucci hauls up the tools of his trade: 4-ft. brush extensions, a dangling star brush and a mirror. He prefers cleaning up on the roof because it gives him the best view of a chimney's overall condition.

If a flue is close to plumb, Galucci can drop in a spoked star brush. It slides down, thanks to a rubber-coated weight, and flairs to remove creosote by friction on the way down and up.

As Galucci does his dirtiest work, cleaning the firebox floor, he protects his lungs with a respirator and rubs his skin with protective creams: "You're dealing with carcinogenic materials."

are three different types of creosote. First-degree creosote is a fluffy gray dust. Second-degree is more dense than first and looks like blackened popcorn. Third-degree creosote is as hard as crystallized molasses and clings tenaciously to flue walls. The dense third-degree creosote ignites first and spreads to the rest.

When creosote ignites, flames may quickly engulf the entire flue, unleashing a firestorm. Heat racing up the chimney sucks an accelerating stream of air through the damper, making the fire burn even hotter and heightening the draft until the flue is growling like a 747 during takeoff. In seconds, temperatures can reach 2,300 degrees, hot enough to melt mortar, crack flue tiles and char or burn nearby studs and rafters. Sparks blown out the top of the chimney like fireballs out of a Roman candle may ignite rooftops blocks away. "Most people don't realize the explosiveness of a chimney fire until they have had one," Galucci says.

Would-be chimney sweeps need a high-powered filtering vacuum to cope with fine soot, ash and creosote. "Soot will eat away at the magnets of a regular household vac," Galucci says.

He recommends checking for creosote buildup at least once a year. Anyone who heats with wood will need a cleaning after burning 1½ cords. "The best place to check a fireplace is the smoke shelf, the small ledge right above the damper," he says. "Take a knife, screwdriver or pen and scrape the wall. If you come away with a piece ¼-inch thick, it's time for a cleaning."

The only practical way to eliminate creosote is to brush it out. After closing the damper, Galucci seals the fireplace opening with a cloth tarp and inserts the hose to his vacuum, his insurance that an avalanche of soot will not end up in the customer's living room. Then he heads outside, sets up his ladders and climbs to the chimney with his tools. One is the star brush. Another, a brush the approximate size and shape of the flue, connects to a set of flexible screw-together fiberglass poles. Galucci pushes, pulls and twists the brush down the flue, adding 4-foot segments as he goes.

Galucci prefers to work from the roof, where he can inspect the chimney's cap, mortar and flashing. When the roof is covered with ice, snow or delicate materials such as clay tile or slate, he can stay safely inside, huddled under his tarp, and pushes a brush up through the damper. When he pulls back on the brush, first a trickle, then a sudden waterfall of blackness falls into the firebox.

After brushing the flue, Galucci removes the damper and reaches his gloved hand through the fireplace throat to remove any debris from the smoke shelf. If there are broken flue tiles at the bottom,

Ways to Reduce Creosote Buildup

- **Burn only seasoned hardwoods. Fires fueled with green wood or resinous softwoods produce copious amounts of creosote.**
- **Build smaller, hotter fires. They generate less smoke.**
- **Don't burn cardboard boxes, wrapping paper or Christmas trees.**
- **Mount a thermometer on the stack of a woodstove. Tar condenses at 212 degrees; a stovepipe hotter than that will deter buildup.**
- **Keep a steady draft up the chimney to allow smoke to exit rapidly.**

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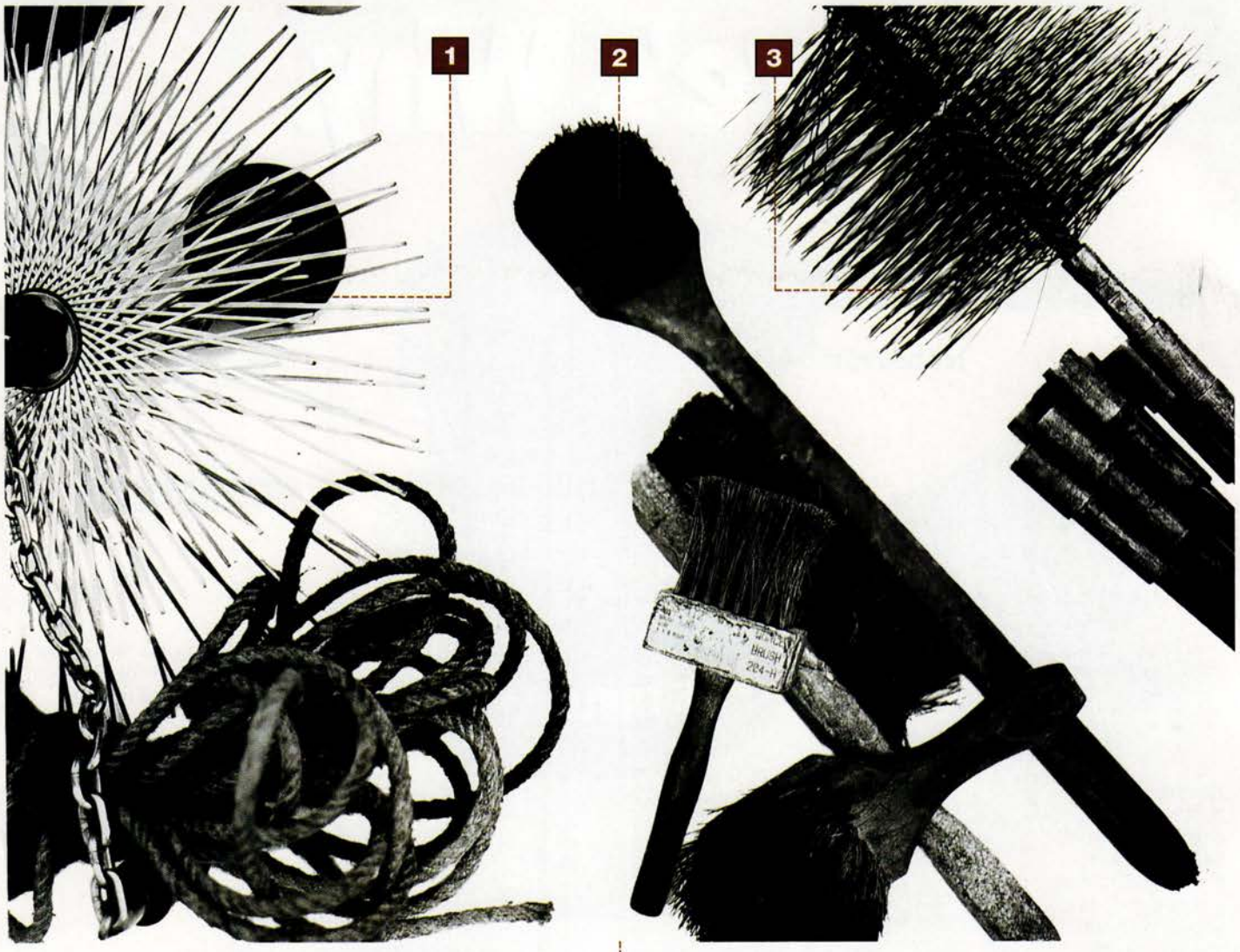
STACK SCRUBBERS



The tools of the chimney-sweep trade all serve the same purpose, to scrub away creosote. **1.** *A spoked star brush with a dangling chain and a 15-lb. rubber ball can be used only from the roof.* **2.** *An assortment of small brushes scrubs every nook and cranny of the firebox.* **3.** *The extension brush with the sectional poles has changed little since George Smart invented it in 1805 to end the practice of sending boys up flues with hand brushes. The bamboo poles of Smart's era have been replaced by flexible fiberglass, and the whalebone bristles are now wire.*

it's a good indication that there has been a chimney fire, which caused the tiles to expand and shatter. (A flue relining is the only recourse.) He then scrubs the back wall of the firebox with a hard bristle brush. In most cases, a two-man crew can do the job within 45 minutes. Third-degree creosote may require three hours to remove with chains and drills.

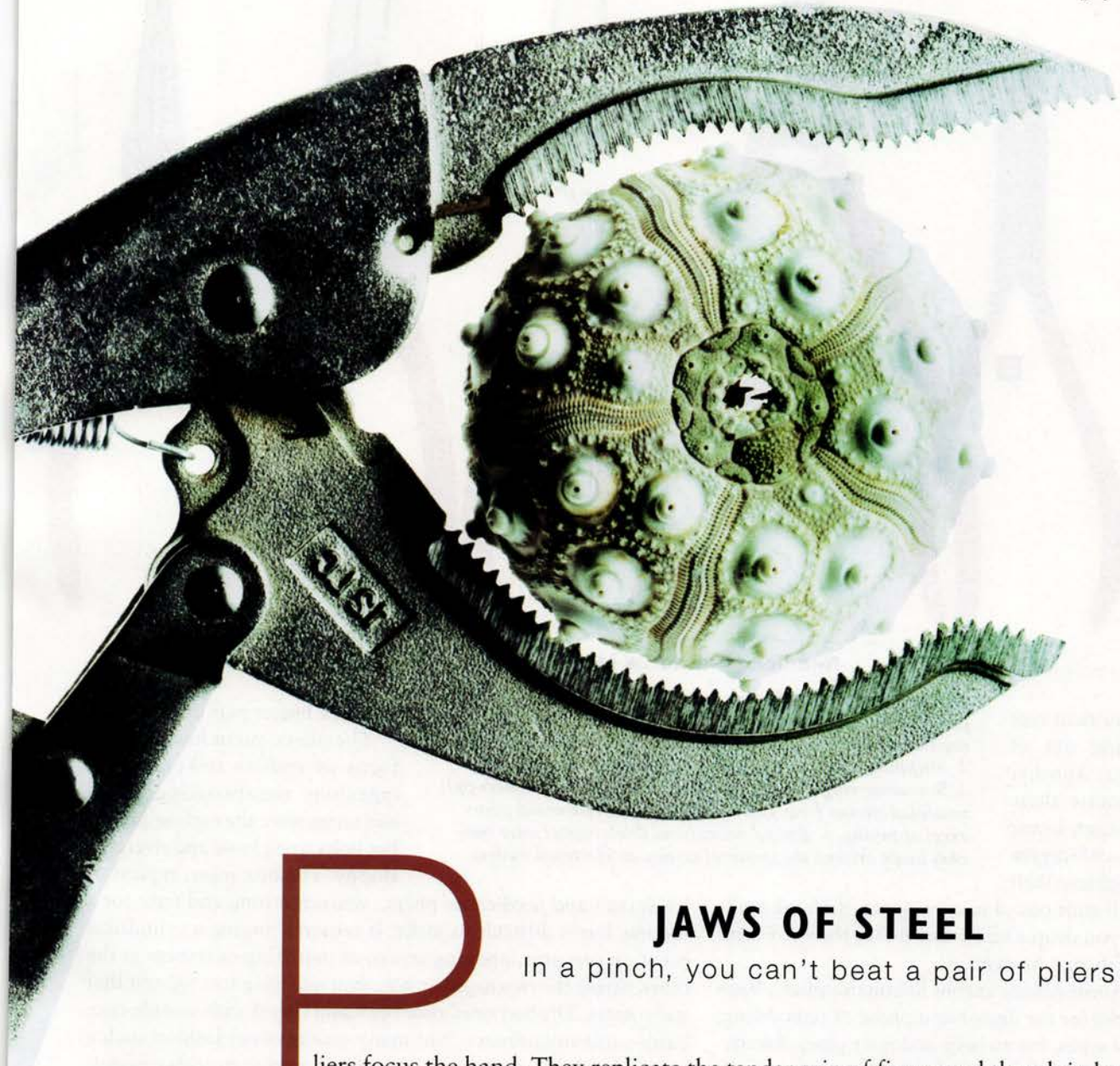
For the price of one professional cleaning, about $75, a homeowner can purchase a set of brushes and poles just like Galucci uses. But cleaning may not be enough. "A lot of people think that as long as the chimney is standing, it's fine. This couldn't be further from the truth," says Ashley Eldridge, technical director of the National Chimney Sweep Guild. "A good chimney sweep is not only someone who will effectively clean the chimney but will also be able to evaluate the whole system."

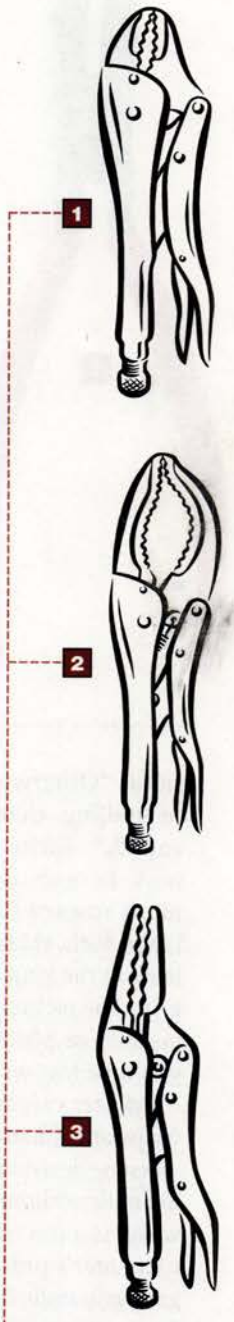
In Europe, the chimney sweep trade is often regulated, but in most of the United States no license or certification is required. For a relatively small investment, anyone can become a sweep. So Galucci advises homeowners to look for more than a low bid. He suggests asking for an up-to-date certificate from the Chimney Safety Institute of America, as well as calling previous customers given as references. Finally, he recommends asking for proof that the sweep is fully insured. "You have to be extremely cautious when choosing a sweep," Galucci says. "If he does it wrong, you may only realize it when it's too late and there is a fire in your chimney." ■

SHOOT STYLED BY JOE LIBONATI

FOR SOURCES, SEE DIRECTORY – PAGE 153

BY JOHN KELSEY





JAWS OF STEEL

In a pinch, you can't beat a pair of pliers

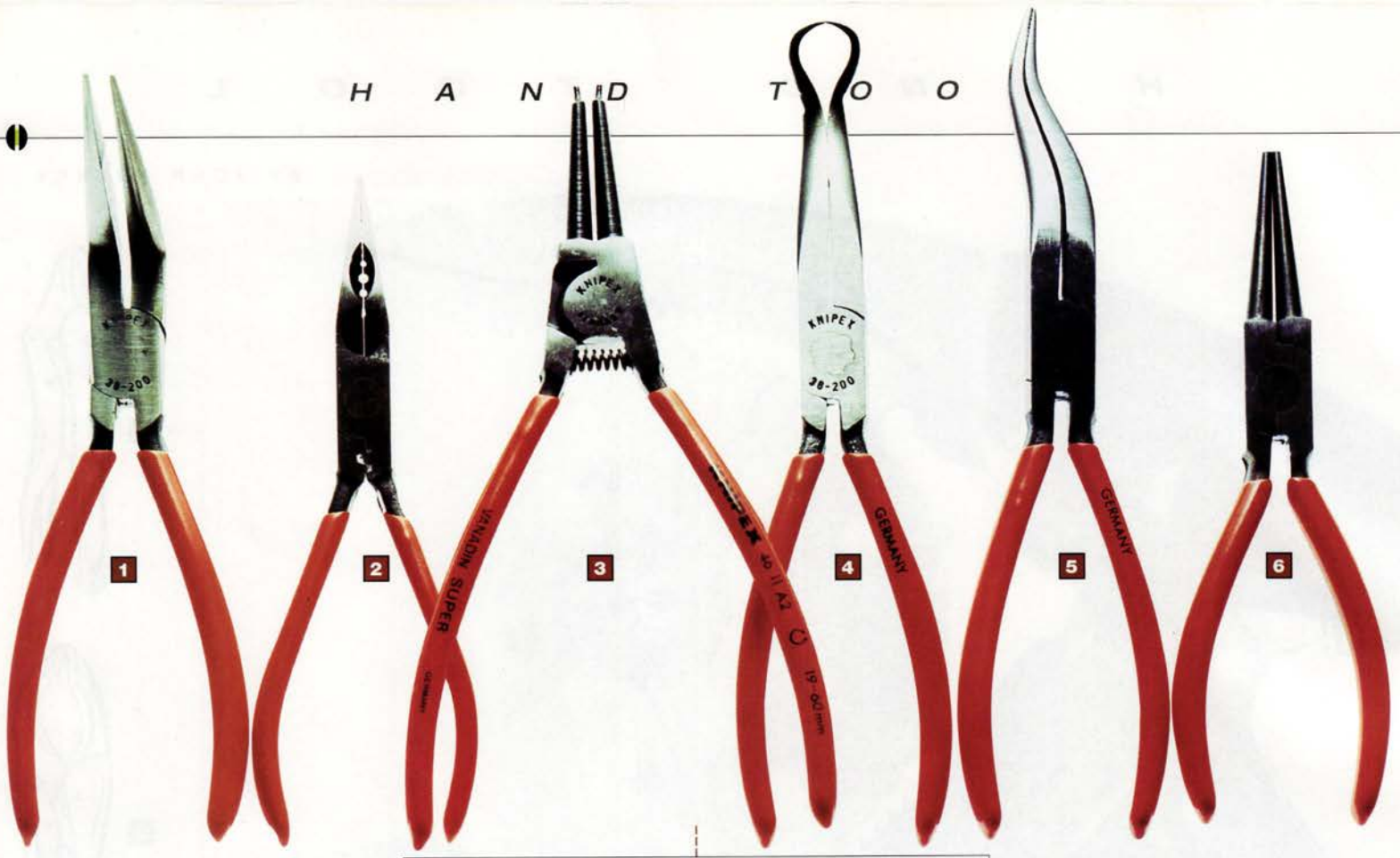
Pliers focus the hand. They replicate the tender grip of finger and thumb in hardened steel, amplifying muscles with the power of leverage. The offspring of blacksmiths' tongs, long-handled, curved-jawed tools that safely held hot metal atop ringing anvils, pliers have evolved into a family of shapes and sizes suited for dozens of specific tasks—pulling, twisting, squeezing, opening and cutting. With nose and jaw shapes tailored for grappling with particular objects, pliers poke into tight spots and reach around corners. No electrician, plumber or carpenter could get along without pliers, as the tool chests at any *This Old House* jobsite can attest.

Electrician Paul Kennedy uses a pair of square-nosed, thick-jawed linesman's pliers to pop blanks out of electrical boxes, pull cable through walls, cut and strip wire and twist and trim its ends for wire nuts. Whenever plumber Richard Trethewey works under a sink, he reaches for a large pair of grooved Channellock-style pliers. He says the secret to using them is to bed the jaws against the fitting so the pliers make contact with three

Self-Lockers

The three-point pivot on Vise-Grips lets these pliers lock rigidly with an iron grip or a gentle grasp. Varying jaw shapes adapt the tool to many different tasks: 1. Nut biting. 2. Pipe gripping. 3. Wire pinching.

PHOTOGRAPHS BY JIM COOPER ILLUSTRATIONS BY BOB HAMBLY



Needlenose Chorus Line

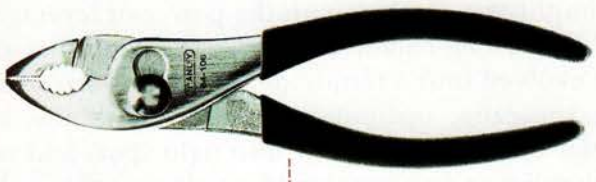
Needlenose pliers, with their hard-to-make, hard-to-break pivots and arced handles, come in a variety of shapes. 1. Bent needlenose pliers help speed work inside electrical chassis. 2. Stripping pliers remove insulation without cutting wire. 3. Retaining-ring pliers open when squeezed. 4. Grabbers pull insulated sleeves from spark plugs. 5. Cranked-nosed pliers excel at prying. 6. Round-noses bend thick copper wire into neat loops around the terminal screws on electrical outlets.

sides. "Otherwise, you're at risk of pulling that fitting out of round," Richard says. Another trick he uses is to rotate these pliers toward the smaller, lower jaw, which, thanks to a 45-degree bend at the knuckle, tightens their grip. For picking small stuff out of narrow spots, Richard needs needlenose pliers. "If you drop a screw down into the valve seat, you'll be lost without them," he explains.

Master carpenter Norm Abram carries linesman's pliers, Vise-Grips and Channellocks for the demolition phase of remodeling, when he deals with live wires, frozen bolts and rusty pipes. Removing nails without damaging the wood is a job for his old-style carpenter's pincers. "You can get a grip right down to the surface and roll the nail out without leaving a dent," he says.

At their simplest, pliers consist of two crossed steel levers pivoting on a pin that joins them. Their mechanical advantage runs between 2 to 1 and 5 to 1, which translates into about 400 pounds of squeeze. Jaw power can be increased by moving the plied object closer to the pin, by shifting the grip outward on the handles or by getting a bigger pair of pliers.

The pliers' pivot has been the focus of endless tinkering and ingenious metalworking. Bolts and rivets were the earliest pivots, but bolts work loose and rivets get sloppy. The box joint, typical of linesman's and needlenose pliers, remains strong and tight for a lifetime but is difficult to make. It requires forging a cylindrical pivot on one arm, opening an eye of matching exactness in the other, fitting the two together hot, then reforging to a tight fit that still rotates. The best ones glide open and closed with wobble-free, bank-vault smoothness. Not many smiths could fashion such a pivot, and even today manufacturers are closed-mouthed about how they make them.



Junk Pliers

Say "pliers" and what comes to mind are the 6-inch slip-joint pliers that haunt Handy Andy tool kits, car-repair sets and kitchen junk drawers. Yet in the view of This Old House *contractor Tom Silva, they are "useless except for pinching fingers, scarring chrome and throwing at squirrels." The slip-joint's barrel-curve handles are too rounded and too short to grip well. "You don't get any leverage," Tom says. And like an unwilling dental patient, the jaws seldom open wide enough. The slip joint is infamous for slipping of its own accord. "Gets you right at the base of your thumb," Tom adds.*

Box-joint pliers are fine for grabbing skinny wires and sheet-metal junction boxes, but anything thicker—a pipe or a nut—is beyond their grasp; the jaws just slip off. Jaws grip best when they are parallel, and the jaws on fixed-pivot pliers are parallel only when closed.

Early attempts to widen the range of bite led to slip-joint pliers, the ubiquitous knuckle-skinning tool with the figure-eight slot. A more successful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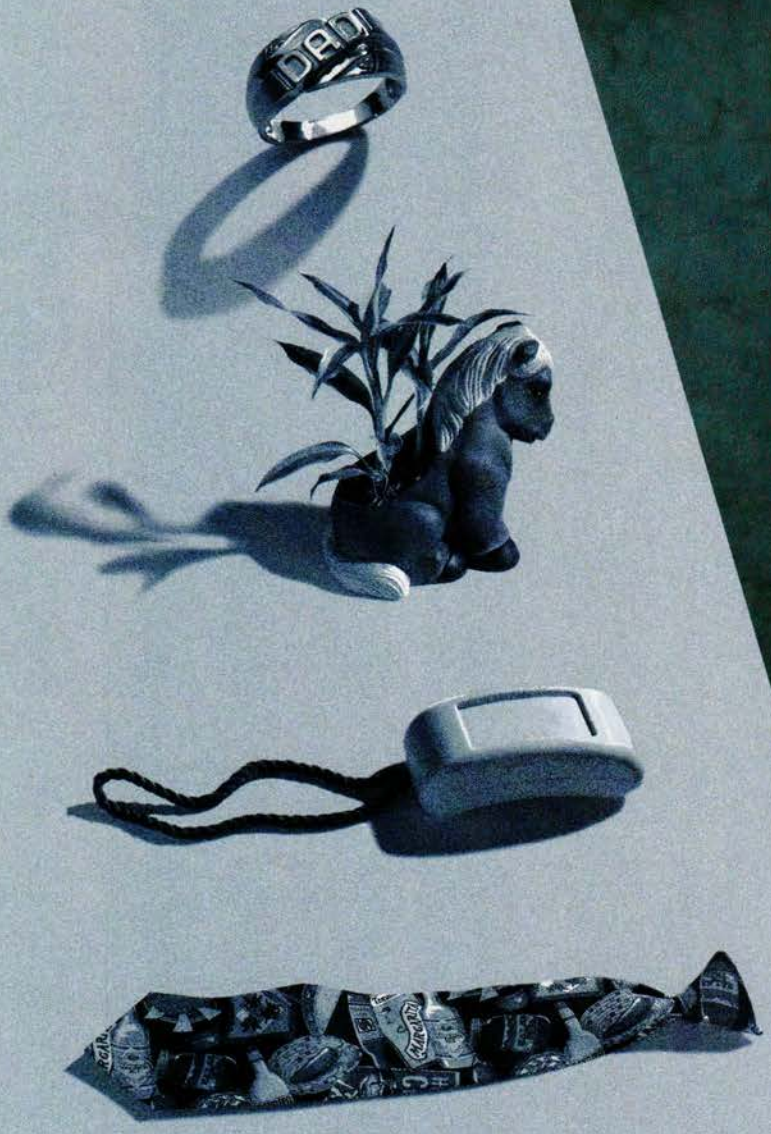

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Oddballs

Plier jaws are as varied as the uses to which they are put. 1. These Swedish-made pliers have fast-opening jaws that adjust with a touch on a red button. 2. Fence tools are Wild West originals, created for cowpokes who needed one tool to cut and crimp barbed wire and also to pound and remove fence staples. 3. Heavyweight linesman-style pliers are favorites of ironworkers who tie rebar together; the bent handle keeps their hands from slipping as they pull the wire tight. 4. This lightweight pair of multiple slip-joint pliers has curved jaws for handling PVC pipe.

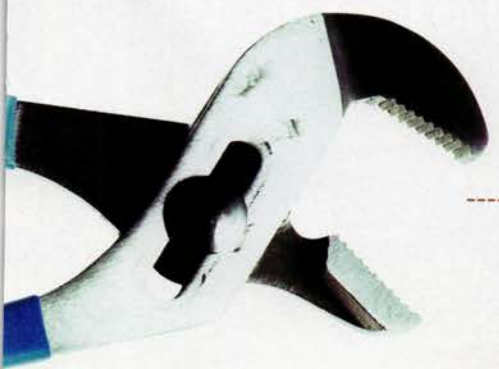
solution appeared around 1920, when a Nebraska blacksmith named William Petersen tinkered his way to the compound-action, three-pivot pliers now known as Vise-Grips. Petersen's pliers self-lock, produce up to a ton of squeeze and have screw-adjustable jaws for optimal grip. After Petersen figured out how to stamp the handles from sheet steel—a faster, cheaper process than hand- or drop-forging—his triumph was complete. Today every tradesman carries at least one pair.

Petersen's Vise-Grips are powerful enough to crimp-seal a spurting water line—or, more notoriously, to strip the corners off seized nuts—but they're also cumbersome to adjust. Howard Manning, the chief engineer at Champion Tools, solved that problem in 1933 when he unhinged the pivot and created Channellocks. The drop-forged and machined jaws of Manning's pliers slip into as many as eight tongue-and-groove arcs, giving one tool a no-slip jaw range of more than 2 inches.

Channellocks do have their drawbacks. Every time the jaws need repositioning, the two handles have to be opened wide enough for the grooves to disengage—a two-handed operation. Also, if the jaws aren't perfectly parallel, there's no way to fine-tune a drop-forged arc.

Enter William Warheit, who invented the first self-adjusting pliers in 1987. His pliers, marketed as Robo Grips, have a cam-and-ratchet mechanism that automatically positions the pivot so the jaws remain parallel as the handles are squeezed. The tool is also simple to manufacture; both the handles and jaws of Robo Grips are stamped out of mild steel sheets, which are then hardened and riveted together around plastic inserts.

Warheit's invention is a leap forward in pliers design, but pliers evolution shows no signs of slowing. Every few years, a new version of Vise-Grips shows up, and now self-locking Robo Grips are sold alongside the originals. The quest for perfection continues. ■



Big Bites

One pair of drop-forged Channellock pliers, left, can be as useful as a whole set of wrenches for plumbers who work in tight spaces with nonstandard fittings. As long as the grooves are engaged, the Channellock behaves like its fixed-pivot cousins, rotating through a narrow arc. Not so with the sliding-pivot Robo Grips, right. A spring-loaded mechanism in the handles keeps the jaws wide open when not in use. All it takes is a one-handed squeeze to close the jaws onto the work and set them parallel to give maximum gripping power.

FOR SOURCES, SEE DIRECTORY – PAGE 153

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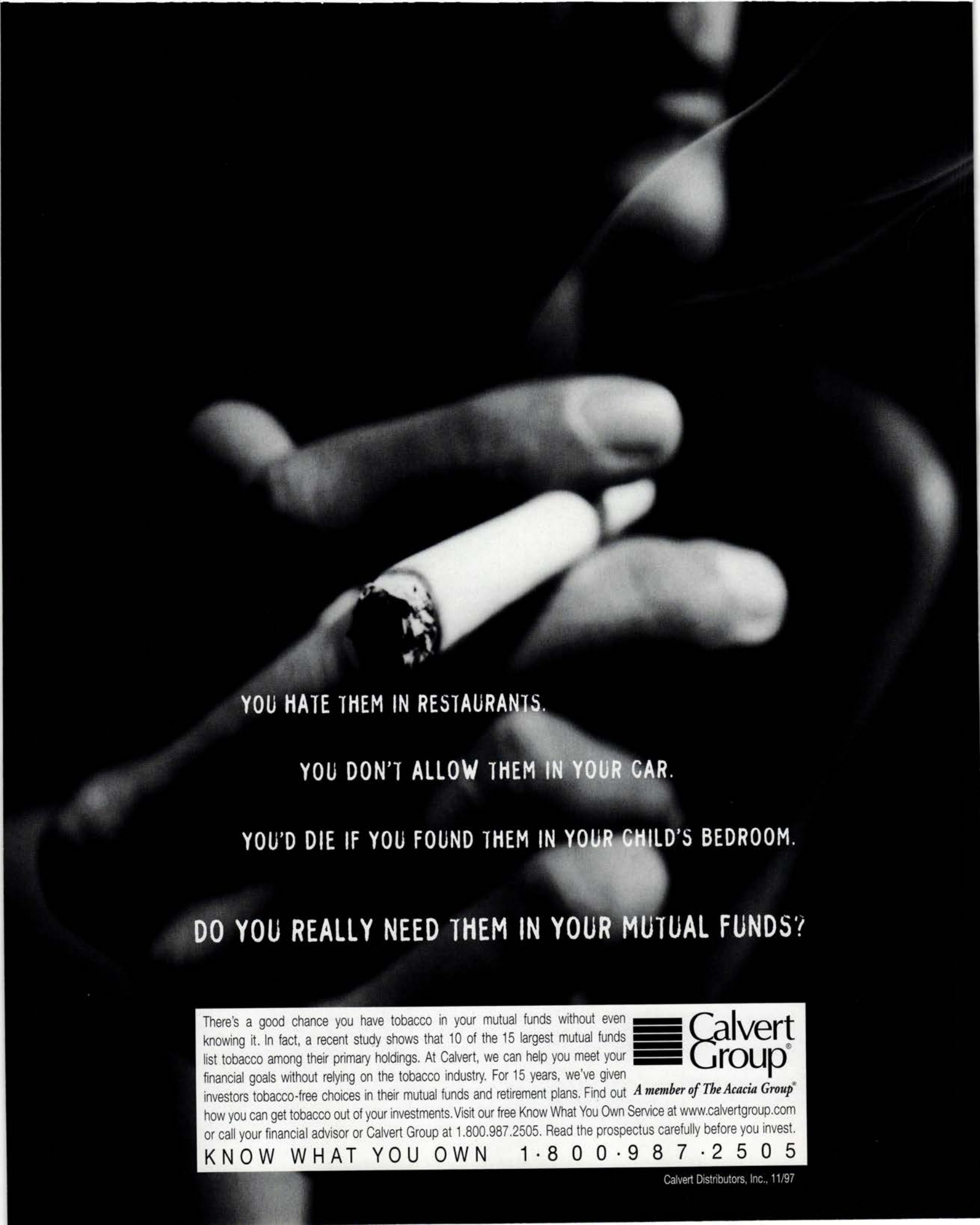

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GET TOUGH WITH YOUR MONEY

When You Buy P. 74

Sit down with your spouse and talk about what you both really want from life. Then ask: Would you rather retire at 50 or have a 3,500-square-foot house?

When You Borrow P. 76

Do not go meekly into that good bank. Lenders will compete for your borrowing business, so you can haggle about everything: rates, points and fees.

When You Renovate P. 78

Stick with readily available, standard-size cabinets, windows and doors, which you can get at any lumberyard. You'll save thousands.

TOP ILLUSTRATIONS BY BOB HAMBLY; BOTTOM ILLUSTRATION BY JOSE CRUZ

BY BRAD LEMLEY

THE ZEN OF FRUGALITY

Imagine, you could be mortgage-free by age 40

Before I signed on with this magazine, I wrote for the "Tightwad Gazette," a newsletter devoted to the art of frugal living. Along with recipes for pancake syrup and broadsides against disposable diapers, publisher Amy Dacyczyn and I banged out many articles on homes and money, detailing ways to prevent the former from utterly devouring the latter.

I enjoyed the process because I needed the information as much as any reader. When I started at the "Gazette" in 1990, my wife, Laurie, our 4-year-old son, Alex, and I lived in Bath, Maine, in a half-finished house festooned with pricey accoutrements such as ash-plank floors and minimalist Swedish bath fixtures. To save money, I'd done most of the work myself, but the size and ostentation of the place quickly chewed through our construction loan, leaving the second floor unfinished. Like Dickens's Miss Havisham endlessly moping at her decayed wedding feast, I used to wander among the naked studs and dangling wires, lamenting. I refused to shoulder more debt; the load was already daunting. Although Laurie and I worked full-time and felt we were rather frugal—we ate out just once a week and subscribed to basic cable—I calculated we'd need to save for three years to finish the place (and, a more inchoate worry, that we couldn't retire until 2070).

So from my first day on the job, I eagerly absorbed the frugal wisdom Amy had demonstrated in buying her own home. On an average annual income of less than $30,000, she and her husband, Jim, a career Navy man, had saved $49,000 in the seven years of their marriage. This allowed them to plunk a fat down payment on a $125,000 fixer-upper farmhouse on seven acres in Leeds, a quiet town in central Maine. As Amy recounted the story, I saw hope not only for myself but also for others staggering under the weight of their mortgages—which included nearly everyone I knew. I realized that anyone willing to exert discipline and common sense could follow the Dacyczyns' example.

ILLUSTRATION BY BRIAN CRONIN

Amy told me that, before they married, she and Jim had defined exactly what they wanted and what they would give up to get it. Fiscal life, she explained, is multiple choice, and "all of the above" isn't on the form. She and Jim chose three goals: a big family, a sound old house in the country, and no day-care for the kids. To achieve them, they pledged to forgo several goodies: restaurant meals, convenience food, movies, expensive vacations, new clothing (except for underwear and socks, all else came from yard sales and swapping with relatives), nonemergency long-distance phone calls, cable TV and much more. Onerous as it might sound, Amy insisted that she enjoyed living frugally, "because we knew it would get us to our goals."

As Jim's retirement loomed, he and Amy bent their formidable will to finding the right house. While stationed in Brunswick, Maine, they piled their four kids into the Suburban every weekend for 15 months and inspected 176 houses. "When you look at a lot of properties," Amy told me, "you know a deal when you find one." The house they ultimately purchased was so cheap that the Dacyczyns and two other families bid the first day it hit the market. But only Jim and Amy realized that this opportunity merited a full-price, no-contingencies offer.

And while, to me, their turn-of-the-century Victorian seemed grand at 2,500 square feet, Amy pointed out that in

HOUSE ILLUSTRATION BY BOB HAMBLY

They always called you "Big John" and "Little John." You were his best man. And he, yours. And when you started the firm, you argued over whose name could go last.

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one sense it was smaller than my 1,700-square-foot Cape. After they moved in, Jim and Amy had two more children, so their home had 312 square feet per resident, mine 566 for our family of three. Like millions of boomers, I'd been sucked in by the bigger-and-snazzier-house zeitgeist.

So Laurie and I began talking. To our mutual shock, we discovered that neither of us coveted a large, luxurious house. Our goals were for Laurie to quit her stressful job and pursue a singing career, to decelerate the debt-powered treadmill that kept me writing feverishly and to keep our son out of child care. We adopted most of the Dacyczyns' economies and threw in some others. Because these sacrifices brought our goals nearer, the process was surprisingly easy, and some aspects of our lives actually became more opulent. Laurie had previously settled for whatever clothing was on sale at upscale department stores but was amazed to find designer garments she really wanted at yard sales for $1 to $10 apiece. In our pre-frugal days, we had purchased a new, no-frills (not even a radio) Toyota Tercel for $7,000. Once we agreed to hunt for a used car, we snagged a loaded Camry for $4,500.

Certain outlays were tough to trim: We couldn't whittle the mortgage or Laurie's college loan, and I found that during a Maine winter a husband can nudge the thermostat only so far back before domestic felicity falters. But surgically slicing every optional expense reduced our spending by about 20 percent. In just 10 months, we freed enough funds to finish the house. In 1993, after evaluating at least 30 houses, we sold the Cape in Bath and bought our 900-square-foot ranch in Topsham. Three years later, we paid off the mortgage.

Our little ranch has no garage and only one bathroom. Some might say that, at 42, I'm a failure for being stuck in this "starter" house. I disagree. We love it. Laurie is singing, I'm writing at a sustainable pace, and Alex, 11, is being raised by his parents. We take a couple of nice family vacations every year, and we're saving a third of our income.

Extricating myself from the too-much-house tar pit is one of the smartest moves of my adult life. The allure of cathedral ceilings, granite countertops, cavernous master suites and burbling Jacuzzis can be potent. I've caressed the cool stone and swished my hand through the bubbles. But honestly, emphatically, I say this: None of it is remotely as satisfying as a happy family, zero debt and money in the bank. ■

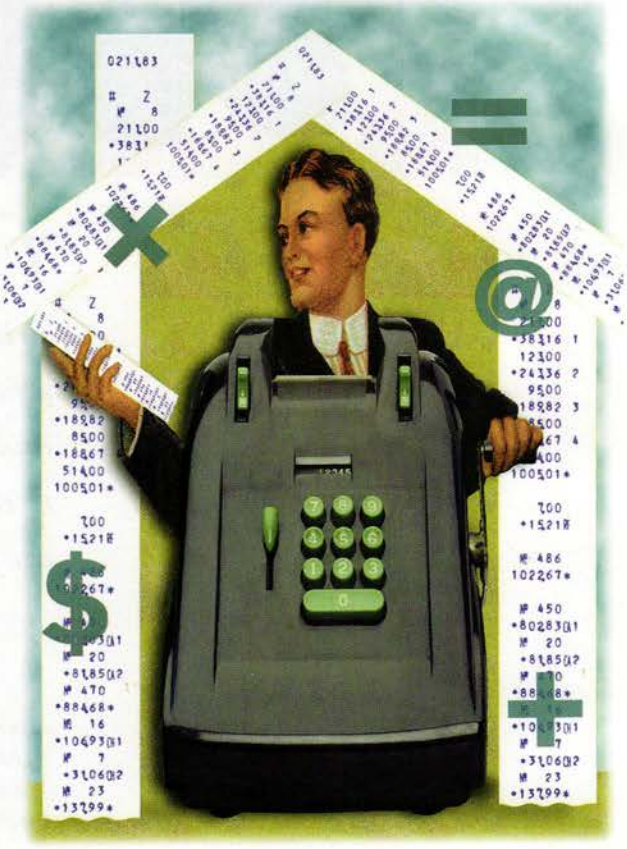
BY MOREY STETTNER

LOAN RANGER: HOW TO NAB THE BEST DEAL

All you need is a good calculator and lots of chutzpah

The next time you need a mortgage, you can save hundreds or even thousands of dollars by launching a bidding war for your loan business. I have proof.

To buy a century-old Victorian in Portsmouth, New Hampshire, I recently shopped for a 30-year fixed-rate loan. I found the best deal with a Virginia-based lender that quoted closing costs of $755. Then I called the company that holds the mortgage on a town house I own. It offered the same rate and points but pegged the closing costs at $1,900. "That's too bad," I said, "because another lender wants only $755." The loan officer asked me to fax him proof of the lower offer. He called back an hour later. "We'll cut our closing costs to $650," he said. It took me five minutes to save $1,250.



Most prospective borrowers look for the best mortgage or refinancing deal in the interest rate and points. Instead of dickering, they pay what the lender asks, not realizing that they can negotiate everything: not only rates and points but also the bundle of fees called closing costs. Because they need tens of thousands of dollars, borrowers may feel they're lucky just to qualify for the cash. And that's exactly the kind of meekness lenders love.

The moment you start pitting lenders against each other, however, *you* wield the leverage. Start by checking with low-cost lenders that process loans over toll-free phone lines or on the Internet. With no showplace office or commissioned salespeople, these companies operate on low overhead and can pass along the savings. After getting more quotes from local or national lenders, call the ones that came in second and third and ask if they want to beat the competition. A hungry lender might shave an eighth of a point off the interest rate or match the rate and reduce the points.

When you've worked down those numbers, keep going with the closing costs. "A thousand dollars of most closing costs are junk fees," says Albert Clark, vice president of the United Homeowners Association, a consumer group based in Washington, D.C. To separate true costs from padded profits, ask the loan officer for a fee-by-fee breakdown that separates actual expenses from lender markups. That's where there's room to negotiate.

Closing costs typically contain at least three negotiable fees: for document prepa-

ILLUSTRATION BY LOU BEACH

CHANGE PURSE ILLUSTRATION BY BOB HAMBLY

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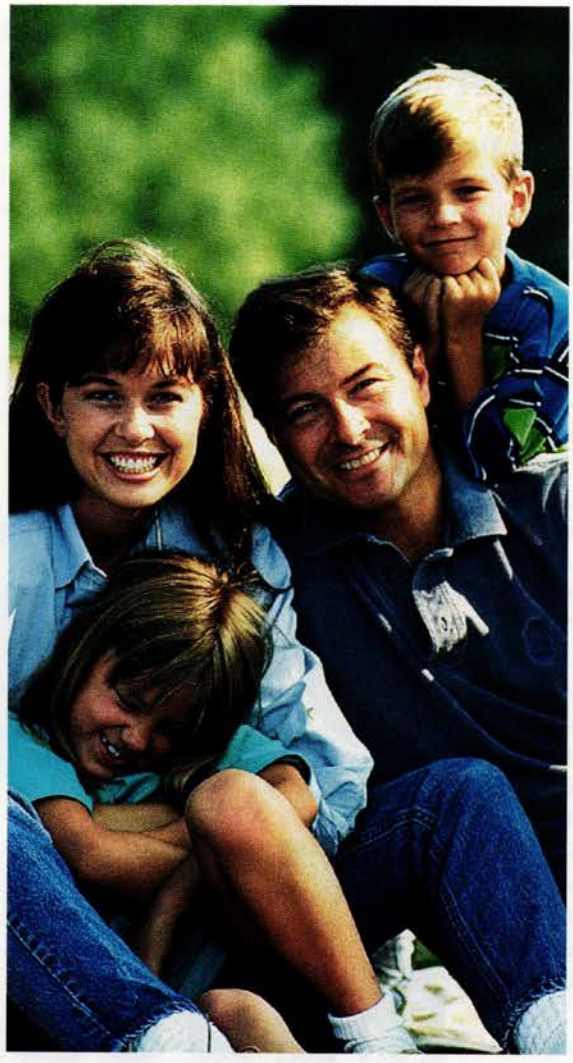

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ration, property appraisal and title search. Many lenders hire document preparation services and pay them $40 or $50 to ready the paperwork for the closing. But, says Warren Myer, who heads a company that markets mortgage firms, some lenders mark up that fee to around $350.

Standard appraisals typically cost the lender $200 to $250, says Ilyce Glink, author of *100 Questions Every First-Time Home Buyer Should Ask*. Lenders typically tack on another $75. An increasing number of lenders rely on electronic appraisals that cost them only about $25, though they still might charge the borrower $100 or more. "If you're getting an electronic appraisal, you should definitely question any charge over $100," Glink says.

If you must shop for a title company (in some states, the seller handles this), dicker over the fee it charges to make sure that no liens or other encumbrances cloud the property title. The title fee does not include the premium for title insurance, which usually isn't negotiable. I called three Portsmouth title companies, all of which quoted a $500 fee, and asked each of them to take $50 off. One did, but none would budge on the insurance premium.

Using a mortgage broker can save a lot of time and hassles in the hunt for financing, but that doesn't mean you can't haggle with a broker the same way you do with lenders. To compete with retail lenders, mortgage brokers can reduce their commission (sometimes called a yield spread premium, the difference between the wholesale rate the brokers get and the retail rate they charge the borrower). Randy Kershaw, a broker based in Sacramento, California, estimates that only "one in two hundred people has a clue about yield spread premium."

When you've got the brokers' best offers, call them back and tell them what you've found on your own. If they want your business enough, they'll swallow some commission and offer a lower rate.

In my own mortgage search, I discovered another cost-saving strategy. Jan Hix, a broker in Atlanta, Georgia, said that she can process up to six transactions a year outside her region if there are no regulatory barriers in the borrower's state. In my case, she could have used a lender in the Southeast to beat the rate I had already locked in by a quarter point. Next time I go through this, I'm calling at least three brokers from different parts of the country. ■

BY DIANE HARRIS

SKIP THE CUSTOM TILE

A good architect can work wonders by assembling standard, off-the-shelf materials in unusual ways

When New York City architect Dennis Wedlick takes on a renovation project, he often finds himself persuading the client not to spend lavishly on it. "People think that, unless they use the most expensive paint or tile or trim, they won't end up with the look they want," he says. "But a high-quality outcome depends on good design, not fancy, high-priced materials." Over the years, Wedlick has developed a long list of tricks and strategies for keeping budgets in check without compromising the results.

Whenever he can, Wedlick avoids custom-made components such as windows, doors and cabinets. Standard-size windows cost $300 to $1,000 less than custom units, he says, yet give up little in looks. To make up for any loss of visual impact that a custom window would have provided, Wedlick surrounds the stock unit with unusual trim or simply increases its size. He also clusters stock windows together to create a custom effect for a fraction of the custom cost.

Even bigger savings come from choosing stock over custom cabinets, which typically cost at least 50 percent more. "You don't lose anything in terms of quality," Wedlick says, "because most cabinets, whether you build them or buy them, are made of the same materials. What you do give up is some variety of size, color and decorative detail." If ready-made lines don't have the features you want, consider moving up to custom stock, which mixes custom and stock sizes and may

ILLUSTRATIONS BY SANDRA AWDZIEWICZ

PAINTBRUSH ILLUSTRATION BY BOB HAMBLY

A flood isn't the worst thing that can happen to you.

Not being insured for one is.

A flood moves with frightening speed. In minutes, a flood can wash away everything you and your family have spent a lifetime building.

But often the worst isn't the flood. It's finding out, too late, that you're not covered for flood damage.

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The truth is, 90% of all natural disasters in this country involve floods. Yet, as many find out too late, most homeowner's insurance policies don't cover flood damage.

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offer more style, finish and material choices. They cost more, to be sure, but still come in under custom.

In the same way, Wedlick sees no reason to spring for a custom or top-of-the-line door that brings nothing more than new style to an old opening. He prefers putting a less expensive door into a new location for better function and visual impact. For instance, he will place a French door so it opens directly into a family room to add light and view and improve traffic flow. Aligning it with a bay window on the opposite wall, he says, creates longer sight lines, which make a room feel bigger. Door costs can be further reduced by choosing reasonably priced hardware. "You can spend up to fifteen hundred dollars on a French-made handle with surface-mount latches," says Wedlick, "but you can also get a brushed-chrome orbit doorknob that feels just as expensive for around fifty dollars."

Elaborate details always cost more, but instead of eliminating them altogether, Wedlick works with simpler, more economical alternatives. In place of fancy crown moldings, he favors plain pine trim—and plenty of it. "The quickest way to make a house look cheap is to skimp on the amount of trim or, worse yet, eliminate it altogether," he warns. "Flat one-by-eight pine boards create a more dramatic frame for a room than a three-inch crown."

Simple detailing can also bring big savings on kitchen counters. When Palo Alto, California-based architect Michelle Belden remodeled her own house, she opted for high-end granite slabs but managed to cut 30 percent off their cost simply by keeping the edges square instead of round or beveled. And in the new master bathroom, she saved $1,000 by eliminating a fancy tile border and going with a checkerboard pattern that was equally attractive. One of Wedlick's tile tricks is putting a few pieces of marble or other stone in a field of ceramic tiles. "You get the look of stone, but it costs a lot less," he says.

Cost overruns often come from mid-project shopping sprees, Wedlick warns, when people go overboard picking out faucets, sinks and other fixtures. "If you walk into a store and see forty faucets in a row, sure, the gold-plated one with the elaborate swan's head is going to stand out," he says. "But the simpler one with the long neck will actually work best." And save you a lot. The long neck will cost $75 to $400, but the swan—or any other triumph of form over function—can be as much as $1,400.

Seemingly small expenditures for towel bars, soap holders, doorway saddles, cabinet door and drawer pulls and the like can also inflate a budget to the breaking point. "Taken individually, the price difference between, say, a fifty-dollar marble saddle and a ten-dollar tile one seems not worth bothering about," says Susan Goddard, a designer based in Montclair, New Jersey. "But if you bring that attitude to all these purchases, you can find yourself thousands of dollars over budget without knowing how you got there." Wedlick has a similar opinion about expensive, elaborate light fixtures that look beautiful in the showroom but often overpower the room when installed. "From a design standpoint, you're better off with fixtures that are as slender and light as the bulb itself," he says. "They get the job done for one-tenth the cost."

Even as Wedlick counsels cost control, he also encourages his clients to spend more in the right places to raise a house's overall quality, improve its appearance or reduce the need for maintenance. For houses that need new siding, Wedlick rates cedar, redwood and cypress far above vinyl. "Wood will give the house a quality feel," he says, "and it can be restained or bleached to make it look new again." Wood floors also add quality, he says, although it's possible to have them for less cost by using pine instead of hardwood. In a marriage of excellent design and low maintenance, Wedlick likes prefab chimneys clad in copper. Other upgrades he believes merit their extra cost: top-of-the-line kitchen and laundry appliances, stone counters, copper hot and cold water pipes (instead of plastic) and lots of electrical outlets.

Long before the big spending starts, Wedlick believes, a homeowner's best investment is to spend enough time to plan the project. That means interviewing several designers and contractors to make sure you hire the pros who are best able to execute your ideas at reasonable prices. Time also lets you price out a variety of design and construction options and, when you settle on a plan, minimize the chances that major money-consuming changes and mistakes will crop up once work begins. "The results of a top-notch renovation are meant to be long-term, so the process needs to be long-term too," says Wedlick. "Inevitably, the more time you invest up front, the less money you will spend in the end." ■

FOR SOURCES, SEE DIRECTORY – PAGE 153

Blueprints for Success:

Part II of a II Part Series

Women Architects on the Rise

Whether at home or at work, the spaces we inhabit have a profound effect on our productivity, comfort and quality of life. Here, women who shape the structures that shape our world share their views on the built environment and its role in making our lives easier.

Betsey Olenick Dougherty
Dougherty + Dougherty Architects
Costa Mesa, CA
Fellow, American Institute of Architects

on career: "We design educational and research buildings, childcare facilities, and government buildings, and emphasize environmentally responsive design."

on design: "The built environment should lift the human spirit, it should let people feel good and it should provide a community with a sense of pride. Our style is very collaborative, and it's exciting to work with a community to give form to their ideas."

on balance: "My husband and I are partners in our firm, we have two children and are very involved in their extracurricular activities and as volunteers in our community. Juggling is difficult, but I'm never bored."

Ethelind Coblin
Ethelind Coblin Architect, P.C.
New York, NY
Member, American Institute of Architects

on career: "We have had projects that range from a custom single-family apartment renovation on Gramercy Park to a $23 million, 984-family modernization for the New York City Housing Authority."

on design: "We encourage our clients to dream, to share clippings from magazines to communicate their ideas, and to think about their future needs. We make our designs flexible and focus on long term value."

on balance: "I make time for family, golf, tennis, gardening and volunteering in state and local chapters of AIA. I'm an advocate of a principled approach to responsible planning, addressing the variety of roles we play in life."

Mary Fishman
Director of Design Review
Dept. Of Planning and Development,
City of Chicago
Member, American Institute of Architects

on career: "I advise on planned development applications for projects that are of a significant size in the community. My concerns are to promote orderly development, to keep structures consistent with their surroundings and to make sure projects will be beneficial to the community."

on design: "My aspirations have always been toward projects that impact cities, to be able to influence urban design. It's an exciting time to be working in city government—we're developing incentives and design guidelines that will have a positive impact on the quality of life for years to come."

on balance: "When I need to put in extra hours I try to make sure that it's for projects that will help me grow professionally. I also try to make the most of my free time by being active in a range of sports. And, every couple of years I go on vacation to a place where there are no buildings—last year I went to Death Valley!"

We'd like to thank these women for providing design solutions that enhance the character of our communities, while helping us flow easily through our busy lives. To identify a registered architect, contact the American Institute of Architects, 1-800-AIA-9930.

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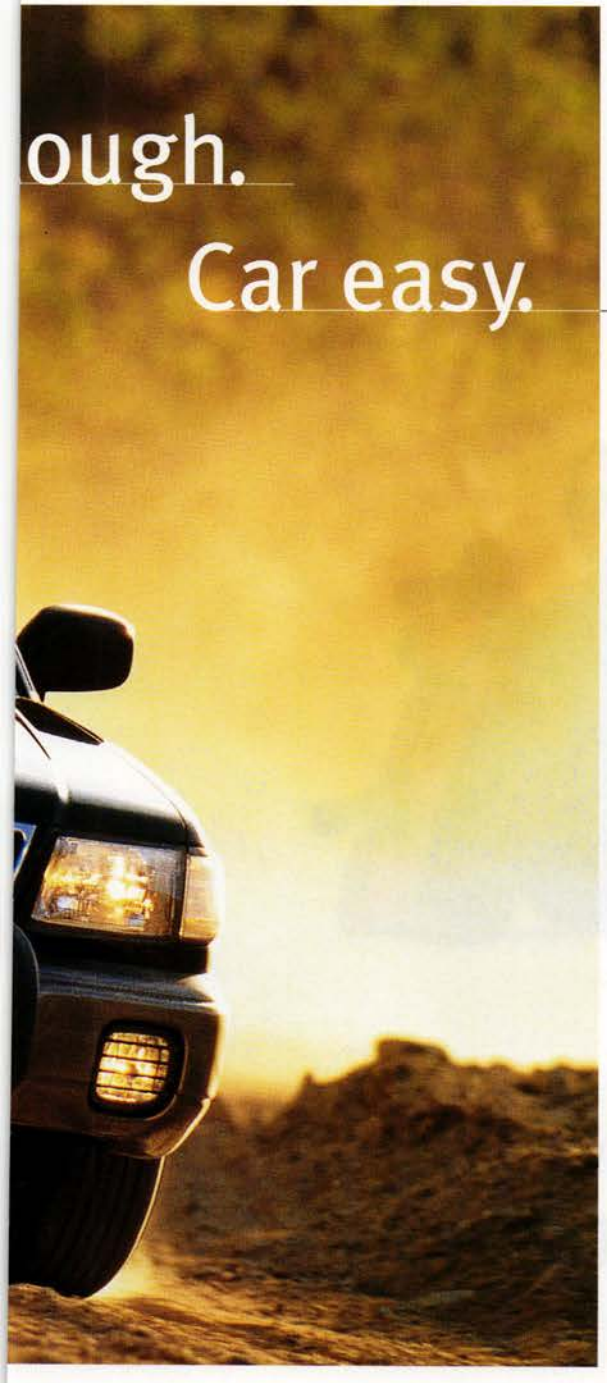

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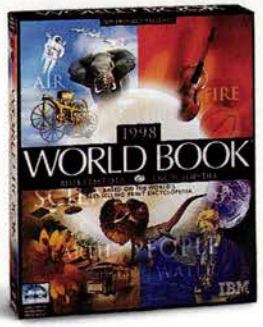

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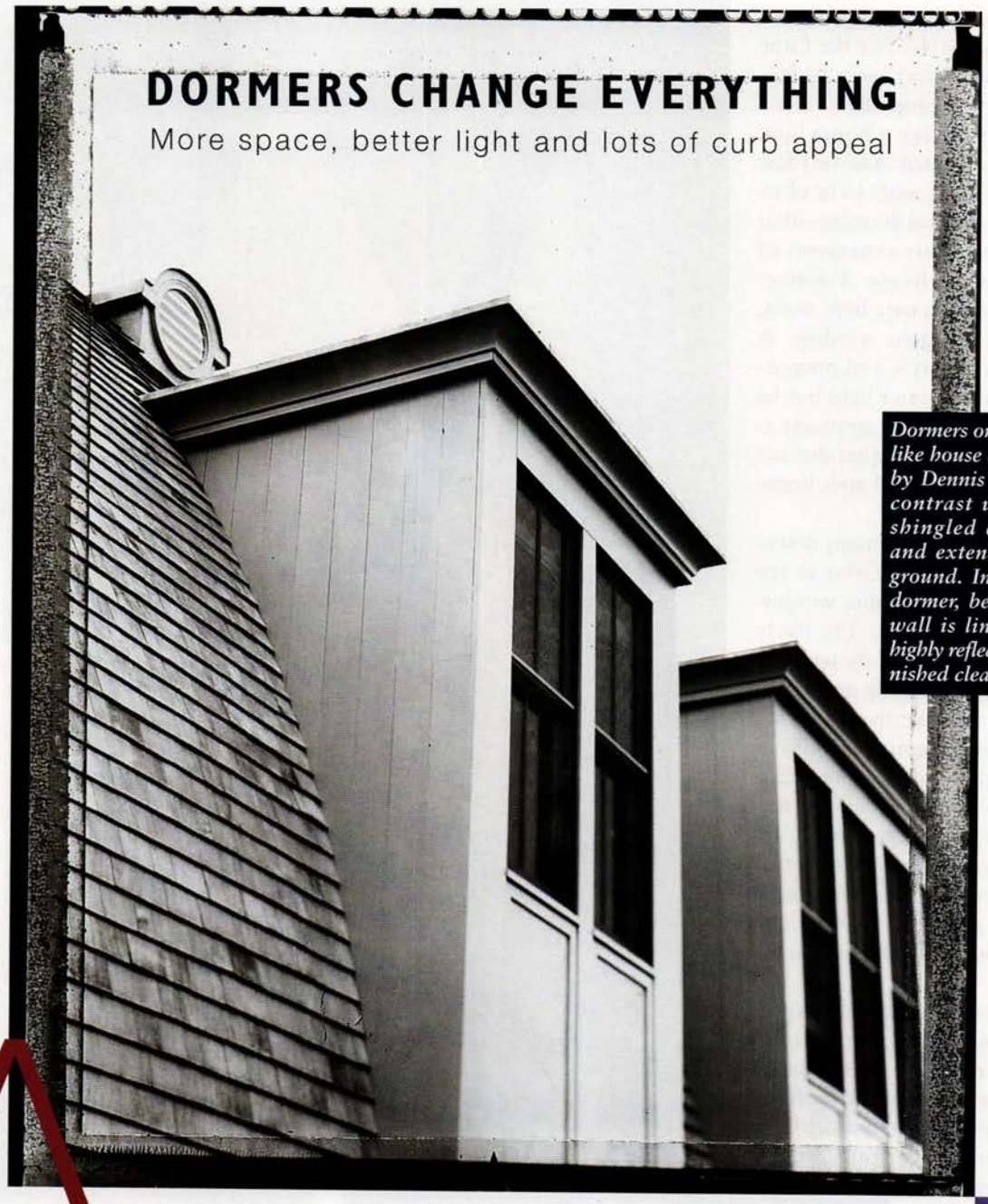
BY DENNIS WEDLICK

DORMERS CHANGE EVERYTHING

More space, better light and lots of curb appeal



Dormers on a barn-like house designed by Dennis Wedlick contrast with the shingled exterior and extend to the ground. Inside the dormer, below, the wall is lined with highly reflective varnished clear pine.

Although dormers may have first appeared on the roof of a turret in Europe during the Middle Ages, they have become the Great American Building Trick, transforming one-story houses into two-story houses with a simple pop-out or two. And when it comes to adding extra square footage, dormers can do it for less than half the cost of an addition. Indeed, dormers offer such easy solutions to building problems that their design has drifted off into clichés. That's a shame because dormers add a special layer of interest to a house, increasing its personality and attractiveness. Like windows and doors and rooflines, dormers can make or break curb appeal.

Drop-dead dormers have been rare since builders took over the architecture of Amer-

PHOTOGRAPHS BY MICHEAL McLAUGHLIN

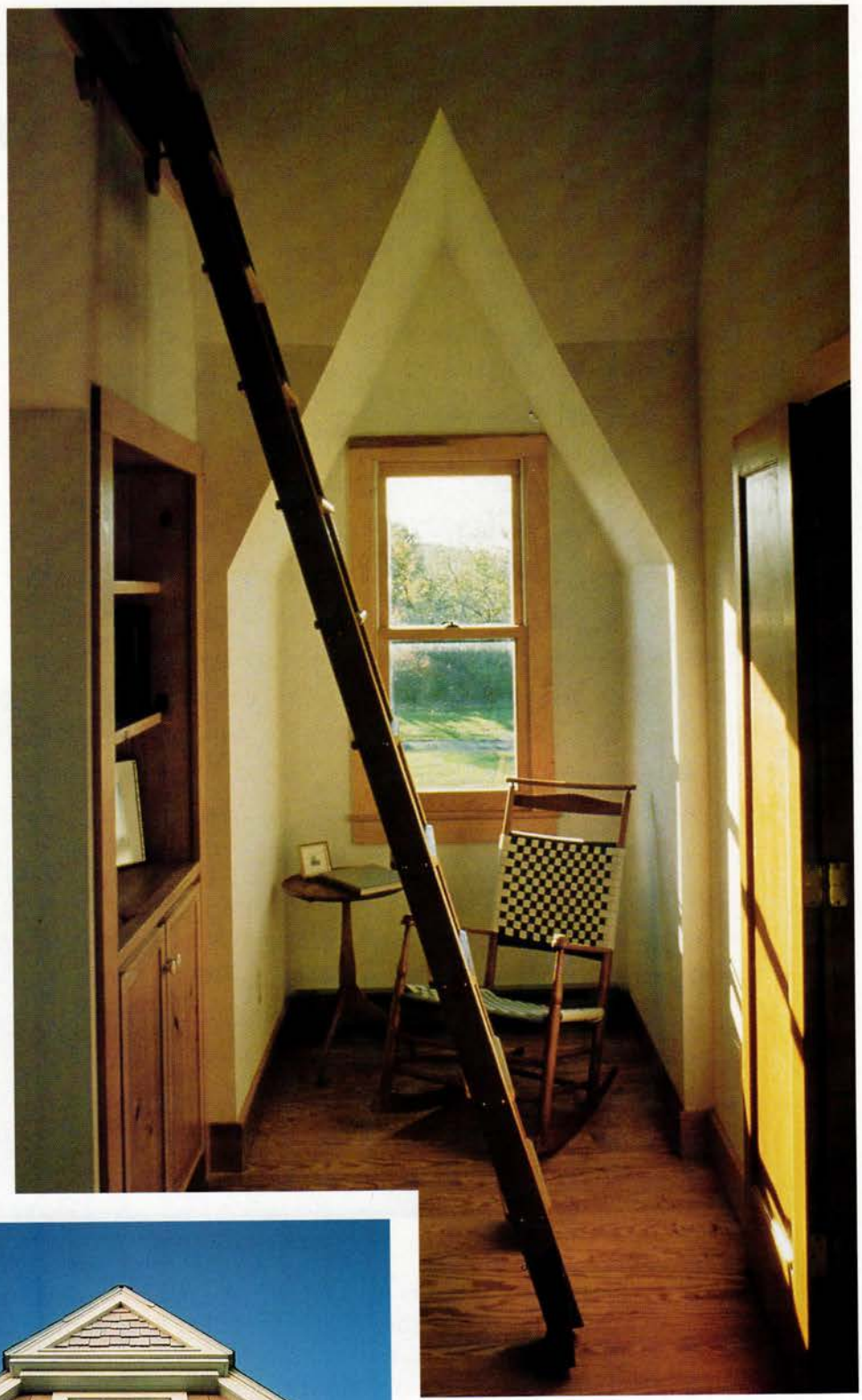
ica's mushrooming suburbs in the years after World War II. In the process, developers managed to convert classic styles like the Cape Cod into the definition of ticky-tacky by failing to design the dormers properly.

The wrong dormers make a house look out of balance, even awkward. And very few builders have noticed what ought to be obvious about the design of good dormers—that they work best as miniature statements of the style of the rest of the house. A dormer is like a little house with its own little walls, its own little roof, its own window. A dormer that mimics the style and proportions of the whole house can't help but be successful. Unfortunately, the opposite is true too. Imagine a long and squat dormer perched on the roof of a vertical-style house such as a Victorian.

Dormers seem so simple that many homeowners and builders just drive over to the nearest lumberyard, pick out a nice window and build a dormer around it. The likely result: A big box rises up around the window, a clunky box. That is the wrong approach. There is less load on a dormer than on a full-size house, and many framing details in dormers can be light and flexible—constructing a dormer is more like building furniture than houses. Conversely, dormers are such an insult to the roof support system that even a lightly built dormer must be reinforced where it meets the roofline. Such unique building knowledge is rapidly fading into the land of lost arts.

Although good dormers tend to be expensive on a square-footage basis, they can still be remarkably cost-effective. Many houses have a lot of space that goes unused under the roof. Even a small dormer can open up large areas there. Eight-foot-high walls are not needed on all sides of a room, just where the window goes and at the entrance. And space under sloping ceilings can be used effectively too. A bed works under a sloped ceiling. Televisions, chairs for reading and small tables with lamps fit under a sloped ceiling. And kids can play under a sloped ceiling.

One largely forgotten idea is using a dormer to make a hallway an extra



Attaching a dormer to the end of a hallway creates a miniature library and lets in sunlight. A peaked roof outside can be an advantage inside as well. The exterior, left, takes its cues from the rest of the house, including clapboard at its base and shingles higher up. The house steps out twice, so the dormer does too.

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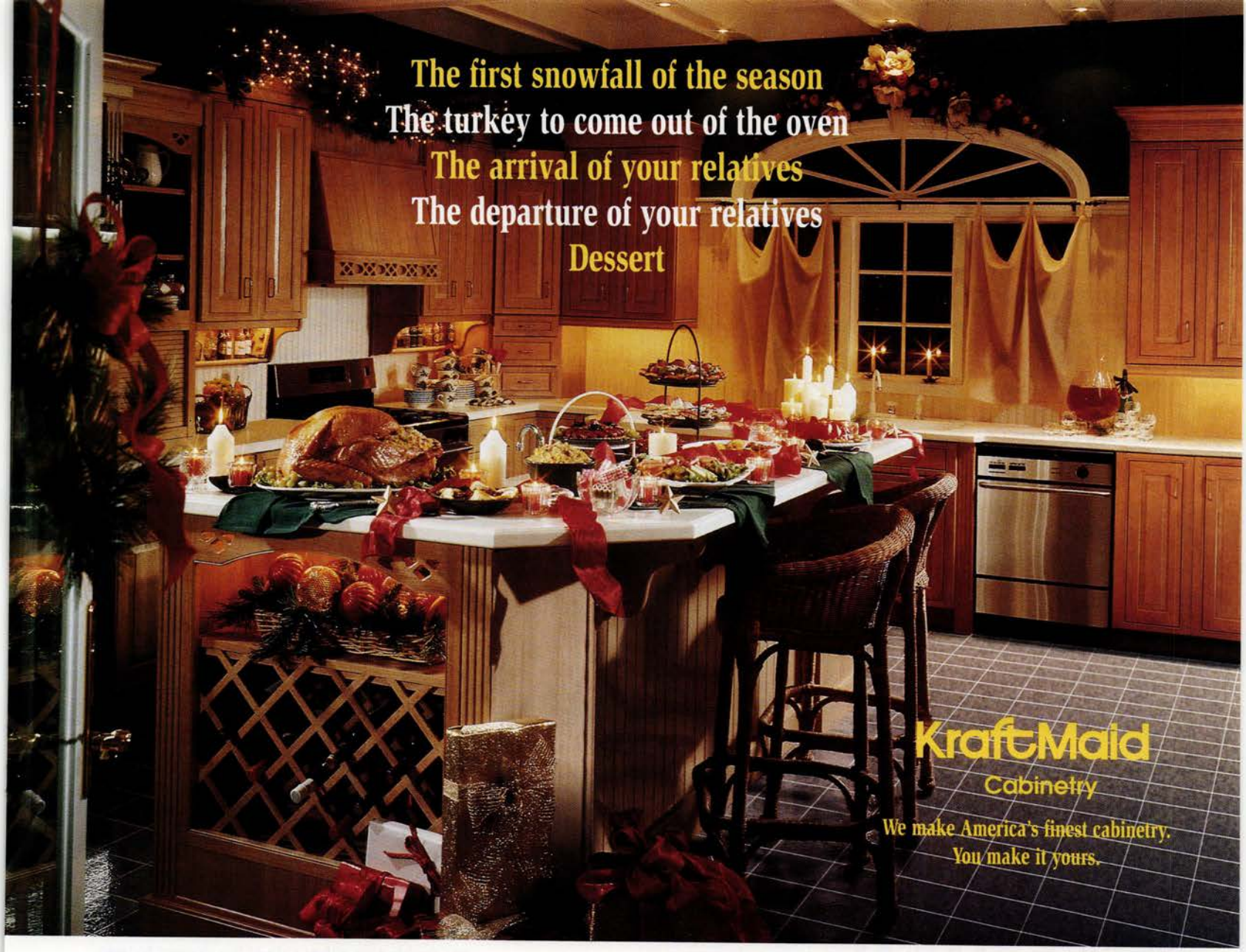

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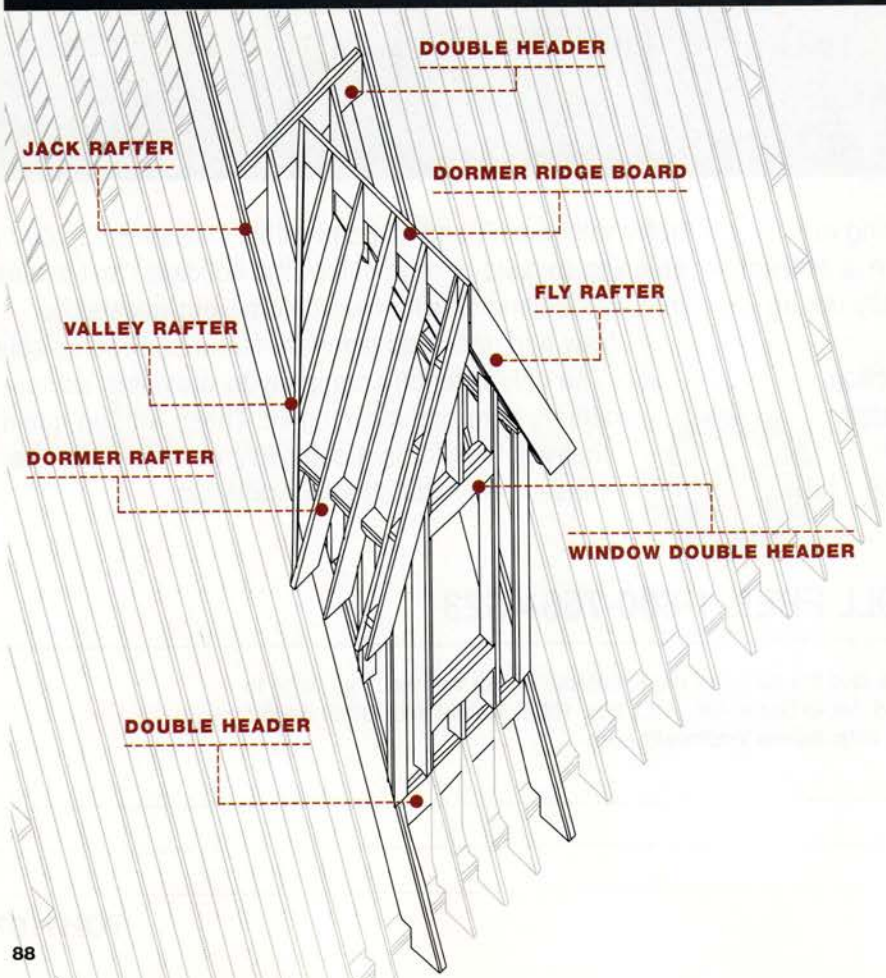
room. Just adding a few feet of dormer depth to the end of a hall creates space for a desk or an easy chair, a place where the kids can work on the computer. And that space has something most hallways don't have: natural light at the end of the tunnel.

Homeowners with low-slung roofs, like those found on typical suburban ranches, can benefit from the dormer as well. What they need is a large one that exceeds the height of the primary roof and extends toward the front of the house. The dormer itself can lap over the main roof, as in the photos on the next page. A structural ridge beam in the primary roof would support the back of the new dormer, which can stop at the centerline of the old roof or continue to the back of the house. Many bungalows already

For the strong, attractive roofline of a weekend cottage, Wedlick chose minimalist flat-roofed dormers that don't draw very much attention.

The Skeleton of a Dormer



This sketch shows how the dormer on the previous page is framed. Rafters on a dormer can be lighter than those on the roof itself. In this case, the rafters on the roof are 2x12s, and the rafters on the dormer are 2x8s. Conversely, roof rafters are doubled on either side of the dormer to help carry loads where the dormer cuts into the roof. Headers above and below the dormer are also doubled. On the sides and front of the dormer, exterior stud walls are built as they would be anywhere else in the house. However, Wedlick often chooses to make the framing around the window itself, including the stud walls, as minimal as possible to heighten the effect of filling the space with light. Unlike the A-frame construction of the rest of the primary roof, which uses cross ties to support the roof load and doesn't use a true ridge beam, this dormer has a structural load-carrying beam called a ridge board. It eliminates cross ties and allows the space in the ceiling below to remain peaked like a miniature cathedral ceiling. The fly rafters at the front of the dormer roof have been extended, or popped out, with 1x4s for visual effect. Typically, dormer width is established by the spacing between existing rafters. For example, rafters set on 20-inch centers accommodate a dormer width of approximately 38½ inches.

The Legendary Architect Mies van der Rohe Said, "God Is In The Details."

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A common ranch house on Long Island is transformed by the addition of a giant dormer, a porch and a V-bay window. The dormer extends out only 6 in. from the original roof eaves and inside creates a cozy new perch, below, in a house that once didn't have an upstairs.

do this, with dormers that overlap the midpoint of the roof. Such a dormer retains the smallish appearance of the house but actually raises the ridge line.

The first thing to ask yourself when considering the addition of dormers is whether or not you like the look of your house. Sometimes I explain dormers to a client like this: Think of a woman choosing jewelry just before she goes out on the town. She can wear very elaborate earrings and a very simple dress, or quiet earrings and a fanciful dress. Both work.

If you like the look of your house but still need the space and light a dormer can offer, the key is to add dormers minimally. If you add too many or they're too big, you'll lose the sense of the roof you have now, and a roofline often defines the appearance of the entire house. One way to minimalize the impact of dormers is to surround the window with the least possible amount of wood. The face of the dormer should be only inches wider and higher than the window itself. Another helpful idea is to use a flat rather than a peaked roof. It should be slightly pitched for runoff, but to the eye, a flat roof over a dormer will seem to disappear. An arched dormer, often called an eyebrow, disappears into the roof. It looks almost as if someone has only raised an eyelid amid the shingles. And the least obtrusive dormers of all are those that don't project but are recessed, notched into a roof slope. Recessed dormers don't work well in all climates because the level sill that leads into such a dormer is a snow trap.

If you don't like the look of your house, dormers are often the perfect afterthought. They can draw attention away from other details and shapes. A dormer with a lot of character, one that's fanciful or playful, can become the center of attention on the facade. Another trick is to steal an element from the dormer design and add it to the main roofline. That will tie the two together visually.

No matter what type of jewelry you choose for your house, be certain the contractor pays careful attention to the joint between the dormer and the primary roof. Typically, a valley—or two valleys in the case of a peaked dormer—will be created at that joint. This valley wants to leak. There are two approaches to weatherproofing this joint: Cover the valley with shingles that come down the roof and then continue over the top of the dormer, or flash the joint with metal and leave it exposed with the shingles overlapping the flashing. In the first case, special waterproofing materials can be used under the shingles at the joint, such as roll-on polyethylene film and rubberized asphalt. I prefer the tried-and-true method of using exposed flashing. And besides, it gives me a chance to use my favorite building material, copper, which ages gracefully and lasts almost forever.

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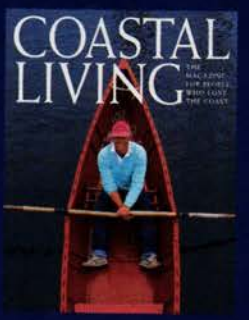

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LETTER *from This Old House*

THE WORKSHOP

Maybe it was a mid-life crisis or maybe I was just looking for an excuse to buy some toys. But last year I decided to take up furniture making, and for that I needed a home workshop. I already had a respectable array of drills, routers, air-nailers and saws I'd used for renovation projects, but I lacked the big stationary floor tools—table saw, band saw, radial arm saw, jointer—that stand like religious icons in shrines such as Norm's new workshop at the dream-house project in Milton.

"The workshop" became my mantra, an idée fixe. My amused colleagues at *This Old House* pointed out that the only space I had available for a workshop was hardly ideal; the basement of my 1700s house is low and forested with posts that thwart any attempt to swing an 8-foot piece of stock. My wife pointed out that I had no time for a new hobby, and besides, if I was looking for something to do, she had a few items on her list.

Undeterred by logic or common sense, I bought my tools and, when the crates arrived, spent a day sliding them down my creaky basement stairs. Little by little, in my spare time, I cleaned out and reorganized the basement and sprayed the rubblestone walls a bright white. I built workbenches, brought in lighting, power and a telephone. Finally I set up and calibrated the tools, one by one, in the peace of the late evening hours.

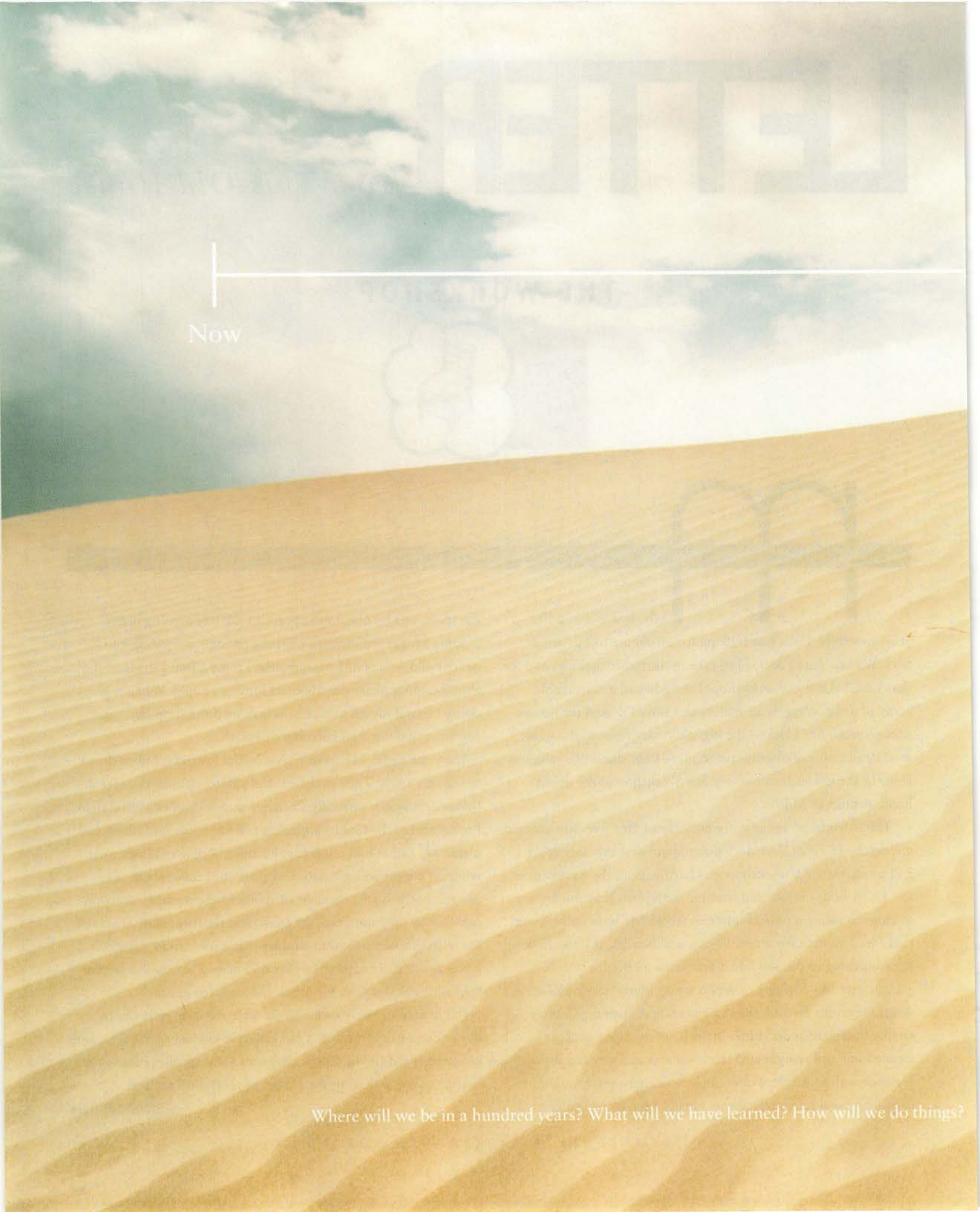
Some people spend years working on their workshop and never build a stick of furniture, and I must admit I dragged the shop-building phase out about as long as I could. When it was done, I found myself at a certain loss, as if the shop itself, not furniture making, had been the real goal.

Then one night, like most nights before I turn in, I went down to visit my tools. Their polished steel surfaces gleamed under the fluorescent lights, suggesting a magic power dwelled within them. I remembered the first tool I had ever held, my grandfather's jack plane. My father had put it in my hands, hoping to distract me while he got on with his Saturday projects. I remembered the swoosh of the blade, the delicate dance of the translucent wood shavings as they spun out like snow, and the turpentine aroma of the fresh pine. I was lost in wonder that a tool could transform a piece of wood. That piece of pine became—what else—a battleship with wood screws for masts and nails for guns.

To christen my new shop, Norm gave me a set of his books. I've chosen a first project, a Shaker-style kitchen worktable, and I look forward to building it. But now I see another reason for having a shop—sharing the power of tools with my son.

—Steve Thomas

ILLUSTRATION BY STEPHEN SAVAGE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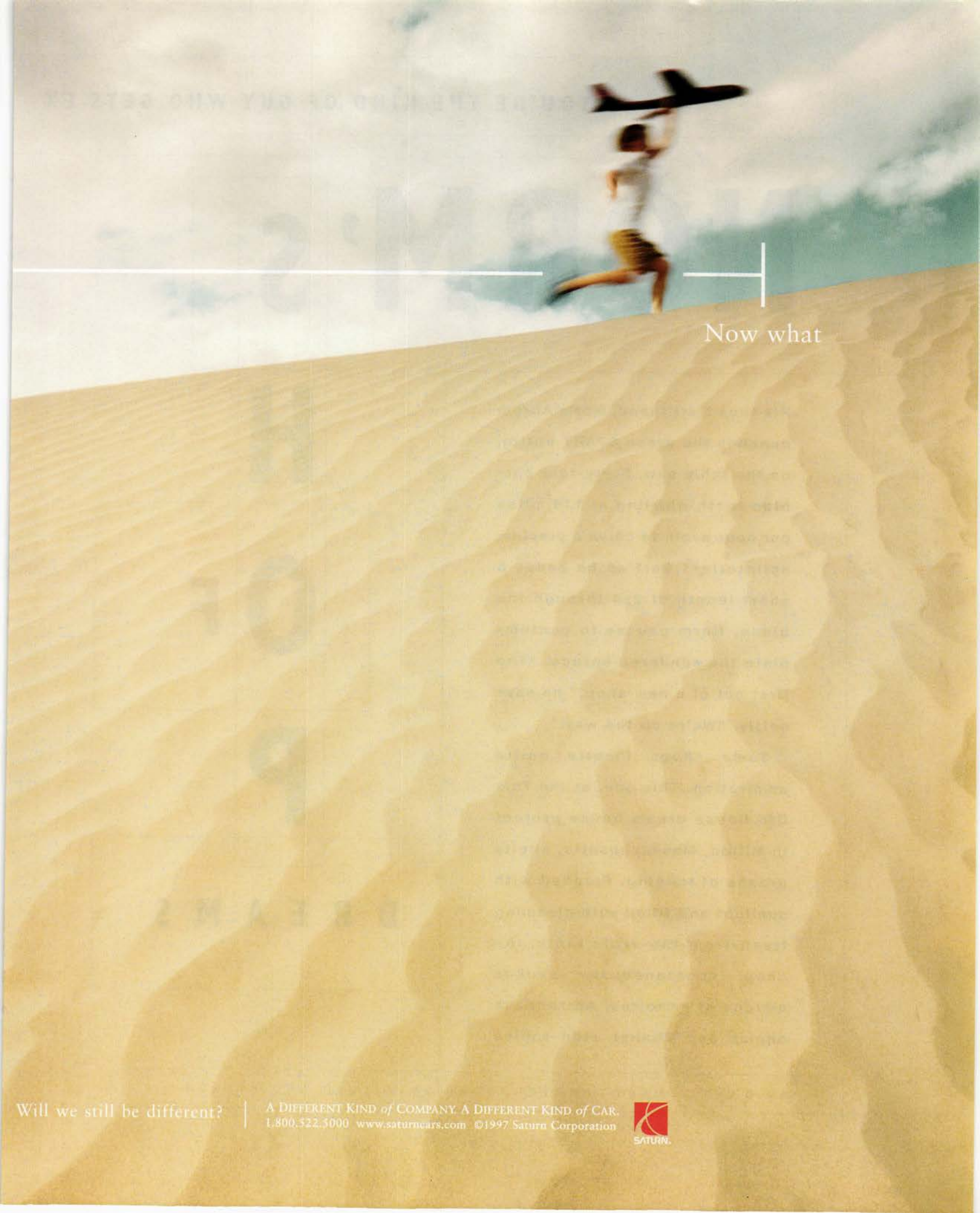

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NORM'S SHOP OF DREAMS

His thumb stiffened, Norm Abram punches the green START button on the table saw. Forty-four carbide teeth whirling at 119 miles per hour begin to carve a precise, splinterless kerf as he eases a short length of 2x4 through the blade. Norm pauses to contemplate the sundered spruce. "The first cut of a new shop," he says softly. "We're on the way."

Some shops inspire polite admiration. This one, at the *This Old House* dream house project in Milton, Massachusetts, elicits groans of longing. Flooded with sunlight and filled with gleaming fresh-from-the-crate tools, the shop spontaneously evokes visions of armoires, Adirondack chairs and Shaker side tables

BY BRAD LEMLEY PHOTOGRAPHS BY KELLER AND KELLER

CITED BY A JOINTER OR A PLANER, WAIT 'TIL YOU SEE THIS

New tools look, sound and even smell good but need fussy adjustments to perform well. Tom Silva, left, and Norm Abram tweak the jointer's fence until it forms a perfect 90-degree angle with its steel table.

emerging through its French doors. "It's a place to dream about possibilities," says Steve Thomas, "and then to make them real."

The shop's first realized fantasy will be the dream house project itself. Norm, Tom Silva and other workers will happily labor here to complete cabinets for the media room and screens for the enclosed porch. Then, they hope, the shop will help lure a buyer when *This Old House* auctions the property next spring.

Assembling the shop, Norm relied on 10 years of experience with *The New Yankee Workshop*, a PBS series that inflames tool lust in millions of viewers weekly. "Anything anyone sees me accomplish on the show could definitely be done here," Norm asserts. "It's not a production-level shop, but it's as good as any serious hobby woodworker could want."

While most of us will never have the chance to build such a glorious work space from scratch, Norm's planning process can teach us all something about upgrading our own cramped, dim, under-equipped shops. "In a small shop, you have to be more creative," Norm says, but "the basic guidelines still apply."

Flung open, the workshop's capacious French doors make it easy for Tom and Norm to move a band saw in or a large completed project out.

First, Norm and *This Old House* director Russ Morash had to determine the shop's length and width. "The New Yankee Workshop is thirty-six feet by twenty-six, and that's pretty much ideal," Norm says. "You've got good clearance around each tool, and you can handle long pieces of lumber." But at the dream house property, the proportions of the ramshackle ell attached to the barn charmed Russ. Once crews razed the hopeless structure, Russ decreed that the new workshop should fit the original 42x16 footprint. "Norm wanted the building to be three or four feet wider, but I thought the original ell was very picturesque," Russ says. Norm worries some workstations may feel cramped, but adds, "I think we've designed around the narrowness pretty successfully."

Norm's beliefs about proper tools are less flexible. He eschews the faddish widgets hawked in woodworking catalogs, such as one-

OVERVIEW OF THE WORKSHOP

ILLUSTRATIONS BY ALLAN MARDON

TOOL PRIORITIES

Most home shops evolve slowly as money, time, space and spousal tractability permit. The tools in our dream house shop are listed here in the order Norm suggests acquiring them. Prices are real-world retail, which is generally about 30 percent less than the manufacturers' suggested price.

STATIONARY TOOLS

1. **3 hp table saw with 50-in. fence and right extension table: $1,568**
2. **6-in. jointer: $1,279**
3. **12-in. compound miter saw with table system: $409**
4. **14-in. band saw: $699**
5. **16½-in. drill press: $395**
6. **Benchtop 12½-in. portable surface planer: $399**
7. **Benchtop router-shaper: $319**
8. **Benchtop wet- and dry-wheel sharpening center: $175**
9. **Benchtop oscillating spindle sander: $199**
10. **Variable-speed wood lathe: $519**

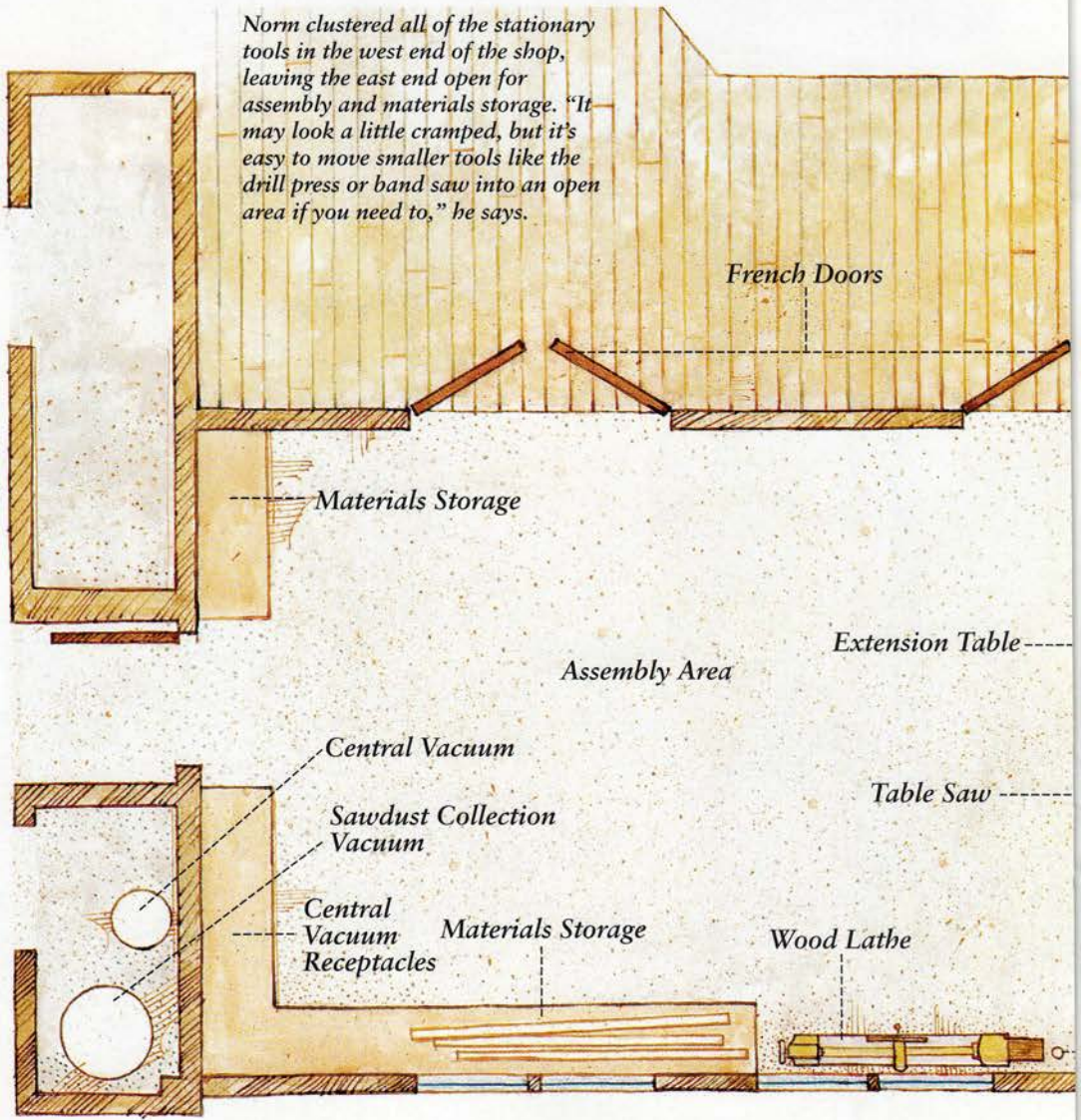
HANDHELD POWER TOOLS

1. **6-in. circular saw: $123**
2. **12-v. ⅜-in. keyless-chuck cordless drill: $218**
3. **1½-hp plunge router: $201**
4. **Barrel-grip jigsaw: $159**
5. **¼-sheet palm-grip finishing sander: $54**
6. **5-in. random-orbit finishing sander with dust collection: $72**
7. **Plate joiner: $386**
8. **Belt sander: $255**
9. **6-in. variable-speed random-orbit sander kit with dust collection: $173**
10. **Profile sander kit: $129**
11. **1½-hp, 4-gal. side-stack compressor, $320; finish nailer, $397; brad nailer kit: $148**
12. **Benchtop pocket cutter: $226**

DUST COLLECTION

Central-system dust collector and drum: $2,249

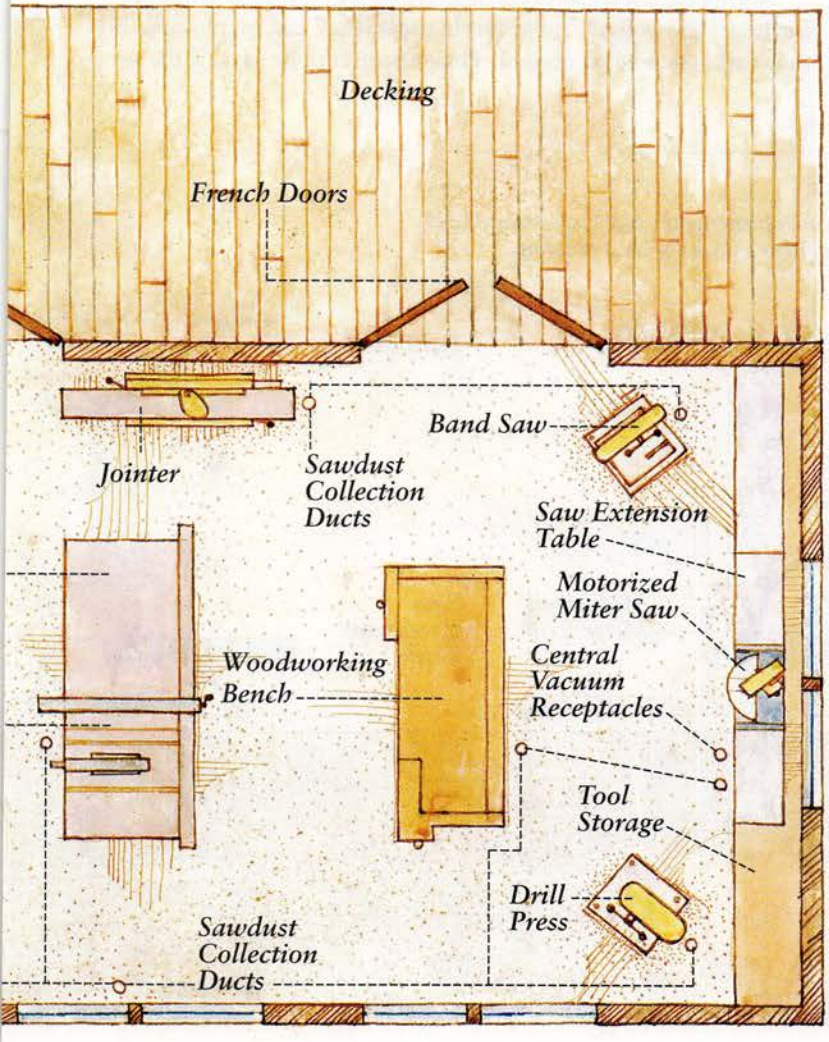
TOTAL: $11,071



trick joining machines and complicated gauges and jigs. "The inventory of tools you need hasn't changed much over the years," Norm says. "There are no bargains. You should pay the extra money up front for professional-quality tools, or you'll replace them sooner or later. The right tools will last a lifetime."

The hub of the productive woodworking shop is the table saw—the one tool used in virtually every project. "You want a flat cast-iron table, not one textured with diamonds or ridges," Norm advises. And motor size matters. "In the New Yankee Workshop and in this shop, we've got a two-hundred-thirty-volt three-horsepower saw. There's not a piece of wood that can slow it down." That translates into straight, burn-free cuts. For the dream house workshop, Norm also specified a high-end, rock-solid parallel fence, for both accuracy and safety, and table extensions to ease solo plywood cutting.

Table saws demand elbow room. Norm's rules: 4 feet of clearance on either side and 12 feet behind and in front. ("You can buy stock 16 feet long, but you'll hardly ever cut something like that.") But he positioned the woodworking bench just 6 feet behind



Like the tools it houses, the workshop building marries old-world craftsmanship and cutting-edge technology. The standing-seam metal roof, top left, resembles tin roofs that have capped farm outbuildings for 200 years. But these panels, made of aluminum-coated steel, were formed by a computer-controlled $25,000 on-site crimper-cutter. Installation took just two days. Even more impressive, however, is the building's structure. Made of structural insulated panels (SIPs) and erected in an astonishingly quick six hours, many believe this is the next evolutionary step beyond stud-and-rafter framing. "For new construction," says Norm, "I don't think there's any reason to use anything but the panels."

SIP design is simple: a core of rigid foam insulation sandwiched by flakeboard. Extraordinary strength and stability spring from the two separated but connected wooden faces. "It's the same concept that gives an airplane fuselage rigidity despite its light weight—it's got an inner and outer skin," says Frank Baker, owner of Great Lakes Insulspan, which supplied the workshop's panels. In this workshop, the only extra support required was a single laminated ridge beam, middle. The basic advantage of SIPs is thermal efficiency. Though a 6-inch-thick, conventionally framed wall may be stuffed with R-19 fiberglass batts, the wall's solid wood studs, which are poor insulators, drop the whole wall's value to R-15.5. An equally thick SIP wall is an honest R-24.

Panels are huge, so construction zooms. This 42-foot north wall consists of just two SIPs: one 24 feet long, the other 18 feet. They were placed by cranes and assembled with construction adhesive and 8-inch screws. The factory-carved rough openings meant Tom Silva and his crew needed only to install siding, windows, doors, skylights and trim, bottom left.

Baker says modern expanded polystyrene foam doesn't give off toxic fumes and shrinks from a flame. The old weaknesses of flakeboard, now called oriented strand board (OSB), are vanishing as well. Presses align the flakes to maximize strength and minimize swelling when wet. Since modern phenolic adhesives emit so little formaldehyde, federal guidelines exempt phenolic-bound OSB from formaldehyde testing.

Until about two years ago, SIPs were significantly more expensive than framing, but rising lumber prices and dropping OSB costs have narrowed the margin: A 1996 article in the *Forest Products Journal* explains that a 6-inch stud wall surrounding a 2,000-square-foot house would cost $9,265; a comparable SIP wall would run $9,890.

the saw. Because the benchtop is roughly the same height as the saw's, it can support long pieces as they're fed through.

Four feet to the table saw's right, Norm stationed a jointer, a tool that straightens and trues board edges with a cylinder of rotating knives. "It can even take the twist out of warped lumber," Norm says. Typically, when ripping stock from boards, he starts by running the edge of each board through the jointer. Then he slides that perfect edge along the table saw's fence, slicing the board 1/32 of an inch larger than the desired width. Finally, passing the fresh-cut edge through the jointer yields the perfect board. The jointer must be near the table saw and demands the same 12-foot clear space on its in-feed and out-feed sides. For the jointer, Norm specified 6-inch knives with a 55-inch-long bed: "To straighten curved edges, the longer the bed the better."

These fundamental, beefy, space-hungry tools justifiably occupy the shop's center. But the three stationary devices that Norm relegated to the periphery of the shop get almost as much use; most projects employ at least one.

He positioned the power miter box, which chops boards and trim to the proper length, on the gable end wall, with an 8-foot extension table to the left and a 4-foot table to the right. Norm specifies a compound version of the saw that both swivels and tilts.

A drill press, he says, is "almost essential. You can bore regular holes, and you can make mortises [rectangular holes required for furniture joinery]. It works well in a corner. It's fairly lightweight so, in the rare case that you have to drill something long, you can pull it into the room." Norm specified a model with 8 1/4 inches of clearance from the drill chuck's center to the support post. "They call that a sixteen-and-a-half-inch capacity because you can drill a hole in the center of a board that wide."

Norm sited the band saw in the corner on the opposite side of the power miter box. Its toothed steel blade, running on two spinning wheels, cuts smooth curves and can resaw (slice one thick board into two or more thin ones). He would have preferred additional space around the band saw to accommodate larger pieces, but it stands next to one of the shop's three sets of French doors: "If I really need the space, I can just open the doors."

Norm concedes that most woodworkers could soldier on without the shop's last stationary tool. Still, "If you're going to build furniture, you'll eventually want a lathe so that you can turn legs. Actually, some people find they like turning so much that it's pretty much all they do in the shop." This is one tool category in which Norm feels restraint is proper. He specified a model that can turn spindles up to 39 inches long and bowls up to 12 inches in diameter.

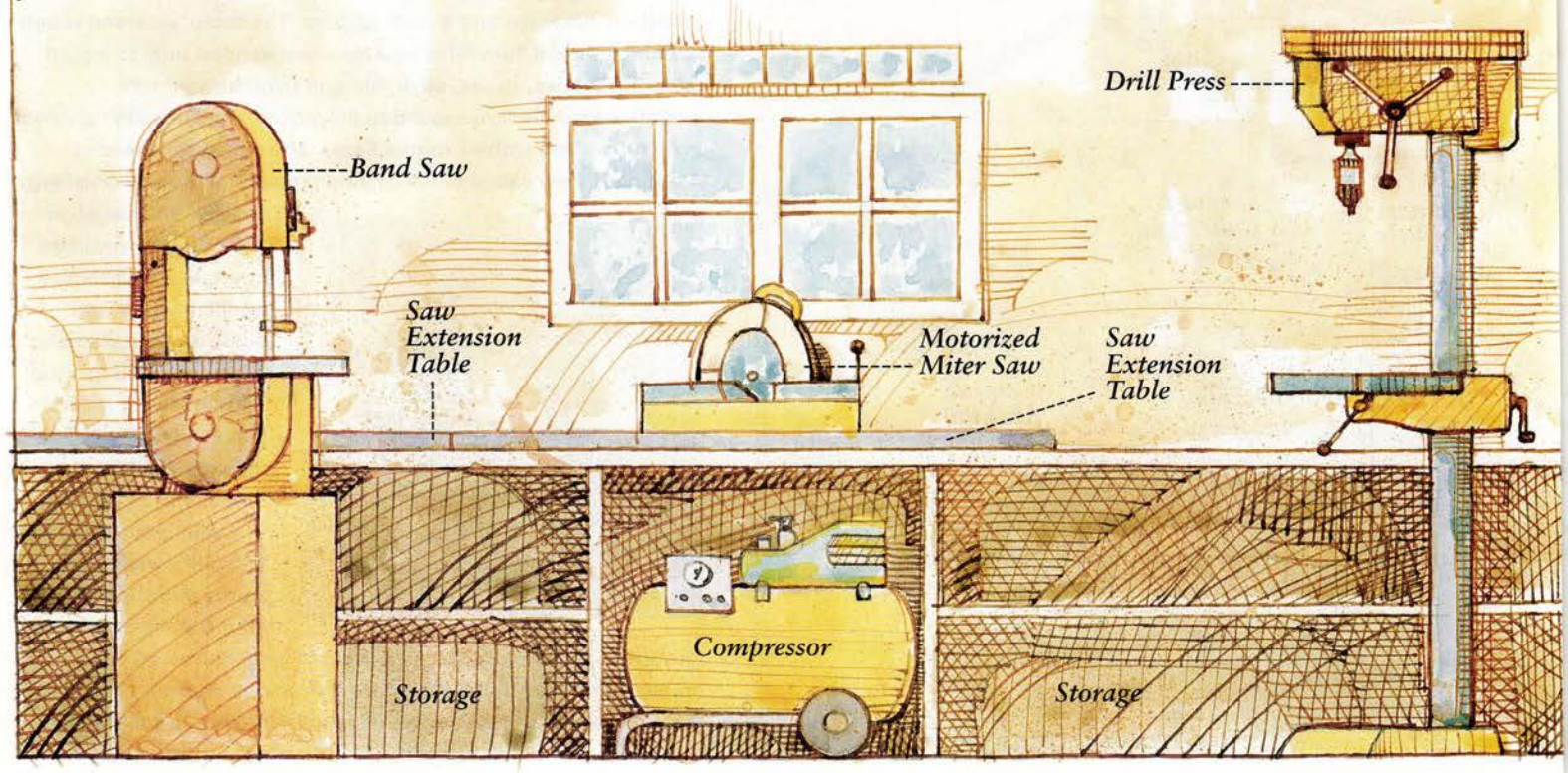
A network of 5-inch-diameter sawdust-collection steel ducts snakes under the shop's concrete floor—one duct for each of these tools. Norm takes dust abatement seriously; three years ago, he underwent surgery for a sawdust-aggravated sinus condition. "In the New Yankee Workshop, we have overhead collection, and it was added as an afterthought. This system should work better because you're working with the natural tendency of sawdust to fall, rather than sucking it up." To muffle noise, the vacuum unit is out in the barn.

Norm ordered several benchtop versions of stationary machines. Legless, lightweight and storable tools, they can be plopped on the workbench when needed. The most useful, he says, is the sur-

PROFILE OF THE WORKSHOP

west elevation

Norm likes a relatively high, 42-in. bench for the motorized miter saw because bringing the tool closer to eye level yields more accurate cuts. Hand tools will likely hang on pegs attached to either side of the west window.



face planer. This treats board faces the way a jointer treats edges, shaving them smooth and to the exact thickness desired. "If you're a serious woodworker, you've got to have one. It lets you buy and use rough-sawn wood, and even dimension lumber can vary in thickness. If you run every board through before you glue up a panel, you can eliminate a lot of sanding." Norm recommends a model with a movable head (as opposed to a movable table, which requires fussing with in-feed and rollers) and easily changed knives.

Now that the various tools are in place, Norm faces a bigger challenge. "The toughest part of all will be giving the workshop up when we sell the house," he say.

Other benchtop tools in the dream house workshop include: a router-shaper for creating decorative edges, a spindle sander to put a fine finish on curved woods and a pocket cutter, which carves angled hollows that receive screws, simplifying cabinet joinery. A small compressor, permanently housed under the power miter saw, powers a pneumatic nailer. This shop also boasts an array of handheld power tools stashed under the bench or on open shelves: a biscuit joiner, which carves slots to receive football-shaped biscuits used in edge joinery; a 12-volt cordless drill; a jigsaw for curves; a router; belt and random-orbit sanders and a multitude of clamps.

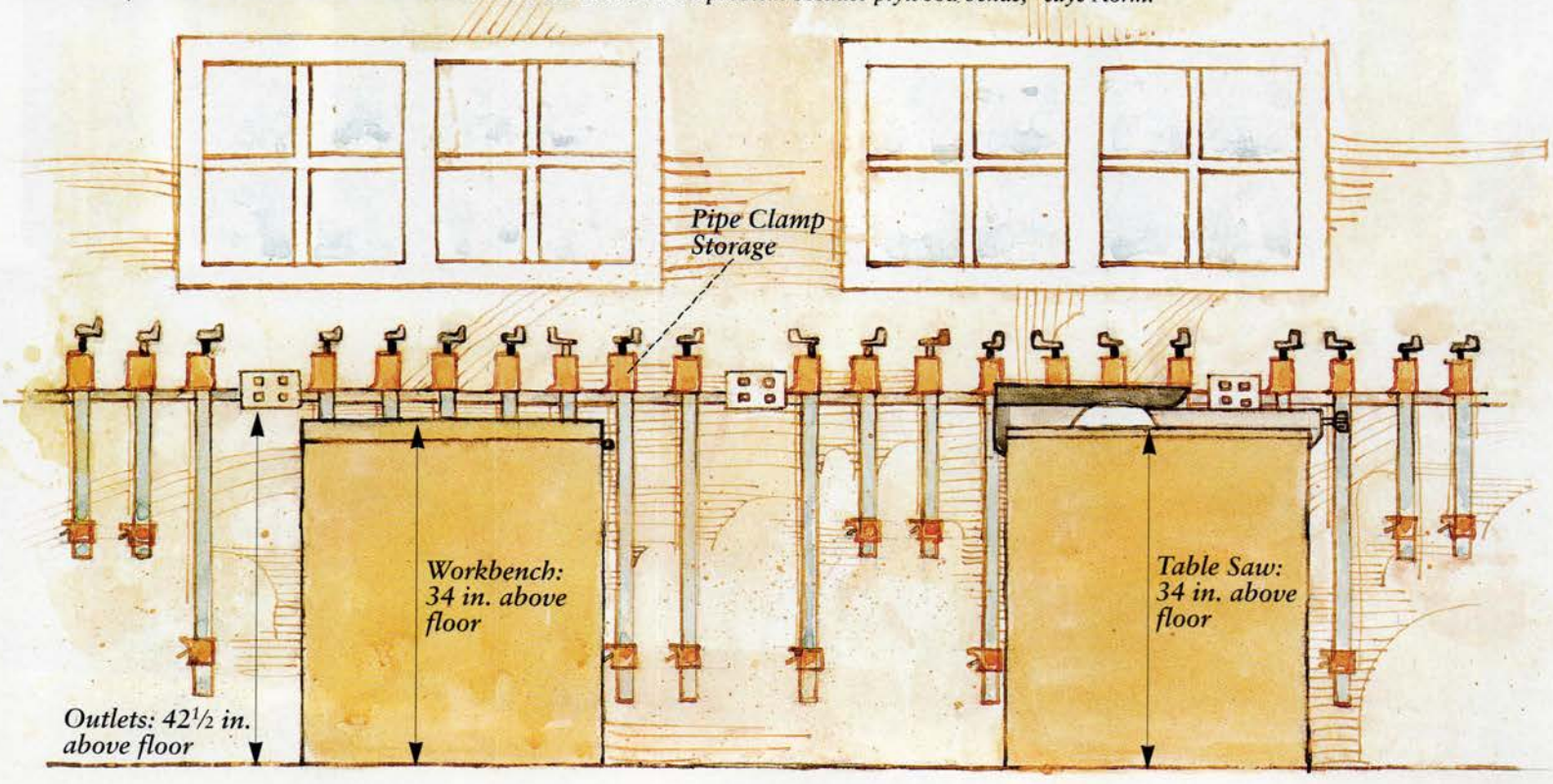
Perhaps just as significant as where Norm positioned all the various tools is where he didn't put them. He left a space roughly 16 by 20 feet at the shop's east end completely open. "You need a materials storage area and an assembly area for large projects," he explains.

Creating such an exemplary shop, Norm says, "isn't as expensive as people think." The building itself cost approximately $45,000, but the total retail price of the tools is a surprisingly modest $11,071. "How many people own a boat and a trailer to haul it? There's your workshop tools," says Norm, "and woodworking is a hobby that can save you money." Still, does a great shop guarantee great work? As the flawless furniture flows out of the New Yankee Workshop's doors week after week, viewers wonder: Is it Norm or is it the tools?

He hesitates. Although Norm is profoundly modest, this is clearly a sore point—after all, no one argues that van Gogh was just a guy with great brushes. "When I'm making personal appearances, people often remark, 'If I had your tools, I could build what you do,'" Norm says. "When I hear that, I think of a comment one woman made at one of my speeches. She said, 'The most important thing in a shop is the woodworker.' You have to learn the process; you have to practice; you have to see how the wood reacts with the tool, and that takes time. The right tools make the job easier and your outcome more consistent. But even with a great shop," says Norm, smiling, "there are no miracles." ■

north elevation

Positioning the woodworking bench, which is 36 in. high, 6 ft. behind the 34-in. table saw will help in cutting plywood. "The fact that the table saw's a little lower than the bench isn't a problem because plywood bends," says Norm.

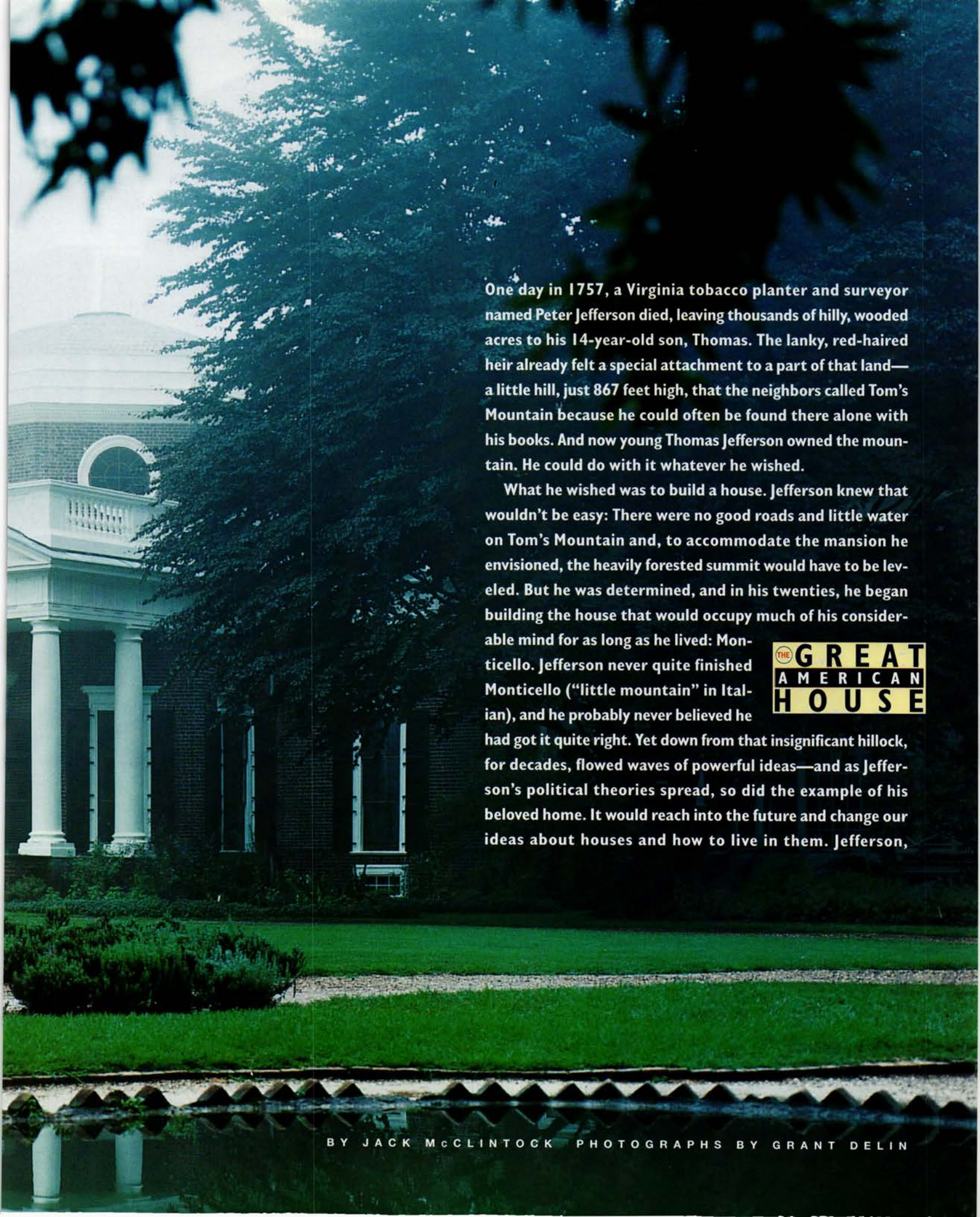


FOR SOURCES, SEE DIRECTORY – PAGE 153

MONTICELLO

Inspired by the classical past, Thomas Jefferson pointed the way to the future with his quintessentially American house

Viewed from the southwest, Monticello offers a remarkable curb view. A serpentine walkway curves around the west lawn, past flower beds. In Jefferson's day, the pond, foreground, was stocked with carp, shad and chub for his dinner parties.



One day in 1757, a Virginia tobacco planter and surveyor named Peter Jefferson died, leaving thousands of hilly, wooded acres to his 14-year-old son, Thomas. The lanky, red-haired heir already felt a special attachment to a part of that land—a little hill, just 867 feet high, that the neighbors called Tom's Mountain because he could often be found there alone with his books. And now young Thomas Jefferson owned the mountain. He could do with it whatever he wished.

What he wished was to build a house. Jefferson knew that wouldn't be easy: There were no good roads and little water on Tom's Mountain and, to accommodate the mansion he envisioned, the heavily forested summit would have to be leveled. But he was determined, and in his twenties, he began building the house that would occupy much of his considerable mind for as long as he lived: Monticello. Jefferson never quite finished Monticello ("little mountain" in Italian), and he probably never believed he had got it quite right. Yet down from that insignificant hillock, for decades, flowed waves of powerful ideas—and as Jefferson's political theories spread, so did the example of his beloved home. It would reach into the future and change our ideas about houses and how to live in them. Jefferson,

THE GREAT AMERICAN HOUSE

BY JACK McCLINTOCK PHOTOGRAPHS BY GRANT DELIN

as the art critic Robert Hughes says, was the "founder of American architecture."

Monticello was Jefferson's great experiment, and like Jefferson himself—the emancipationist who owned slaves, the classicist who couldn't resist innovating—the house was a paradox. He wanted to build a model of rigorous Palladian classicism, yet Monticello embodied many revolutionary ideas that architects would eventually come to take for granted: the value of natural light, the mating of a house with its natural surroundings, the use of glass and transitional spaces such as porches and planters to create an intimacy between indoors and outdoors, the indoor privy, the consolidation of food storage and preparation facilities connected to the main house, the importance of spaces given over to individual privacy.

Located two miles southeast of Charlottesville, Monticello is a domed, red-brick structure with white-painted Neoclassical porticoes and wharflike terraces jutting into the landscape. The house sits on a great lawn amid acres of gardens and orchards surrounded by native forest. If Monticello looks monumental to approaching visitors today, that's because Jefferson was inspired by the temples of ancient Greece and Rome as interpreted by Andrea Palladio in the 16th century. To the refined eye of Yale University art history professor emeritus Vincent Scully, "Monticello looks positively tacky" compared with Palladio's Villa Rotonda, one of Jefferson's models. Yet if Monticello is too cluttered-looking to fulfill the Palladian ideal, it reveals its designer's quintessentially American outlook: Inspired by the classical past, he couldn't help facing eagerly toward the future.

The first version of Monticello, which Jefferson began building for his new bride, Martha, in 1768, was a two-story, six-room manor with stylish Palladian porticoes. Basing his design on pictures in English architecture books, he drew the plans himself, carrying out the decimals to multiple places in his compulsive way. (One was 1.8991666 &c. inches,

ABOVE: *A large greenhouse attached to Jefferson's library and study features door-size windows that allowed him access to a terrace. The cooking area and a privy are in a passageway underneath the terrace.*

Poplar Forest

As a hospitable Southerner, Thomas Jefferson could never turn a guest away; Monticello teemed like a hotel. Still, he longed for solitude and in 1806 broke ground for a villa retreat 70 miles south of the mansion: Poplar Forest. The villa is America's first octagonal house, and for Jefferson it was "the ultimate octagon in a lifetime of octagonal design," says Travis McDonald, Poplar Forest's director of architectural restoration. Inspired by Palladio's Villa Rotonda near Vicenza, Jefferson wanted Poplar Forest to be rigorously Palladian. He latched onto Palladio's notion, says McDonald, that "even the smallest molding inside a room bears a relationship, in mathematical modules relating to proportion and scale, that extends into the landscape and—probably far beyond it." But Jefferson never did anything strictly by the numbers. "It was his character to blend things together," McDonald says. He changed some of the ornaments in the frieze of a Doric entablature, adding ox skulls just to suit "a fancy which I can indulge in my own case," Jefferson wrote, "altho in a public work I feel bound to follow authority strictly." Like Monticello, Poplar Forest embodied numerous design innovations, many of which Jefferson adapted from the French: alcove beds, indoor privies, skylights, floor-to-ceiling windows that lend the airy feeling of a French town house. The foundation of the villa is set right into a hillside, even more intimately tied to the earth than Monticello was. So thoroughly did Jefferson integrate his Palladian, English and French models that the building turned out, as McDonald says, "very, very American."

as if any carpenter could cut it that fine.)

But as Jefferson traveled, representing the new nation's government as minister to France, his world stretched and his tastes broadened. In Paris, he saw domed single-story town houses. In the south of France, he saw a Roman temple, the Maison Carrée, and wrote: "Roman taste, genius, and magnificence excite ideas." He returned to serve three years as secretary of state in New York City and Philadelphia and then began planning the redesign of Monticello.

In 1796, he tore off the roof, pulled down the eastern walls and portico and began to expand eastward. He added a new row of rooms parallel to the old house, with a hallway and two narrow staircases in between. Following Paris fashion, he altered the windows to make his three-story house appear single-story. He capped the north and south ends with piazzas (covered porches). Then he built a new east portico. In all, he more than doubled Monticello's size, ending up with five bedrooms on the second floor and three on the third, and he topped it off with an impressive Roman-inspired dome—the first dome on an American house.

At Monticello today, what immediately strikes a visitor is how bright the house seems. Light—"quite glorious light," says Monticello's director of restoration, William L. Beiswanger—is everywhere. The typical 18th-century house was a dim box with stingy little windows, dark walls and shadowy corners. But Jefferson added numerous features to Monticello to create great splashes of light: enormous floor-to-ceiling windows to which he added a third sash, so that they also served as doors through which even his 6-foot, 3-inch frame could pass without stooping; light-colored walls; semi-octagonal rooms at either end of the house that admitted waves of balanced sunlight during the day and spread the glow of candles in the evening. Twelve skylights, made of small glass panes overlapping like shingles to prevent leaks, brightened rooms and halls.

When the classical rules he admired didn't work, Jefferson cheerfully dumped them. Or invented new ones. For example, his tall, narrow windows detracted from the Palladian perfection of the house, but they offered a splendid mountaintop view. In his book *Jefferson and Monticello,* Jack McLaughlin argues that Jefferson was among the earliest

BELOW: *The ever-inventive Jefferson equipped his study with a swivel chair and two time-saving desktop tools: a five-book lazy Susan reading stand and a polygraph rigged with a second pen to make copies of his letters.*

Following a structural design he had seen at a grain market building in Paris, Jefferson laid out the frame for the dome as a series of interlocking boards he described as "a parcel of sticks and chips." He never carried out his original plan to install a billiard table in the oculus-lit space.

designers who "assaulted the barriers between inside and outside." Jefferson opened Monticello not only to the light, but also to the air, the sky and the views in a remarkably intimate and harmonious way. Porticoes (large, columned, open porches) flanked Monticello to the east and west. To the north, a porchlike piazza led directly onto a terrace that in turn pointed like a long, stern finger into the landscape. To the south, another piazza housed Jefferson's greenhouse, with floor-to-ceiling windows that opened and shut. The total area of these indoor-outdoor porches—"all usable space," says Beiswanger—equals about half the square footage of the ground floor.

Monticello, built of brick fired from local clay, seems to grow from, or flow into, its exposed mountaintop, hunkering there against the sun, wind and rain. Probably because of Jefferson's attempt to make a three-story building resemble a single-story one, the lines seem surprisingly horizontal. It may be too much to claim Jefferson inspired Frank Lloyd Wright's Prairie Houses, with their low-pitched roofs, wide eaves and horizontal bands of casement windows. But Wright would certainly have appreciated the way modest steps and built-in brick planters at each corner tie Monticello to the earth, step by step, in what Beiswanger calls a "refined transition to the outdoor landscape."

Inside, too, Jefferson pointed a way toward the modern house, consolidating the functions of domestic life. He moved the privy indoors, where it was ventilated by a tunnel; waste fell to ground level for removal (by a slave).

He also rethought the traditional kitchen. In contrast to the modern setup, where stove, refrigerator, sink and pantry dwell in a single room inside the house, cooking was done in outbuildings to isolate heat, flame and smells. Slaves delivered meals to the house. At Monticello, these elements were still divided, but Jefferson, uniquely, brought them in closer to the house. The "stove" was a fireplace beneath a terrace, the "sink" a set of tubs in a scullery, the "refrigerator" an icehouse—an underground pit containing tons of ice probably insulated by straw or wood shavings—the "cabinets" and "pantry" a ware room where cheese, coffee, chocolate and (in one inventory) 40 beef tongues were stored. All were accessible to the dining room through a Jefferson-designed all-weather passageway (a tunnel beneath the house) and then upstairs.

RIGHT: Northern light filled the tea room from dawn to dusk with a warm, even glow. But drafts from the tall windows turned the room so cold in winter that Jefferson used double-glazed doors to close it off from the house.

RIGHT: Jefferson filled the cooking area with saucepans, frying pans, food warmers, kettles, ladles, spoons and cleavers he purchased in France. A gourmand with a sweet tooth, he set down a written recipe for ice cream.

Slaves—he called them house servants—carried food up the narrow stairways on trays, set it on shelves fastened to one side of an unusual revolving door and then spun the door a half turn. Presto: Dinner appeared in the Jefferson dining room, but the servant didn't. His famous dumbwaiters brought bottles of wine up from the house's cellar. "Maybe this was the beginning of modern conveniences in America," says Monticello architectural conservator Robert Self.

Easing his slaves' burden wasn't Jefferson's motive. What he sought was privacy, a rare amenity in the 18th century. Houses were expensive, hard to heat and small—while families were large. Floor plans designated most indoor space as public, so people were always crowded together. The notion of a room of one's own was foreign to the average person. But Jefferson was not the average person; he had a passion for privacy and he seldom denied himself anything.

Jefferson's need was most visible in his private apartment, which a friend dubbed his "sanctum sanctorum." There he created a retreat that nurtured his intellectual spirit, offering a quiet spot not merely to sleep, but also to read, write, think, work, rest and restore his mind without interruption. Once, he even nailed the door shut to prevent visitors and family members from barging in. "This was a new concept in America," Monticello guide Peggy Mowbray says, "having a private space within your own home."

Jefferson's private suite became Monticello's liveliest, most human space, where it seems possible—even in his absence—to breathe in something of the man's personality. Jefferson laid out a two-room library and designed the shelves, which are actually stacked boxes, so he could easily move his books. He owned nearly 7,000 and, sure enough, had to sell them in 1815 to pay debts. (They were the original volumes of the Library of Congress.) He made certain his study had lots of light and installed his famous 6-foot, 3½-inch alcove bed (the standard bed was then 6 feet) between it and his dressing room. Just outside the tall windows stood the south-piazza greenhouse, where he sprouted seeds, grew orange trees in pots and built furniture on a workbench. Light spilled into the suite from many directions, and the space flowed, unbroken by doors, through wide arches.

Ironically, Jefferson's love of privacy and his fondness for light and flowing spaces ultimately trapped him. If he could see out, people could see in and Monticello, a working plantation, supported more than 100 souls. Eventually, he took to sleeping behind a paper-lined screen. To modulate the light from outside, he designed porticles, as he called them: louvered structures of wood to shade the greenhouse's east and west doors.

If the porticles were practical, Monticello's dome was a purely aesthetic statement. Meticulously, Jefferson laid out the complex framing himself, improving on a French method. The dome is the highest spot on the mountain and, seen from outside, it appears to be a handsome, even inevitable, crown to the house. Yet inside—despite its brilliant skylight and circular windows—the dome room is drab: a kind of dead zone, like an empty skull atop a vital body. Even in Jefferson's lifetime, it was used mainly for storage. Perhaps, having violated the rules so often, Jefferson decided he would at least have a proper Palladian dome even if, in the end, it was hollow.

Clever as he was, Jefferson still had to make the tradeoffs that test every architect. His "most honorable suite," he said, was the bright, many-windowed tea room on the house's north end. But winter froze the little chamber and chilled the adjacent dining room as well. Jefferson installed two sets of sliding glass pocket doors, one a foot inside the other, between the rooms. The innovation was the first known North American use of double glass doors for dead-air insulation, a precursor to the storm door. He also invented a decoding machine and a mathematically proportioned plow. But most of his creations were ingenious reworkings of common objects: goblets with square bases, a comfortably sprung seat for his two-horse phaeton, the bizarre calendar-clock driven by cannonball-like weights in the Monticello basement.

Contradictory as he often was, Jefferson still had a kind of internal consistency. Although he loved the idea of perfect systems, he was a freethinker. In politics, he fought against placing total power in a national government—and in architecture, much as he admired Palladio's rigid rules of design, he was unwilling to follow them. He looked to old Europe for his inspiration, yet he designed for a new America, and he loved to preach that well designed buildings could animate the democratic mind. After Jefferson died in 1826, Monticello—the house, the idea—remained as paradoxical as the man and his country: idealistic and pragmatic, impressive, grand and unfinished. ■

The Monticello in Your House

If your bathroom is indoors, thank the third president of the United States. Thomas Jefferson discovered that happy convenience in France and built indoor privies at Monticello. Look around your house, or even out the window, and chances are you'll see many more examples of ways Jefferson changed our ideas about houses and how to live in them.

THE VIEW **Jefferson built on an "elevated and agreeable place," as his idol Palladio suggested, and favored informal, natural-looking gardens with curving walks and borders.**

THE LIGHT **Skylights, floor-to-ceiling windows, fanlights, half-octagonal rooms with many windows—all were Jeffersonian innovations. Some windows he made large enough to use as doors.**

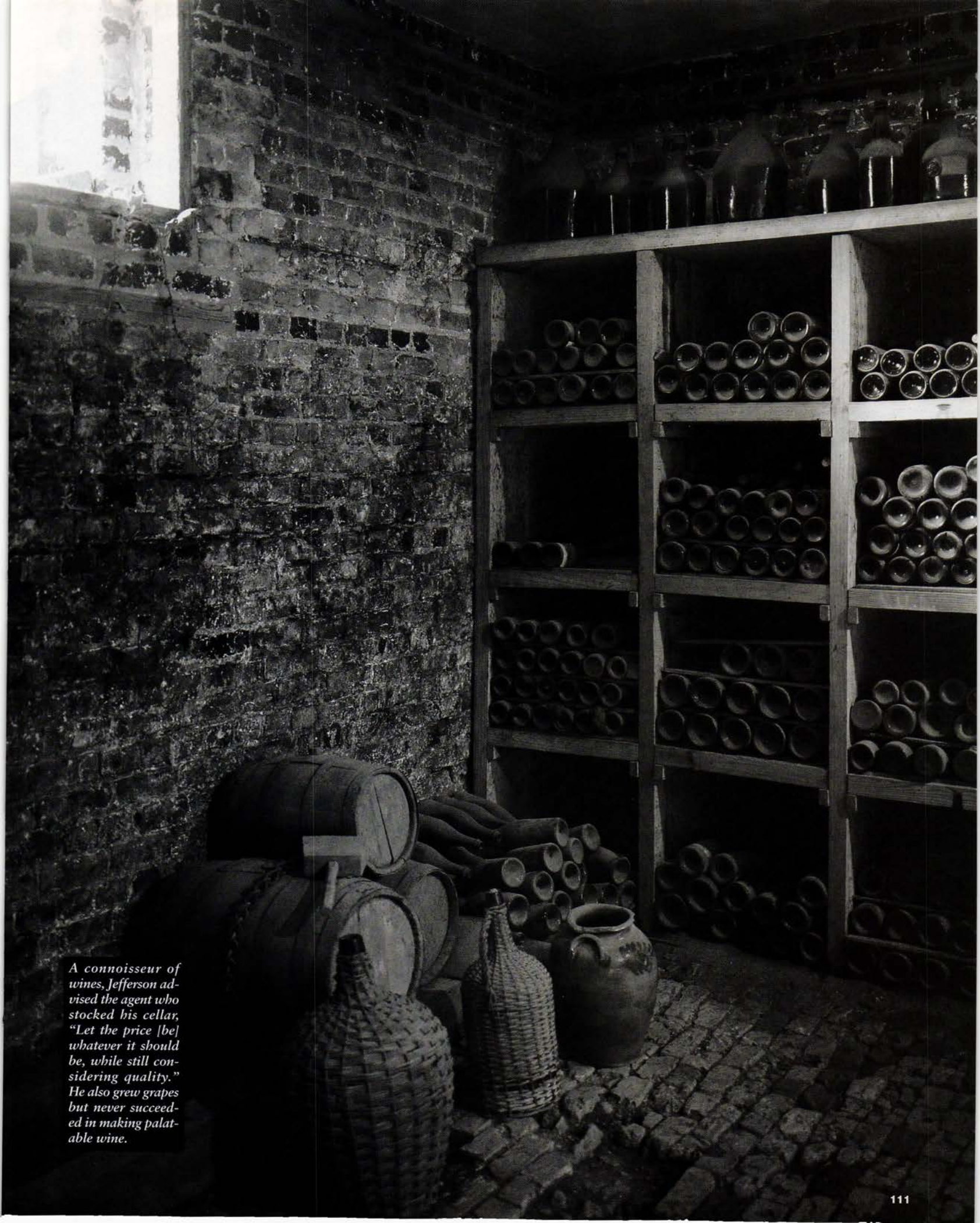
OPEN PLANNING **The space in a modern kitchen-dining-living room flows smoothly from one area to the next—as it does in Jefferson's two-room library at Monticello.**

PRIVATE BEDROOM SUITE—OR HOME OFFICE **Jefferson insisted on setting apart a space for individual privacy and reflection. Most modern homes honor the concept.**

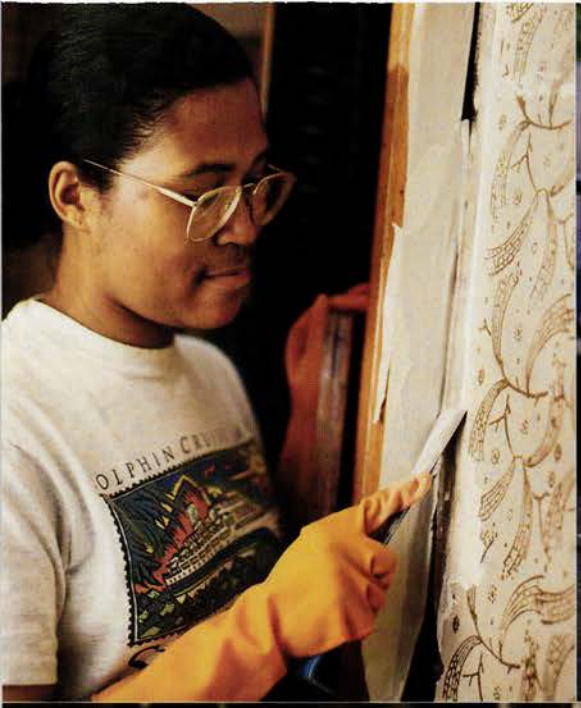
PARQUET FLOOR **Jefferson's, of cherry and beech, was one of the first in the United States.**

FAUX STONE AND WOOD GRAIN **Painters applied these finishes at Monticello; they are fashionable again today.**

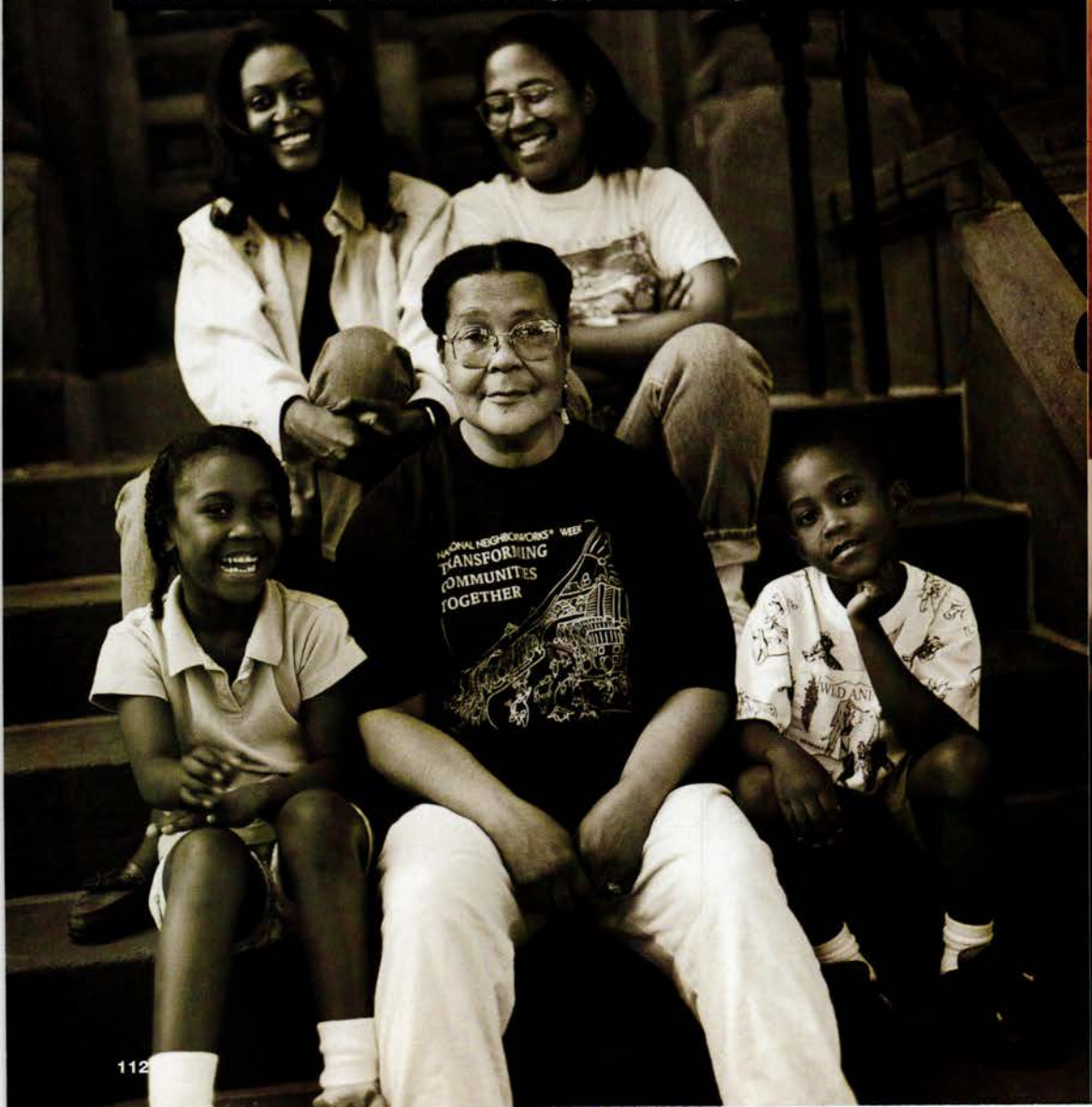
THE KITCHEN **At Monticello, Jefferson began the process of moving food storage and cooking areas into the main house, where they are today. "Convenience" was one of his favorite words.**



A connoisseur of wines, Jefferson advised the agent who stocked his cellar, "Let the price [be] whatever it should be, while still considering quality." He also grew grapes but never succeeded in making palatable wine.

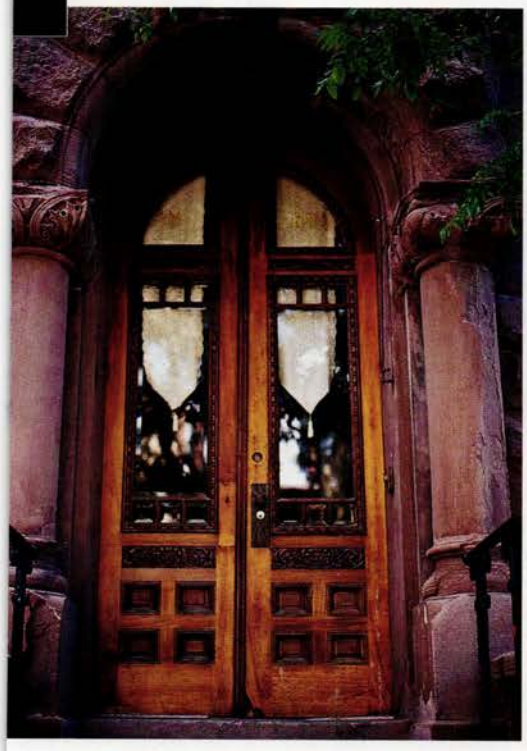


BELOW: *Wright, center, talked her daughter, Joyce Williams, top right, into taking the course, where they met Valerie Williams, who was also a student, top left. Wright's grandchildren Jasmine and Miles sit next to her on the front stoop.* TOP FROM LEFT: *Joyce Williams patches a hole in a wall painted long ago to resemble wallpaper. The house also has ornate carved-wood trim, which Joice Wright pries off tenderly for refinishing.* RIGHT: *Restoring the front doors was an early project; when the Wrights removed the doorknob, they discovered it was stamped "1891."* BOTTOM RIGHT: *Valerie Williams, the tallest of the crew, smooths rough spots on a ceiling.*



FINISHING SCHOOL

In cities like New York, where patching a hole in the wall can cost $200, classes in homeowner basics really pay off



The first time Joice Wright saw her 1890 brownstone in the Bedford-Stuyvesant district of Brooklyn, New York, she had eyes for only a floor-to-ceiling mahogany china cabinet in the back parlor. All else vanished. The four-story house's crooked windows, broken-down kitchen and garish yellow living room walls barely registered. "I just knew I had to have this house."

That was 13 years ago. In the seasons since, Wright, a junior-high school art teacher, has tried bit by bit to banish the horrors inflicted on the grand old building during its decade as a rooming house. She might be further along had she not grown up in rental apartments, used to leaving repairs to someone else. Wright didn't know the first thing about patching a hole in the wall, fixing a plumbing leak or evaluating the safety of wiring. "My husband knows how to do those things. He just won't do them," Wright says. She laughs, then adds: "I am the biggest starter of things. But I never get them done."

She needed a coach, and she found one in Neighborhood Housing Services of New York City, a not-for-profit organization that teaches home-owner basics. In a 10-session course that meets three hours a week in five locations, about 300 people a year learn to fix toilets, lay tile, frame walls and replace windows. Banks donate most of the classrooms and pay for some of the instructors' fees and other program expenses—an innovative way to comply with the Community Reinvestment Act of 1977, which requires lenders to serve low-income communities where they operate. Other businesses also support the program; Home Depot, for example, provides materials such as nails and wood. The students pay $100 per course.

When Wright's husband, Milford, heard about the program, he suggested she give it a try because she was always coming up with projects for him. Wright and her daughter, Joyce Williams, who lives in the upstairs apartment of the house, took the beginner classes together, then signed up for the intermediate—and talked a niece into following along. "Most of what I learned was after class," Wright says. "A lot of people in class were brownstoners. We all had the same problems."

One classmate was so excited after a lesson in patching plaster and drywall that he went home and fixed several holes where doorknobs had slammed into walls. When he finished, he punched more holes—just for the pleasure of patching them—and called friends, asking if they had any holes to patch. Each repair had saved him $200, the price a contractor had quoted.

The instructor asked whether others had ever received estimates for patching walls. "We all sheepishly said, yes, we were paying $200 a hole," Wright recalls. "We'd had people in the house doing work for us, but we couldn't really evaluate what they were doing. When we took the class, we saw we were wasting money because the repairs weren't being done well."

With her newfound knowledge, Wright discovered she could screen jobs before tackling them: "I decided that fixing sweating pipes is not for me. And I'll leave electrical repairs to a professional." But perhaps the most valuable lesson was learning how to focus, she says. Instead of simultaneously starting projects throughout the house, Wright worked last summer solely on turning the front downstairs room into the family's everyday dining room. (She's leaving the parlor with the china cabinet for entertaining.)

The dining room will get a lot more use once she finishes the kitchen. It's a disaster now—the ceiling is falling in, and only one stove burner works. But Wright and her husband can't agree on how to redo the room. So for now, the kitchen remains—as her teachers taught her to think of it—a project for another day. ■

BY JEANNE HUBER PHOTOGRAPHS BY ALISON ROSA

FOR SOURCES, SEE DIRECTORY – PAGE 153

OPPOSITE PAGE: *"I enjoy making something old look pristine," says Kollmeyer, relaxing in her workshop.* BELOW: *The elaborate ornamentation she restored on the bay window of a Victorian house in San Francisco includes a classical relief of a woman's face as well as corbels and pilasters decorated with an acanthus-leaf motif.*

an **american** craftsman

PLASTERMASTER

Lorna Kollmeyer's relentless pursuit of beauty in the delicate details of moldings, reliefs, friezes and medallions

BY WALT HARRINGTON · PHOTOGRAPHS BY STEFANO MASSEI

She talks to herself while she works. Mumbles, really, through the long, elegant fingers of her right hand held to her mouth, her left arm spanning the waist of her lean 6-foot, 1-inch frame, an athlete's frame. "OK, who goes where?" she asks, reaching out, plucking up and relocating a piece of the twirling-floral Victorian frieze that is spread like a three-dimensional puzzle on the worktable. "This little guy goes here. And this fellow goes next to him." She straightens up, closes an eye. "Let's move this little sucker." She gently twists the corner of an acanthus stem where it kisses a nasturtium bud. Then, reaching across her body with her right arm, she jacks up the left leg of her jeans, hoists her work-boot-shod foot onto the table, rests her left elbow on her bent knee and stares.

"So how does this damned thing go together?" She stands down on both feet, arms akimbo. "There's something gratifying in getting that acanthus stem to turn just right. Your mind is a little muddy, you can't see the solution and then suddenly it's clear."

Poof!

"That's the feeling I love."

Lorna Kollmeyer, one of the nation's finest ornamental plaster artisans, is the modern embodiment of Italy's 15th-century *stuccotori*, who resurrected the plaster-molding techniques of ancient Greece and Rome, allowing for the creation of mammoth columns and statues, as well as delicate wall and ceiling reliefs, at a fraction of the cost of traditional stone carving. This particular morning, Kollmeyer has been in her shop moving pieces, mumbling to herself for four hours. She is almost satisfied with the layout of the intricate 10x24-inch pattern she'll soon reproduce in plaster to run above the picture rail high on the dining room walls of the elegant Shannon-Kavanaugh House on San Francisco's famous postcard row.

The frieze pattern, supplied by the owner of the house, was jumbled in shipping. After Kollmeyer pieces it back together, she must cast the

pattern in 2-foot sections of plaster that can repeat seamlessly along the wall as if the frieze's swirling tendrils, leaves and flowers had no beginning or end. She must outline the frieze on its backing board and heat, soften and press the pieces back into place. Only then can she brush liquid urethane onto the pattern to create a mask that will be pulled away, then used like a Jell-O mold to cast plaster images.

"Maybe I can cheat this down," Kollmeyer says to herself.

"That appears to fit," she answers.

"Maybe I can split the difference."

"That's lookin' pretty good."

"Go down a little, come up."

She shrugs, smiles. "I mumble to myself."

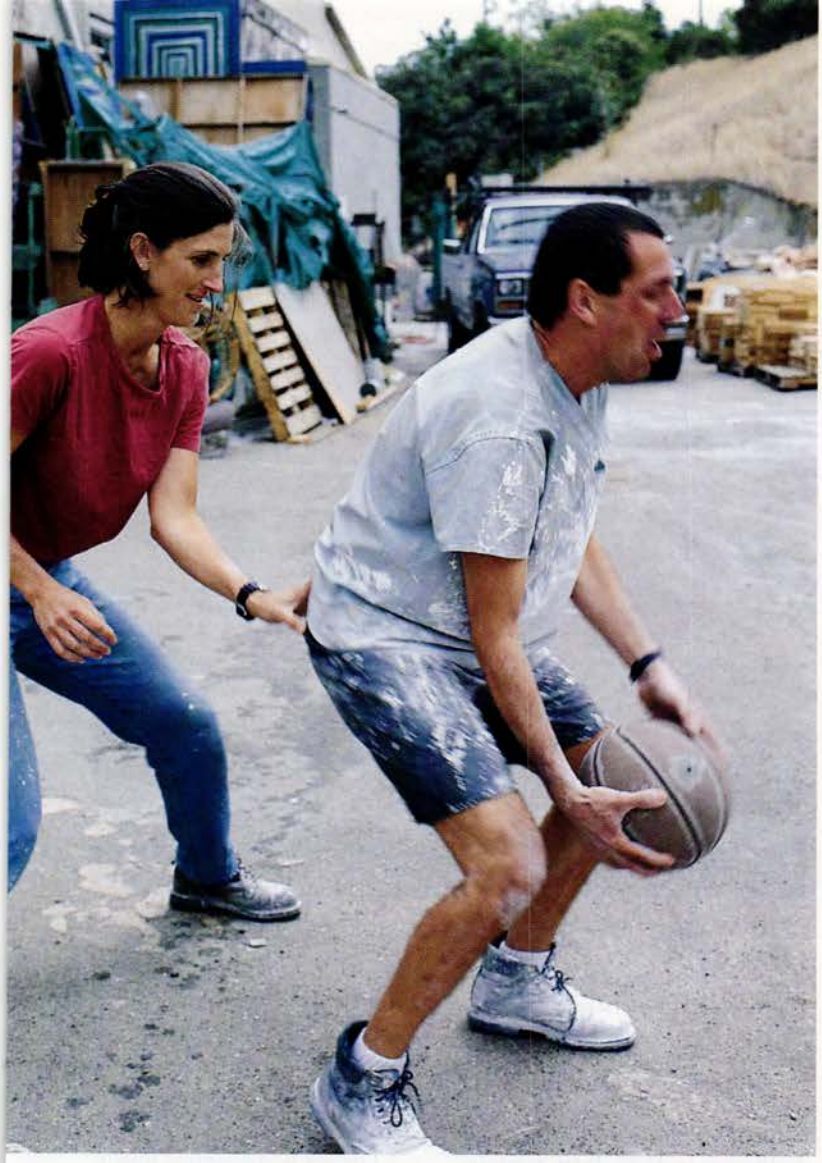
Two decades ago, the 39-year-old craftsman was an all-American basketball player at Colorado College with a jump shot smooth and silky. And she was a Phi Beta Kappa who wrote her undergraduate thesis on how William Wordsworth and Charles Dickens portrayed England's transformation from agrarian to industrial society. She was always going to do something BIG with her life. Her dad was a Los Angeles pipe fitter, a blue-collar guy who worked with his hands and expected the young and gifted Lorna to make the great American leap: He wanted her to work with her brains not her muscles, her head not her hands.

Lorna never made that leap. After college, she played pro basketball in France for a year and planned to get a college coaching job. But basketball had been the focus of her life since she was 11, and she wanted to try something new. So she landed in San Francisco, where she had friends, and took a job on a house remodeling crew. Never a priss-pot, Kollmeyer hammered nails, sawed trim, refinished floors, cold-tarred roofs and Sheetrocked walls. "I really loved it," she says, "being fit and hammering nails and understanding how something went together."

Kollmeyer removes a urethane mold after casting a section of the plaster frieze that will adorn the dining room walls of the Shannon-Kavanaugh House in San Francisco. Using the same mold, she performs the delicate process again and again to create more than 60 identical frieze sections.

Then 14 years ago, without realizing she was making a choice that would change her life, Kollmeyer bought a friend's fledgling ornamental plaster business for $1,000, and he spent two days teaching her to mold brackets and ceiling medallions. Soon after, on a whim, she bid on a job to restore what she calls the plaster "bits and bobs" of the historic Hotel Majestic. Surprise—her $22,000 bid won. She panicked. The next lowest bid had been $56,000. And she had no experience making the scores of Victorian ornaments she'd promised—medallions, rosettes, cartouches, finials, moldings, plaques, capitals, scrolls, spandrels and corbels.

Kollmeyer marshaled the same laser-sharp concentration, attention to tiny details and ability to work long unbroken hours that had made her a precision athlete. "It was like she was getting ready for a big game," says her good friend and coworker Mike Dyar. "She got down and ugly under the basket." Overnight, she created a factory, rented a shop in a former Navy shipyard in San Francisco and called on an army of friends. Working from old photographs, her friends Ali Pearson and Lori Lambertson, both painters and sculptors, carved reliefs of mermaids and scrolls and baskets of fruit from clay. Kollmeyer learned to sculpt acanthus leaves and scrollwork herself, discovering that she had a natural artistic touch and an eye for proportion. Then she made molds and casts. Her contract



LEFT: During a game of one-on-one, Kollmeyer keeps coworker Mike Dyar in check. The hand quickness and concentration skills she honed as a pro basketball player in Europe have also served her well as a plasterer. ABOVE: Kollmeyer's 5-year-old Tibetan mastiff, Bosco, oversees all the work she does in her shop, often ending the day with a fine layer of plaster dust lightening his dark fur.

called for all objects to be soaked in boiled linseed oil and, taking the charge literally, Kollmeyer dipped each piece in a kiddie pool of oil. Only later did she realize she was expected only to brush on the weatherproofing liquid. "To this day, I can't stand the smell of linseed oil," she says, laughing.

Kollmeyer still finds it nearly impossible to believe that she got the job done, laboring night and day for five months. "The universe smiled my way," she says. "The Majestic put me on the map."

This morning, back in her shop, Kollmeyer jury-rigs a stove to soften her frieze for application to its wood backing. She takes a 5-gallon plastic bucket, puts a spouting tea kettle inside, stretches nylon mesh over the bucket's mouth and lays out pieces of frieze like so many strips of bacon on a grill. When the pieces are hot and juicy, she scrapes them off the screen with a 6-inch drywall blade cum spatula, lays them back inside their penciled outlines and gently presses them into place, careful not to leave prints. As she steams, scrapes and presses, as the goop rides up and hardens under her fingernails, she talks.

"After the Majestic, I got better at plaster." She mastered the techniques of mold making, learned to alternate thin and thick coats of latex or polyurethane to make the mold strong enough to remove without tearing. She learned to remove old paint by pouring boiling water over an object. She discovered that she had an artist's eye for resculpting the flowers and vines, faces and bodies of old and damaged ornaments. "She has the amazing ability to make them look old and new at once," says Dyar.

"But I was still tortured," she says.

Although she was making as much as $60 an hour, success seemed to her a leather briefcase, clicking heels on marble hallway floors, fashionable clothes and a wide-windowed office. She touches the blue collar of her work shirt and laughs. Her pipe-fitter dad would just shake his head, baffled. "We spent $25,000 on college so she could be a plasterer," he'd say. "I could have taught her to be a plasterer."

Kollmeyer decided: "What I'm doing isn't really good enough." So in 1989 she got a friend to run the business, moved to London and studied computer animation. As time went on, she began to see her electronic images as lifeless. She couldn't touch them, hold them in her palms, run her fingertips over their nooks, feel roughness where she had failed, smoothness where she had succeeded. In San Francisco, she had been surrounded by her plaster sculptures—gargoyles high on rooftops, garlands and berries, roses and lamb's tongue, a fairy riding a dolphin, a mermaid, a seahorse, pineapples and seashells, a wild pig, wreaths and laurels, a man playing a lute, cherubs, angels, an elephant and an owl, Madonna, Venus, Apollo and Buddha.

"My work was more of my identity than I gave it credit for," Kollmeyer says, as she deftly works teardrop buttons of modeling clay into tiny fractures in her frieze, simultaneously pressing and smoothing the clay with "toolie"—a spatula the size of a small fingernail file. "My work was a lot more gratifying than what I was seeing in the great world of computer animation, which I had thought was so glam-

The original pattern for the Shannon-Kavanaugh dining room frieze, pieced together and mounted on a backing board, left, lies next to Kollmeyer's rubber mold and a section of plaster cast from the mold.

orous. There was a whole epiphany about me struggling all day to make something on the computer, and it just didn't mean anything to me. I got over being embarrassed about working with my hands. I decided to take great pride in it."

She flew home from London with a new attitude. I'm not making plaster doodads for a living, she thought: I'm resurrecting history, creating a collection of original 19th-century and Art Deco architectural ornaments. Kollmeyer now has more than 50 original San Francisco ceiling medallions, each named after the street it originally came from—Broderick, Page, Hayes, Laguna, Anza, Hartford, Scott, Water, Ellis and Steiner, medallions that come in intertwining leaves and garlands, grapes and pears, lilies, roses, palms, cattails, daisies, acorns, seashells, storks and an endless array of geometric designs. She also has collected and reproduced 75 original corbels and hundreds of other ornaments.

"I want a collection of real San Francisco patterns," she says. "The beautiful things in this city just about bring tears to my eyes. There were people all over the city, mostly European immigrants, creating these ornaments, coming up with ideas and designs that were unique to San Francisco. We know nothing about these people today, but we have their work. It's a legacy for me.

"That is the quest."

Right now, Kollmeyer seems like the last candidate for a hero's journey. Having donned a black pig-snout respirator, a plaster-caked apron and rubber gloves, she begins to brush urethane over the frieze—a thin layer to coat the intricate details, then heavier coats that don't drip even when she turns her brush over and back. Her voice gurgles up as if from deep water. "So much of this is just plain hard work." She'll get an old piece and spend days laboriously removing 120 years of paint, layer after layer.

In her workshop, Kollmeyer keeps replicas of some of her favorite pieces including, center and right, a corbel festooned with laurels and berries and an acanthus-leaf acroterion both from San Francisco's Hotel Majestic. The mirror frame, in front, will be installed at the Club Donatello apartments.

LEFT: *Kollmeyer uses an air-hardening clay to blend and hide the joints of the Shannon-Kavanaugh frieze. Good plasterwork, she says, requires "being present with a project, being very patient. Not everybody has that capacity."* ABOVE: *Peter and Helene Marchant, who sold their plaster business to Kollmeyer in 1983, later commissioned her to decorate a skylight in their home with a swag pattern of faces and acanthus leaves connected by a ribbon-and-drop pattern of laurels and berries.*

Then she'll patch the cracks and holes—and sometimes the piece will be more cracks and holes than not. "What's gratifying, after all the back-breaking labor, is making it look perfect again."

Poof!

"The joy is seeing this lovely thing."

Outside her shop an hour later, in San Francisco's summer sunshine, Kollmeyer breathes the fresh air deeply. She can smell the brackish bay and the sourdough bread cooking at the Parisian Bakery. "I like answering to my own standard. I once worked in a bike shop, and even when there wasn't any work to do, when the shop was in order and there were no customers, I wasn't allowed to read a book. I had to pretend I was organizing the shorts. It was demeaning. I used to stand in that shop and time just went tick, tick, tick for hours. So boring. Now I blink my eyes at 3 o'clock and I think, 'Where did the day go?' The lure of working at some bureaucratic job or in a bank is not for everybody. I would have withered and died on the vine at a 9-to-5 job where I had to show up at exactly the same time and have a 15-minute coffee break between 10 and 10:15 and a half-hour lunch between 12 and 12:30. It would have crushed my spirit."

Tomorrow morning, the mold Kollmeyer made from the frieze will be cast in plaster. It will harden in about half an hour and the rubbery mask will be pulled off, revealing the twirling-floral Victorian adornment that will rim the dining room walls of the elegant house on postcard row.

Poof!

"I made this," she will mumble to herself.

That's the feeling she loves. ■

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A close-up of the portico from the Hotel Majestic, the job that launched Kollmeyer's career: A laurel-and-ribbon pattern graces a spandrel above the arch, which is outlined at the top by egg-and-dart molding. To the right, an acanthus-leaf acroterion sits above two pilaster capitals; above, an urn with vertical laurel drops is set against a background filigree of acanthus tendrils.

MASTER PLASTER TIPS

Finding the highest quality plaster ornament—one that will last 100 years if painted and maintained properly—is simply a matter of looking closely, Kollmeyer says. Cracks and chips are telltale signs of cheap plaster, which breaks easily. Unless a rough finish is intentional, surfaces should have a marble-like smoothness, not the fuzzy feel that pitted, worn-out molds produce. Pockmarks reveal that an ornament has been badly cast; protruding bits that need to be sanded or broken off show that the piece has been poorly molded. Plaques and swags, which can warp if they haven't been dried and stacked correctly, should lie flat on a surface. Supposedly straight lines should really be straight, angles consistent. Outdoor ornaments should be cast out of Hydrocal or a higher grade of gypsum cement to ensure durability. And choosing hollow versions of large three-dimensional pieces, now as strong as solid ones thanks to technical advances, will mean easier transportation and installation. However, not even the best-made ornament will fit the bill if it doesn't fit the architectural style of the house it adorns.

WRIGHT HOUSE,

High-tech solutions for the architect's notoriously leaky design at Wingspread

In 1939 in Racine, Wisconsin, Herbert "Hib" Johnson threw a housewarming party at Wingspread, his new 14,000-square-foot residence designed by Frank Lloyd Wright. As dinner was being served in the great hall—a quintessential Wright creation with sweeping curves and a soaring skylight-ringed ceiling suspended from the central chimney like a circus tent—a thunderstorm erupted, and water began dripping steadily into the room. Johnson, CEO of the S.C. Johnson Wax Company, phoned Wright in a rage. "I'm sitting here with some friends and distinguished guests," he fumed, "and the roof is leaking right on top of my head!"

"Well, Hib," Wright replied, "why don't you move your chair?"

Armed with plenty of putty, Wingspread's maintenance crew worked for more than half a century, plugging and replugging leaks at the mansion. Then, in February 1994 after a severe ice storm nearly collapsed the heavy clay-tiled roof, the Johnson Foundation, which now uses Wingspread as a conference center, launched a $2.85 million repair effort. Members imposed one major restriction on the preservation team: Do nothing to alter the room's appearance. All repairs had to be made from above—through the top of the roof—to avoid damaging historic plaster and millwork.

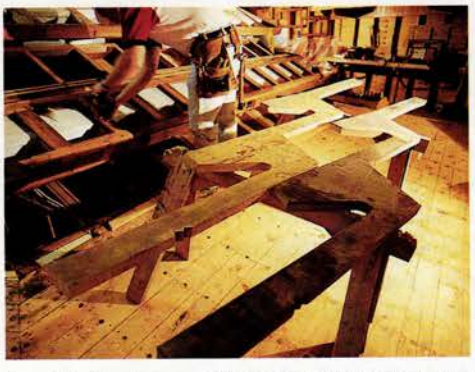
By summer, a forest of scaffolding erected in the hall held up the slumping ceiling and, outside, plywood and tar paper covered Wright's airy pagoda design like a prairie-style Darth Vader helmet.

At first, no one knew exactly what held the roof up—Wright's plans were short on detail. To their amazement, members of the restoration team found the sagging Z-shaped rafters in the upper part of the roof were nothing more than butt-nailed, plywood-gusseted 2x4s; eight had been rotted by the chronic leaks.

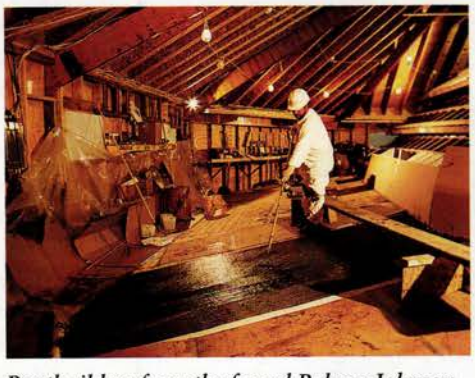
Rot-proof replacements for the rafters were fashioned from 1½-inch thick slabs of aircraft aluminum. Robotic water jets did the cutting. Extracting the old rafters and fitting new ones in their place demanded surgical precision, so the workers first rehearsed the entire procedure on a full-size mock roof.

To strengthen the structure without altering its shape, thin sheets of carbon fiber, used in racing boat hulls and Stealth bombers, were epoxied to the sheathing in a corsetlike band around the lower roof. No roofer knew how to install the material, so the foundation hired a crew of boatbuilders. They started work late last December, just as nighttime temperatures in Racine plunged below zero. Because the epoxy cures properly only when warmed to 140 degrees Fahrenheit for 24 hours, the contractor brought in a million-Btu propane heater and sealed off the area around the roof with plastic tarps. "We basically built a big oven that enabled us to cook the roof," says Kevin Higgs, project superintendent.

The roof cap and interior scaffolding came down in June, and Wingspread reopened a few weeks later. The ceiling and roof now look just as they did when Hib Johnson lived there. And the next time it rains, there will be no need to rearrange the furniture. ■



A solid aluminum replacement rafter, right, lies beside a plywood template that mimics the lightning-bolt shape of the original rafters. To minimize the possibility of damage to the roof, the carefully choreographed replacement is executed mostly with hand tools.



Boatbuilders from the famed Palmer-Johnson yard in Sturgeon Bay, Wisconsin, stiffen Wingspread's lower roof with 14 layers of carbon fiber glued together with waterproof epoxy, creating a lightweight laminate never previously used as a roofing material.

Workmen install new insulated skylights using silicone sealant to prevent leaks. The replacement clay tiles, made from molds of the water-damaged originals, are held in place by an elaborate earthquake-proof system composed of stainless steel straps and wires.

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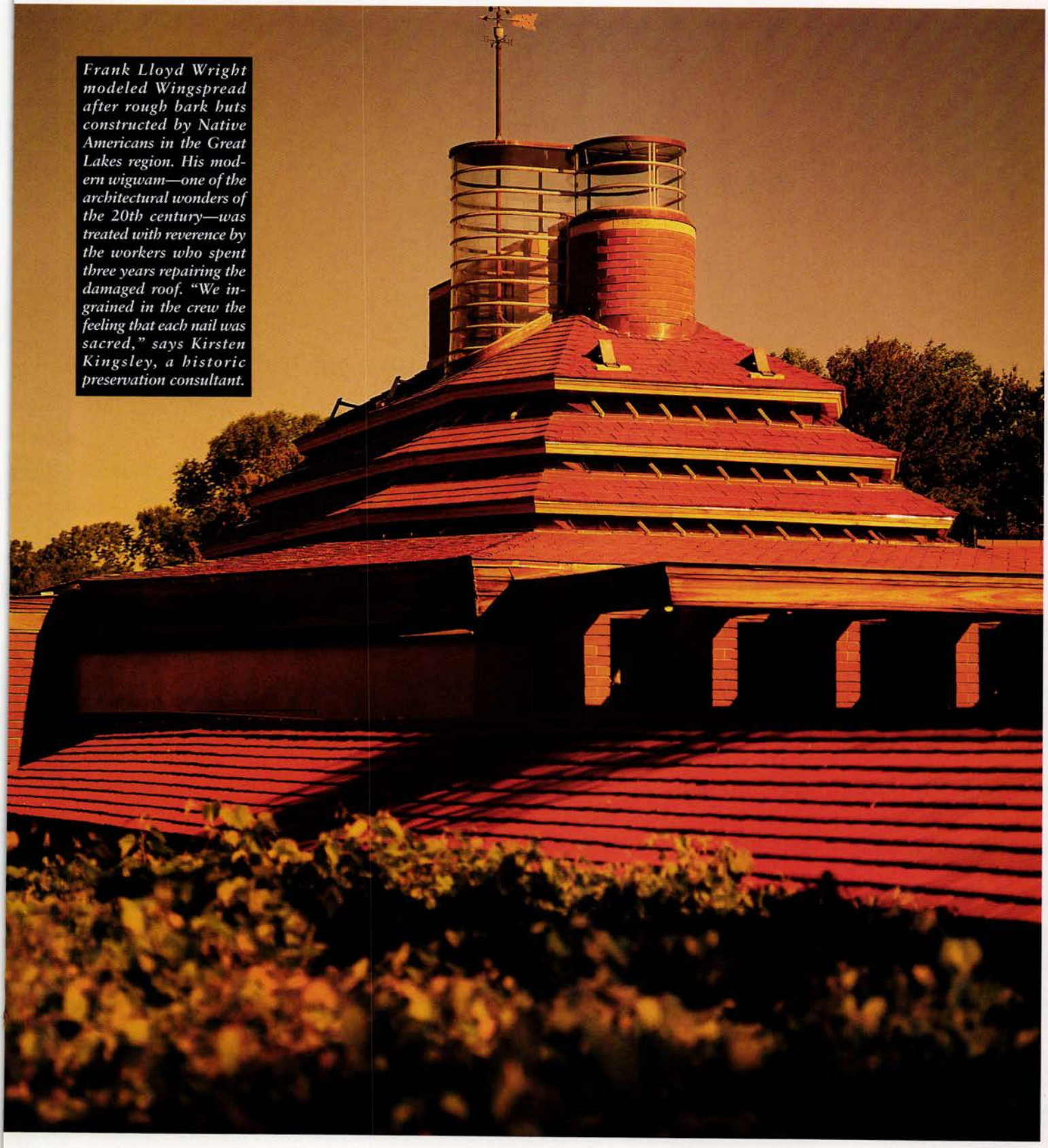
WRONG ROOF



Frank Lloyd Wright modeled Wingspread after rough bark huts constructed by Native Americans in the Great Lakes region. His modern wigwam—one of the architectural wonders of the 20th century—was treated with reverence by the workers who spent three years repairing the damaged roof. "We ingrained in the crew the feeling that each nail was sacred," says Kirsten Kingsley, a historic preservation consultant.

BY CRAIG CANINE PHOTOGRAPHS BY JAMES SCHNEPF

GOT SNOW?

GET ONE OF THESE

Ten inches on the ground so far, and no signs of stopping. If that weather report applies to your driveway more than a couple of times a year, as it does to ours, you might be a customer for a top-of-the-line snow thrower. To find out which ones work best, we decided on a real-life test of eight machines over an entire winter in Vermont, 18 miles from the Canadian border. All were factory-new, self-propelled, 1997 models with two stages: snow-devouring horizontal augers working in tandem with small impellers that shoot snow up the discharge chute. All came with four-cycle gas engines, and all but one checked in at 9 or 10 horsepower. All were equal to the work of clearing a 1,500-square-foot parking area 1 foot deep in fresh snow (about a 20-minute job), and none balked at digging out a 900-foot single-lane drive. Each of these big guys could pick up the snow and send it halfway back to Canada. The contrasts came in terms of price, size, maneuverability and convenience of controls.

With the exception of the Honda, which uses its own 8-horsepower plant, each of the machines came with a Tecumseh Snow King gasoline engine—the

BY WILLIAM G. SCHELLER PHOTOGRAPHS BY KELLER AND KELLER

The chute aims snow to one side—but a sudden gust can easily toss a flurry of flakes back in the operator's face. A removable cab, an option on snow throwers such as this John Deere and available as an aftermarket item by most other manufacturers, offers extra protection.

industry standard. All models start manually with a pull cord; all machines fired on the first pull. Several models also have electric starting—you plug in an extension cord, and the ignition fires with the push of a button or the turn of a key. I observed little difference in performance between the 9- and 10-horsepower Tecumseh engines or between the Tecumsehs and the 8-horse Honda. The Honda, however, ran a little more quietly.

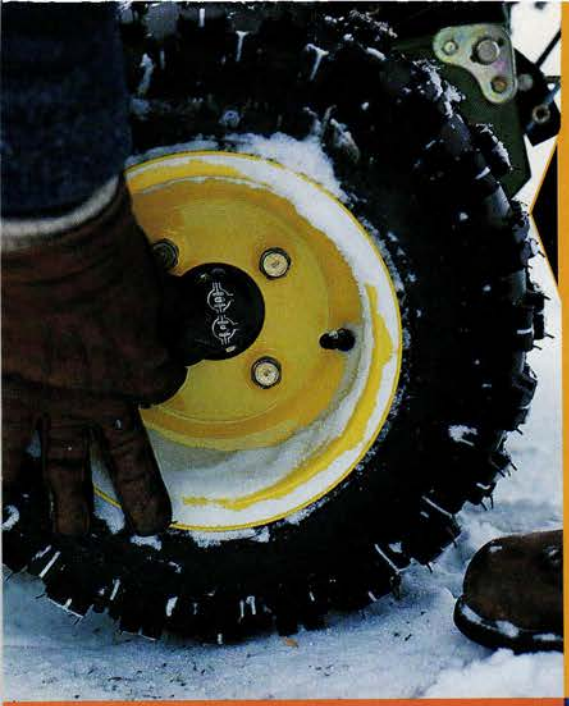
Heavily lugged, 16-inch tires are another standard, except on the Honda, which is the only model with tank like tracks. Both tires and tracks bit well into any surface short of glare ice; for additional traction, chains are available except on the Honda.

Honda again hears a different drummer when it comes to gearing. It has an infinitely variable hydrostatic drive. Operation was wonderfully smooth although top speed was relatively stately. The seven other snow throwers had four to six speeds forward and two reverse, engaged by selecting a gear and squeezing the drive lever against the left handlebar. Unless you are dealing with the lightest powder, the top gears are useful only for moving the machine, not for throwing snow. Even then, several models—notably the Toro and Husqvarna—seemed almost too speedy in top gear.

Engines, tires and gearing may not vary much, but drive systems do. Ideally, both wheels work together for plowing straight paths through heavy snow, but spin independently of each other in turns. The standard Toro and the Honda have only full-time, two-wheel or two-track drives, but the other machines have mechanisms to make turning easier. Simplicity, Husqvarna and Noma convert from two- to one-wheel drive when you remove a click pin in the hub and disengage one wheel from the axle. John Deere eliminates the pin, providing an easy-to-use knob. Troy-Bilt users don't even have to bend down: A differential lets the wheels spin at different rates (also an option on the Toro). The Craftsman comes with both a click pin and a differential—the designers can't seem to decide which system is best.

MODEL	LIST PRICE	ENGINE	AUGER	TRANSMISSION	FOOTPRINT	HEIGHT	STANDARD*	OPTIONAL*	WARRANTY
CRAFTSMAN	$1,250	10 HP	29"	6 SPEEDS FWD, 2 REV	30"x 63"	48"	L, ES	C, DC	2 YRS
HONDA	$1,945	8 HP	28"	HYDROSTATIC TRANS	28½"x 56"	40¼"		L, ES	2 YRS
HUSQVARNA	$1,700	10 HP	30"	4 SPEEDS FWD, 2 REV	30½"x 55"	45"	L, ES, DC	C	2 YRS
JOHN DEERE	$1,850	9 HP	27"	6 SPEEDS FWD, 2 REV	34"x 61"	41"	L, ES	C, DC	2 YRS
NOMA	$900	9 HP	27"	6 SPEEDS FWD, 2 REV	29"x 58½"	46½"	L, ES	C, DC	2 YRS
SIMPLICITY	$1,699	9 HP	28"	5 SPEEDS FWD, 2 REV	30"x 56⅞"	37⅜"	L, DC	C, ES	2 YRS
TORO	$1,760	10 HP	29"	4 SPEEDS FWD, 2 REV	30"x 54½"	42"		L, ES, DC, C	2 YRS
TROY-BILT	$1,699	10 HP	26"	5 SPEEDS FWD, 2 REV	26"x 63"	41"	DC	L, ES, C	3 YRS

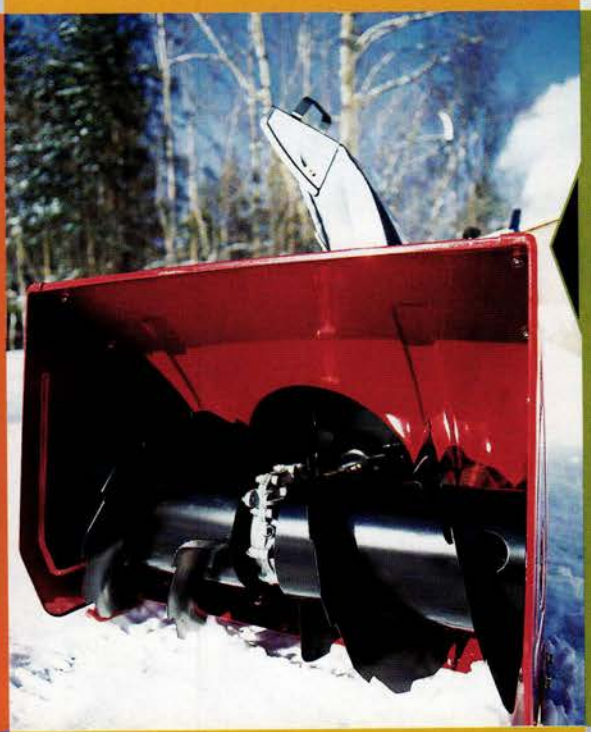
*STANDARD/OPTIONAL EQUIPMENT: L=LIGHT ES=ELECTRIC START, DC=DRIFT CUTTERS, C=CAB



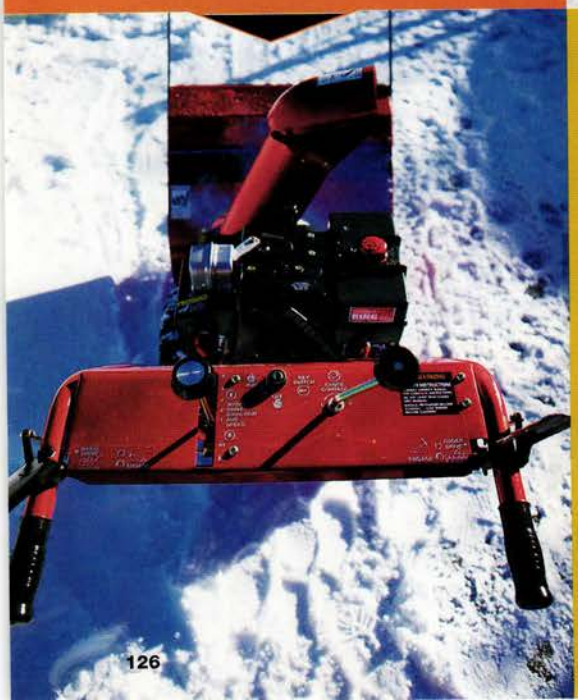
Five out of the eight snow throwers tested can shift from two-wheel drive (for maximum forward power) to one-wheel drive (for maximum maneuverability). On most machines, shifting involves removing a click pin from one of the hubs. John Deere's hub (shown) is pinless; it locks and unlocks with an easy-to-use knob.

The Honda's rubber tracks give this machine the look of a doughty little tank, although traction proved only minimally better than the aggressive-tread tires on the other snow throwers. The tracks are powered by a silky smooth hydrostatic drive.

On Troy-Bilt's control panel, the lever just left of center changes drive speeds (five forward and two reverse). The crank that wheels the discharge chute is at right center near the lever that engages the auger, the best place for this control. The drive lever is at the far left, as on all machines. The on-off key is at dead center. Standard on this model, drift slicers are the narrow bars that extend forward from the upper front end of the auger housing, at top of photo.



The 28-inch auger on this 10-hp Toro has a drum that surrounds the auger shaft. It's supposed to prevent the machine from biting off more than it can chew while preventing it from choking on things it can't. In practice, there isn't much difference between the Toro and the drumless makes; they all choked and stalled at one time or another. Note the Toro's toothy grin: Like the John Deere, it has notched auger blades for a better bite when the snow turns crusty.



We strongly recommend that a snow thrower be equipped with a headlight for two reasons. First, it's dark on winter mornings, when you're most likely to clear a driveway. Second, in whiteout conditions a light will warn oncoming traffic—particularly those big municipal plows—that you're out by the curb. A headlight is standard on this 9-hp Noma and on four other machines tested. The Noma also offers a push-button electric start if you're within the reach of an extension cord. For restarting at the end of the drive, you can give the old-fashioned pull cord a yank.

As far as I'm concerned, differential models' added convenience outweighed their slight loss in maneuverability.

The Toro has a "power shift" feature, which moves the wheels forward and back to redistribute weight. Shifting the wheels aft, for instance, throws weight forward so the Toro can bite into packed snow and heavy drifts without riding up on a snow pile. When "power shifting," I had to lift the Toro slightly by its handlebars to help the wheels travel rearward. And I kept them there. Centering the weight—e.g., thrusting the wheels forward—made sense only in light snow and when making lots of turns.

For operating ease, a simple factor like handlebar height mattered as much as any clever engineering. Surprisingly, the height on these machines (counting disengaged drive and auger levers) varied from 37⅜ inches on the Simplicity to 48 inches on the Craftsman—with no adjustment possible. One manufacturer said height is based on the average American. As a 5-foot, 11-inch American, I felt I was flirting with lower back trouble on the low handles, while the high handles had the feel of Peter Fonda's old Harley; I had to keep reminding myself not to pull back and lift the auger.

On all the models tested, the user engages the auger by depressing a lever on the right handlebar. To allow a free hand for operating other controls, the auger will continue turning when released by the right hand as long as the left continues to hold the drive lever down. On the particular Simplicity machine I tested, however, the auger lock came into play only after I depressed the auger lever twice—an odd quirk.

Another quirky area is the location of the crank for the discharge chute, which directs the plume of snow. Troy-Bilt, John Deere and Husqvarna place the crank in the best spot—centered or to the right, where the hand falls when it lets go of the auger lever. Craftsman, Simplicity and Toro have it over on the left but still up top, which isn't bad. On the Honda and Noma, it's beneath the handlebars.

All the models have discharge chutes topped by a deflector that controls the angle of the snow plume. A remote-control lever for this deflector is a plus—all had it except the Troy-Bilt and Toro. The Craftsman's deflector repeatedly jumped back to its highest position. The Simplicity's locked effectively yet suffered from a chute that tended to wander.

No machine vibrated enough to cause discomfort. The Husqvarna makes an extra effort by employing rubber engine mounts, but the Honda stood out as the most vibration-free.

At the business end, there isn't much difference from one snow thrower to the next. Some auger blades are notched; others are smooth. Both worked equally well in fresh snow; the notched blades give a slight advantage in the crusty stuff.

Aside from a few encounters with an indigestible stick or ice chunk, all of the machines just kept on eating snow. Any of them would make a stalwart companion right into April, when most Vermonters start wishing someone made a mud thrower. ■

Do You Want a Snow Thrower This Big?

Handling a big snow thrower may not entail the same amount of aerobic exercise as wielding a snow shovel, but that doesn't mean there isn't any muscle involved. These machines weigh upward of 200 lbs., most closer to 300 or even a bit more. Although they are all self-propelled, it still takes some effort to turn them, especially in the two-wheel-drive mode. Unless you are reasonably hale and hearty, consider buying a smaller model—or think about hiring a snow plow.

A few inches off the top: When the mailbox is 900 ft. away, you don't need a major blizzard to justify a snow thrower. The track-drive Honda, shown throwing a rooster tail of fresh Vermont powder, offers three ground-clearance settings that let you choose how close a shave you want.

As for price, all of our machines list for around $900 to $1,950 plus the cost of extras. Even if you can get an end-of-season deal, you'll still be paying at least $1,500 in most cases. Ask yourself: How often do I get a heavy snowfall (8 inches or more), and what does my local plow operator charge?

If you'll need a big snow thrower an average of six times a year and the plow guy gets $25 a shot, that's an amortization period of 10 years, not counting gas, maintenance, repairs and interest. On the plus side, a 10-hp snow thrower works just as well on lighter snowfalls, and it will never tell you that business is heavy and it can't get to your house until noon.

FOR SOURCES, SEE DIRECTORY – PAGE 153

THIS VERY OLD

HOUSE

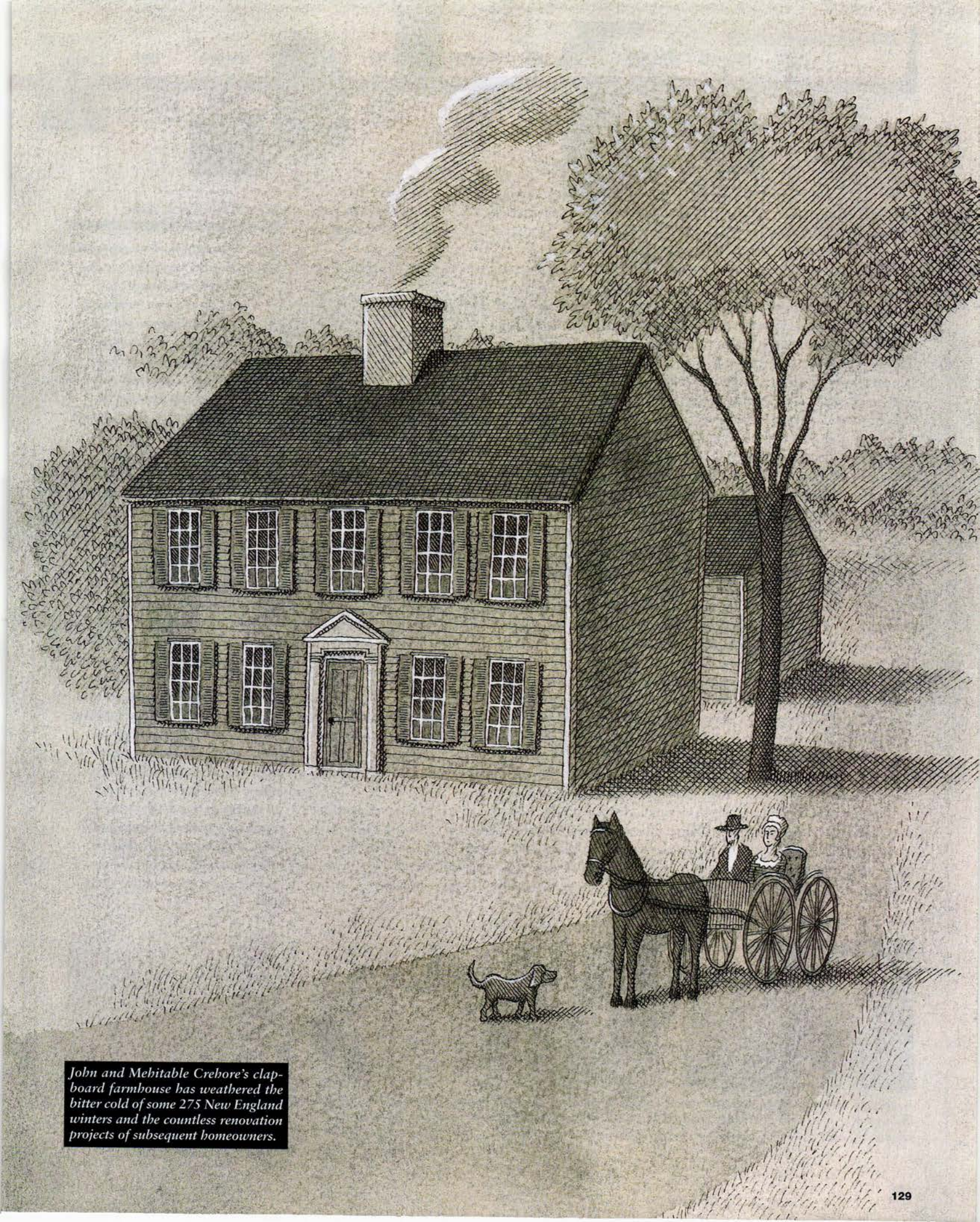
MILTON, MASS.

BUILT BEFORE THE AMERICAN REVOLUTION, OUR DREAM HOUSE IN MILTON HAS BEEN HOME TO PURITANS, PATRIOTS, ABOLITIONISTS AND EVEN A FEW GENTLEFOLK

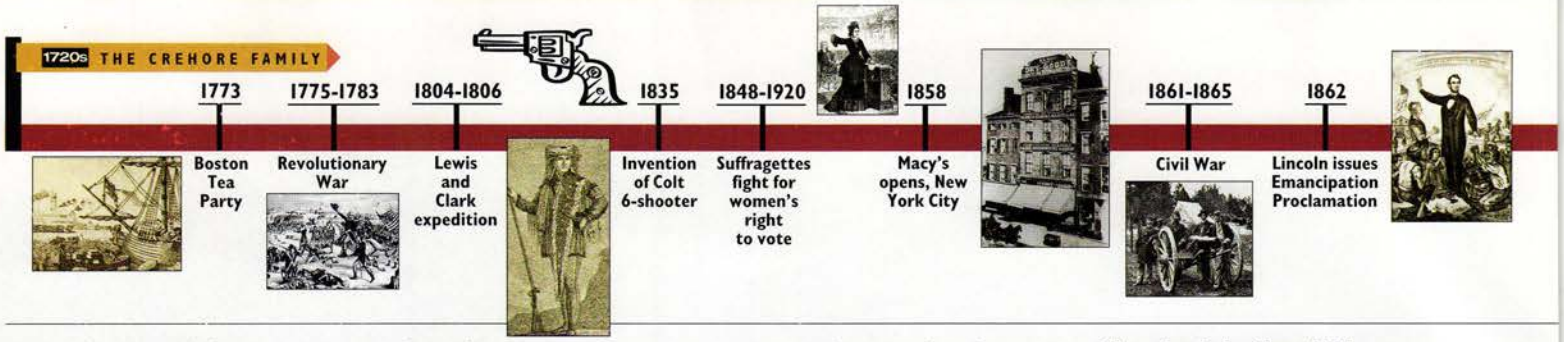
The tidewater region just south of Boston was a forbidding wilderness when 25 Puritan families founded the town of Milton in 1662. As they struggled to clear and farm the thickly wooded marshland along the Neponset River, most early settlers lived in simple saltbox cabins. But the house John Crehore built six decades later, on land inherited from his grandfather Teague, featured an elegant facade and a grand doorway that were the envy of other Miltonians.

Crehore erected a box-shaped clapboard house that rose two stories on a dressed-stone foundation. Following the Georgian style of architecture then popular among rich landowners in both England and the colonies, he laid out the house symmetrically, with trim

BY DANIEL S. LEVY ILLUSTRATION BY PIERRE LE TAN



John and Mehitable Crehore's clapboard farmhouse has weathered the bitter cold of some 275 New England winters and the countless renovation projects of subsequent homeowners.



details borrowed from ancient Greek and Roman architecture. Nine evenly spaced sash windows surrounded an entrance fit for a wealthy country gentleman: a paneled door framed by two wide pilasters and topped with a simple pediment.

Nearly two and three-quarter centuries later, Milton has grown from a farming community of a few hundred far-flung residents into a suburban enclave of nearly 26,000. All the Crehores left long ago, and the vast area of farmland they staked out has shrunk to a residential plot of 2.9 acres. But the Crehore house, which the crew from *This Old House* began renovating this summer, still stands proud. Over the years, only four families besides the Crehores have lived there. All of the owners made changes or additions to suit their practical needs as well as their tastes and aspirations. Yet the house has retained the aura of simple elegance and grandeur that made it so appealing in the first place.

After working all day in the fields, cultivating fruit and vegetables for sale in the Boston markets, John Crehore would join his wife, Mehitable, in a parlor adorned with raised-pine paneling, a rare touch of refinement for that era. When the sun went down, the Crehores would reach their bedroom by ascending a compact, winding staircase with attenuated columnar newels and austere balusters.

By the time the patriots defeated the redcoats in the Revolutionary War, signs of growing affluence had appeared everywhere in Milton. The eastern and central parts of town had attracted blacksmiths, shipbuilders and tavern keepers, and Miltonians had established granite quarries and tanneries along with New England's first paper mill and the first power-operated chocolate factory in the United States. The town also had become a favorite vacation spot for successful merchants and other wealthy city folk seeking to escape the summer heat and bustle of Boston. Meanwhile the Crehores prospered. John Crehore's son, John, had served as a private in the patriot army, inherited the house and in turn passed it on to his son, also named John. In 1812, the youngest John produced 2,181 pounds of cheese and 200 barrels of apples for market. He was the first in Milton to raise strawberries for sale, and he also originated a variety of Catawba grape named for his wife, Diana.

Caught in the fledgling nation's spirit of independence, young John, as was the fashion, decided to remodel the Crehore house, making it more distinctly American. The new Federal style of architecture, like the Georgian style, was based on the architecture of ancient Rome and Renaissance Italy. But its features were more refined and—many Americans believed—enlightened because they were distinct from earlier forms inherited from the monarchist British. In the dining room, Crehore

John and Alice Brown's maid used homegrown fruit and vegetables in the meals she cooked for the family. On special occasions, she would wring the neck of a barnyard chicken and serve it for dinner.

Sherlock in the Attic

When Norm Abram first ventured up to the attic, the quality of the timber frame impressed him. But he was surprised by the way sawed purlins and hand-hewn timbers were juxtaposed. Nearly three centuries ago, John Crehore had beveled the purlins on one end to create tenons—projecting members inserted into corresponding mortises in the rafters. The other end of the purlins sported butt cogs, sections of wood dropped into notched grooves in the rafters. Norm had never seen the two joint technologies used in tandem. Although Norm and other experts remain baffled about why the frame was built that way, the attic discovery helped solve another mystery: the date the house was built. Original building records—if they ever existed—were misplaced long ago. But historical evidence that builders began using butt cogs instead of tenons in the early 1700s—combined with clues gleaned from Crehore genealogies and town histories—suggests the house was erected in the 1720s.

HOW THE HOUSE CHANGED

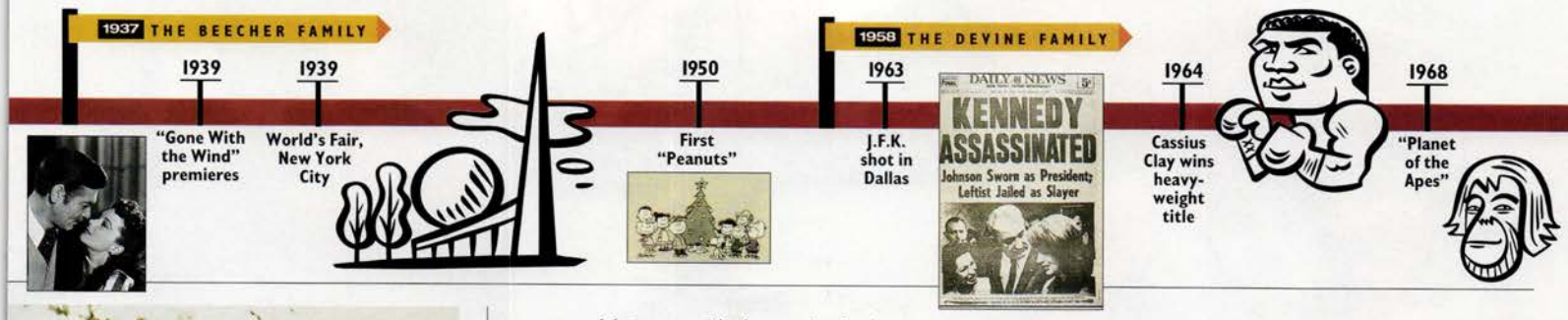
By the late 1800s, the house facade as viewed from the roadway, left, had changed little since the Crehore era. But a muddle of additions had sprouted from the back of the house, center. Around the turn of the century, John Brown launched another renovation. He replaced a porch hidden behind overgrown shrubbery with a greenhouse, right, where he nurtured seeds for his garden and sheltered delicate perennials during the winter months.

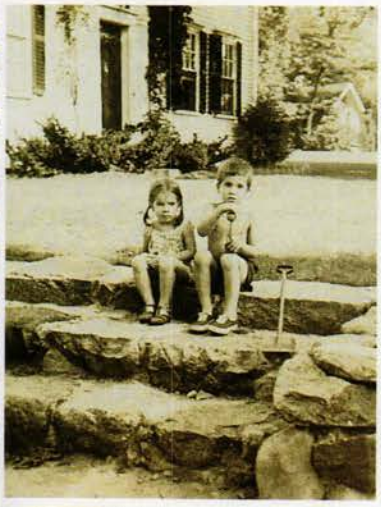
TIME-LINE ILLUSTRATIONS BY TIM CARROLL; REVOLUTIONARY WAR: ARCHIVE PHOTOS/LAMBERT; LEWIS & CLARK, LINCOLN, BOSTON TEA PARTY: ARCHIVE PHOTOS; CIVIL WAR, SUFFRAGETTES, MACY'S: CORBIS-BETTMANN

John Brown, left, who eventually became a county Superior Court justice, tended vines in an all-glass grape house near the barn during his spare time. Brown was so revered in the community that Milton officials flew the flag at half-mast when he died in 1924, at age 76. John's wife, Alice, top left, dons her Sunday bonnet for an early 1900s portrait in front of the barn with young John Jr. and Toots the family cat. The Browns' daughter, Alice, moved next door after she got married in 1922, and her child, Mary, frequently traveled by toy car, top right, to her grandparents' house.

The turnaround driveway, left, was already gone by the '30s, when Henry and Margaret Beecher bought the property. In the '50s, Dutch elm disease claimed a 250-year-old tree, right, that shaded the back of the house. "It was as if a member of the family had died," says Holly Beecher Field.

WW I, MODEL T, CHARLIE CHAPLIN: CORBIS-BETTMANN; HUCK FINN, KING KONG: ARCHIVE PHOTO; STOCK CRASH: UNDERWOOD & UNDERWOOD/CORBIS-BETTMANN





A 1936 Ford coupe with a rumble seat, left, graces the driveway leading to the barn. Holly and Jonathan Beecher, above, strike a pensive pose in front of the house on a set of stone steps that their father, Henry, built during the early 1940s.

removed his grandfather's thick, heavy paneling and installed a small mantel composed of elegant fluted pilasters and delicate dentils. He replastered the walls, strung a chair rail and an elaborate baseboard around the room and topped the space with a dentiled cornice. He decided the cramped cooking area at the back of the house—an antiquated hearth with a fireplace and Dutch oven—would no longer do. For Diana he wanted something more modern, so he added a sizable new service wing in which he and subsequent owners installed a heating stove, a cooking stove, a soapstone sink and a walk-in wooden pantry.

The house went through a transformation of a different sort after John and Diana's son, John Ames Crehore, sold it and a small parcel of the surrounding farmland to Jonathan Mann in 1844. Mann is believed to have made the house an Underground Railroad station for runaway slaves en route to Canada, and there's a perfect hiding place behind the closet door to the left of the parlor fireplace. When pushed, the back wall of the storage area opens, leading to a small crawl space formed by the three fireplace flues on the first floor. According to local legend, this corbeled chamber kept escaped slaves safe from the bounty hunters seeking to capture and return them to their Southern owners.

A new branch of the Old Colony Railroad had been built before the Civil War to link Milton to Boston. Taking advantage of this rail line during peacetime, Boston merchants and lawyers bought parcels of farmland in Milton and erected grand estates. In 1875, John Freeman Brown, who would later become an associate justice on the county Superior Court, and his wife, Alice, moved from Boston to Milton and bought the Crehore house from Mann. Brown, the urban jurist, envisioned himself a gentleman farmer. In his spare time, he helped his hired man tend to a small barnyard menagerie of horses, cows and chickens. Emulating his wealthy neighbors, he donned his city suit as he supervised landscaping and worked in his grape house, a greenhouse where he tended his rows of vines. He also constructed a smaller greenhouse alongside the first Crehore kitchen to keep and grow plants for his gardens. The Brown children, Alice and John Jr., liked to ride around the property in a small carriage pulled by a goat.

Judge Brown died in September 1924 and, during the years of the Great Depression, his family did little to maintain the house. Henry and Margaret Beecher bought it as a fixer-upper in 1937 and set about restoring it two years later. For Henry Beecher, an anesthetist raised in Kansas, the historical legacy of the house gave it romantic allure. "He had grown up very modestly but had big dreams," says his daughter Mary Beecher Price. "When Daddy saw that

While their dad, Henry Beecher, served as a military doctor in Europe and North Africa during World War II, Holly and and her younger sister, Mary, were inseparable, left. Before his departure, Beecher had reduced the size of the greenhouse, which blocked one of the windows in the formal front room. But in the early '50s, he built a new greenhouse with arched windows, right, to raise camellia trees.

GONE WITH THE WIND: SPRINGER/CORBIS-BETTMANN; PEANUTS: ARCHIVE PHOTOS/CBS; KENNEDY: ARCHIVE PHOTO

Virginia Devine felt pangs of regret after she sold the house and moved out this spring. "I couldn't bear to think of another house," she says. "Nothing else looked like home." Memorable moments from the Devine idyll at the Milton house include, COUNTER-CLOCKWISE FROM TOP RIGHT: *Donald and Virginia prepare for the arrival of Santa in 1969 with their youngest son, Jeffrey; Peter frolics in the backyard on a late winter day in about 1960, when the weather had turned but the trees had yet to bud; Peter, Patricia and Virginia, pregnant with her second son, Christopher, enjoy the summer warmth in 1961; Peter dons an elf hat for a 1989 Christmas celebration with Jeffrey, Virginia, Donald and Patricia; in 1996, various members of the extended Devine family gather to celebrate the marriage of Jeffrey, in bow tie, to Sharon Moran in front of a huge spruce at the bottom of the meadow; in the early '60s, Peter and Patricia share a carefree moment by a bay window that Henry Beecher installed for his personal study.*

1968 Peggy Fleming wins Olympic gold

1969 Man lands on the moon

1974 Nixon resigns over Watergate

1987 R.I.P. Andy Warhol

1992 Clinton elected President with 44 million votes

THIS OLD HOUSE 1997

1993 "Jurassic Park" sparks dino-mania

MOON LANDING: UPI/CORBIS-BETTMANN; ANDY WARHOL: DAVID OSBORN/REUTERS/CORBIS-BETTMANN; PEGGY FLEMING: JURASSIC PARK: ARCHIVE PHOTOS; KELLER & KELLER: ALL HISTORIC FAMILY AND MILTON HOUSE PHOTOS COURTESY OF JINNY DIVINE AND HOLLY B. FIELD

Preventing Future Schlock

The original Crehore house was a boxlike structure, but it didn't stay that way. One owner added a side wing without first laying down a foundation. Another grafted on a shed, and plumbers cut floor joists in order to insert pipes. Two and three-quarter centuries of alterations turned the house into a rambling hodgepodge.

Most houses go through many changes over the years, but the process need not be so haphazard. Planning is the key. Prioritize small-scale repairs or alterations; then deal with them in order of importance. Roof work should precede a new plaster job. And before adding onto a house, consult a professional. "Sit down with an architect and create a master plan for the house," advises Richard Bechtel of Bechtel Frank Erickson Architects, the firm overseeing the Milton restoration for *This Old House*. Base that plan on a careful study of the building's layout, as well as how access to plumbing, heating and ventilation ductwork might affect a renovation. Ultimately, the more thought that goes into alterations, the better the chance the house will look as though it had been designed that way from the start.

house, he just fell in love with it. It had a kind of style and cachet that he wanted."

"It was in terrible, terrible repair," says Mary's sister, Holly Beecher Field. "I remember taking rags and warm water to get old wallpaper off and scraping, weekend after weekend, to get down to the lovely paneling or the dado." Inspired by the architect Royal Barry Wills, whose 1940s books and published plans helped popularize the Colonial Revival movement in America, Henry Beecher made countless sketches and then eagerly searched through salvage yards for period beams, board doors and other materials to renovate the house.

Donald and Virgina Devine called the ell attached to the barn their "garden house." Although in tumbledown shape, the ell was equipped with a fireplace that made it a cozy retreat even on cold winter days.

Beecher's aim was to modernize the house while restoring what he imagined to be an ideal Colonial appearance. He set up a new kitchen at the back of the dining-room side of the house, rebuilt and enlarged the greenhouse and turned the 19th-century kitchen into a study with a large Colonial-style brick fireplace and a bay window that mimicked those at Mount Vernon. He even added reproduction strap hinges to give the doors a ye olde look.

By the time Donald and Virginia Devine bought the house in 1958, John Crehore's boxy, vertical Georgian was a rambling horizontal maze—three staircases and design styles spanning more than two centuries. Needing still more space, Donald Devine converted the woodshed at the back of the study into a waiting room for his psychiatric patients and replaced the Brown greenhouse with a new one.

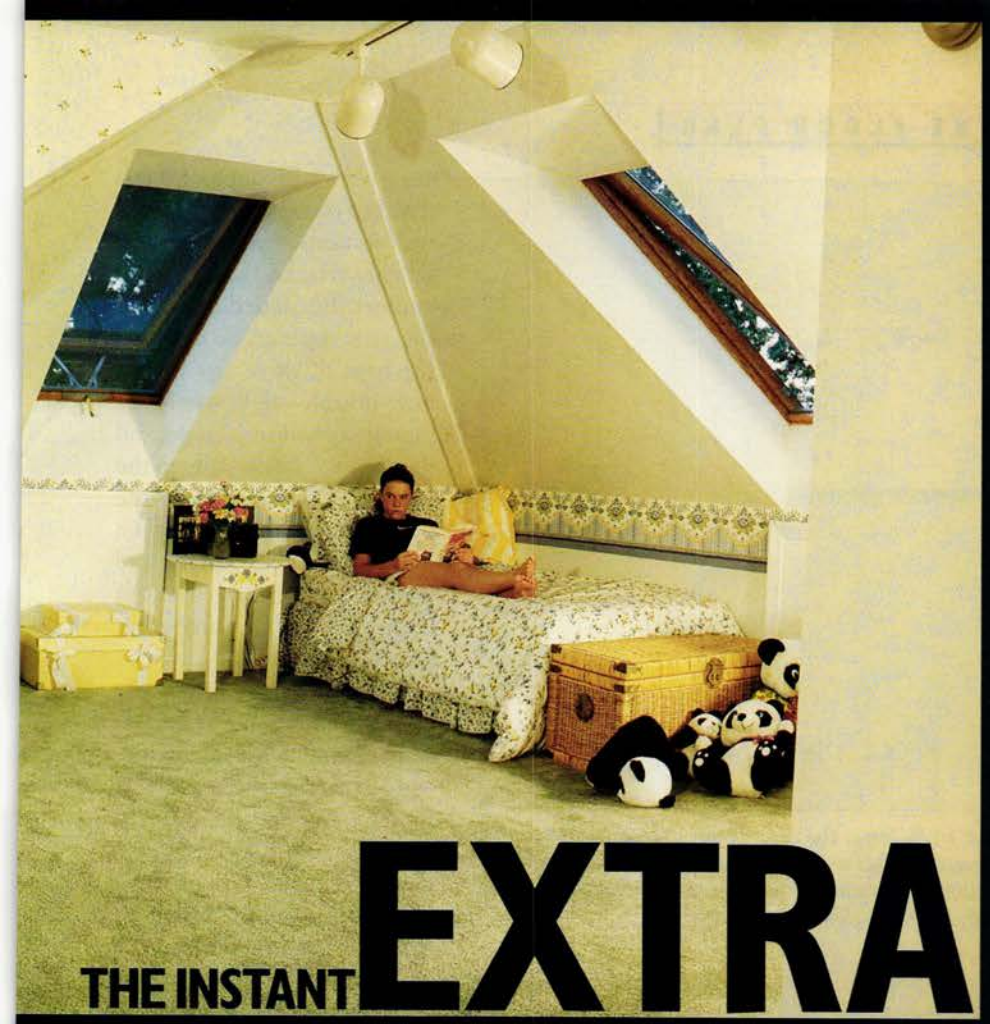
For the Devines' four children, the sloping garden—with its field of alfalfa—was a retreat and playground where they found Neponset Indian arrowheads and other treasures. "That was my fantasy adventure land," recalls Christopher Devine, who says he played Tarzan or hiked across the street to a marsh to observe turtles and snakes. In the barn and attached ell, he and his brothers and sister staged shows with homemade musical instruments.

Donald and Virginia Devine often regaled their children with stories of the people who had lived in their house since the Crehore era. One favorite bit of lore was that a previous resident had hidden valuable booty in the chimney crawl space. Sure enough, when Christopher was 10, he discovered a 1954 Benjamin Franklin silver half dollar perched high up on one of the stepped bricks inside the flue chamber. Since WGBH and *This Old House* bought the Crehore house in April, Christopher Devine has stopped by occasionally to monitor the progress of the renovation. When the work is completed, Christopher says, he plans to walk quietly through the front door and return the silver coin to its secret spot. "I think that is a neat thing to leave for other kids to find," he says. It will be just one of many historical treasures awaiting the next occupants of the Crehore house. ■

The Devines built a basic Plexiglas structure, left, to replace Henry Beecher's arch-windowed greenhouse, whose framework carpenter ants had destroyed. The Devines also installed solar energy panels on the roof, center, which helped power their furnace and boiler. The This Old House *crew removed both the greenhouse and the solar panels, right, to create a less cluttered appearance, more in keeping with the antiquity of the house.*

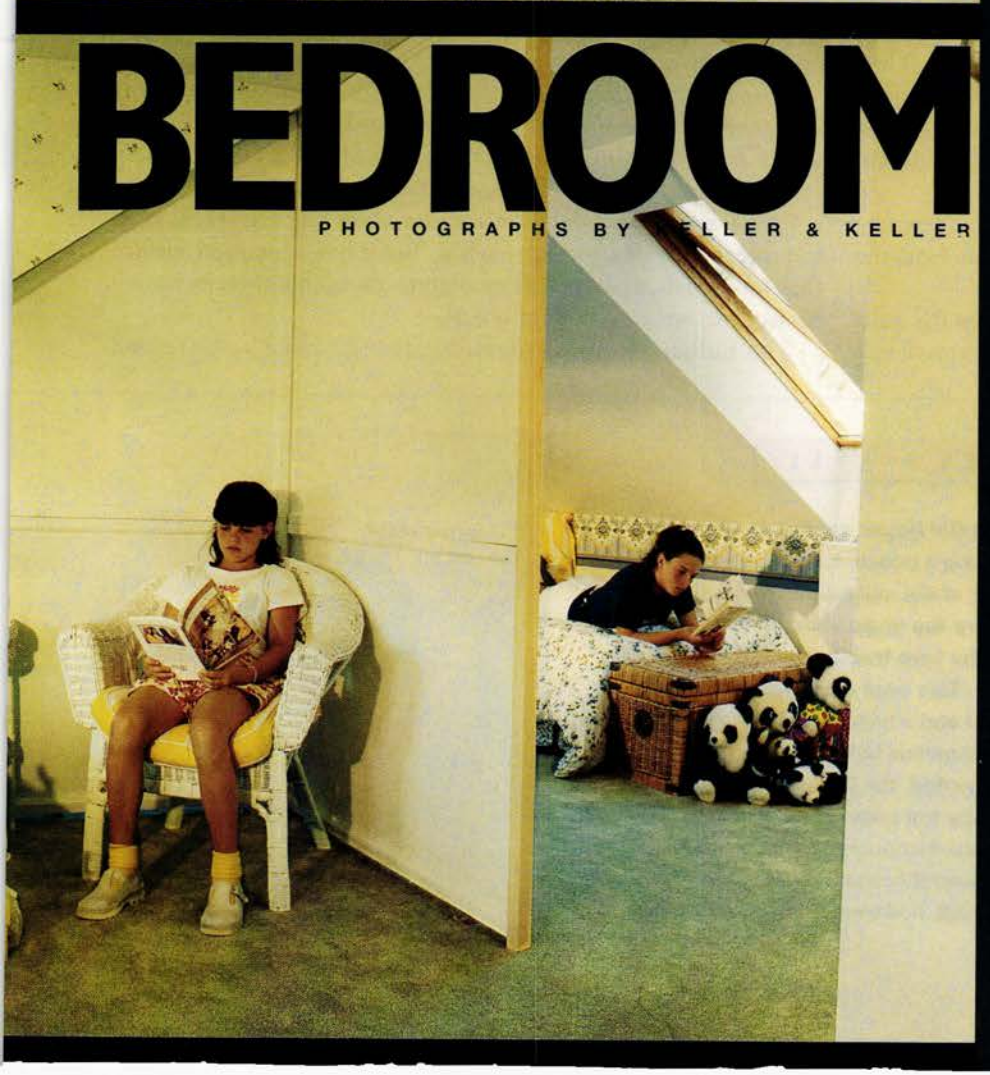
FOR SOURCES, SEE DIRECTORY – PAGE 153

The new wall affords Michaela Hardy, left, and Cara Hardy privacy without total isolation.



THE INSTANT EXTRA BEDROOM

PHOTOGRAPHS BY [illegible]LLER & KELLER



This simple wall separates warring siblings yet requires no building permit, goes up in a day, keeps construction debris outside and can be taken down in minutes

FOR ALMOST A DECADE, Cara and Michaela Hardy shared the attic of their family's 1925 Colonial near Boston. At one end of the room sat their beds, tucked under the sloping ceiling. At the other stood their desks and a table with two American Girl armoires, which held the sisters' collections of doll accessories. "They really did get along," recalls their mother, Ann Hardy.

But by this past summer, with Cara 13 and Michaela 10, a different dynamic had set in. The girls were often as annoying to each other as a mosquito. Ann could count on constant arguments over whether the night-light should be on or off. And each complained constantly that the other had messed up the room. "It really just started last year, that pre-teen year," Ann says. "And Michaela began asserting her independence too."

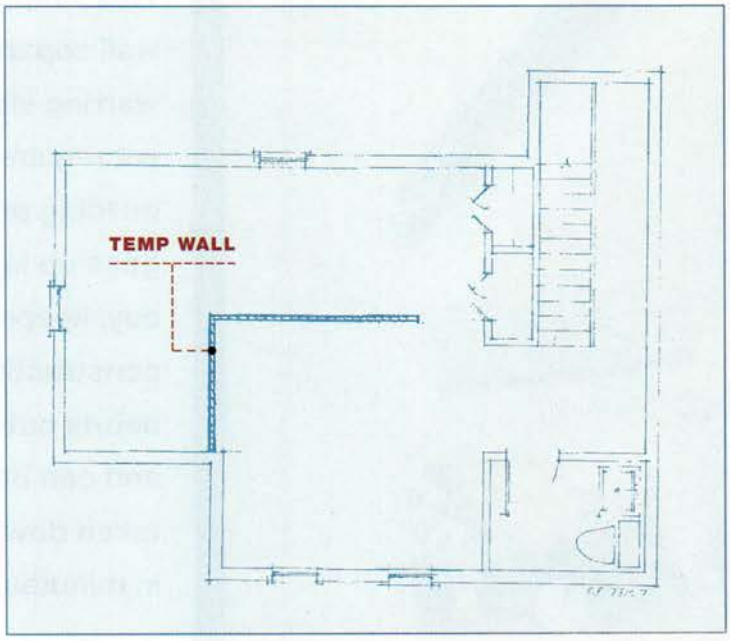
Ann knew the real solution was to give each girl a room of her own, but remodeling did not make sense because a bedroom would open up when the eldest daughter, Meaghan, headed off to college

BY JEANNE HUBER

THE FLOOR PLAN

in a year. Then Ann discovered a painless way to carve out another bedroom by putting up temporary walls that look perfectly solid—but could be removed without a trace when the family's needs changed.

An instant partition seemed ideal, although when *This Old House* contractor Tom Silva met with the family to discuss the project, Ann still had a few questions. "Will this wall be at all attractive?" she asked, "or will the rooms look like two little office cubicles?" She suggested painting the new walls a subtle shade of white to blend with the rest of the bedroom. Excitedly, Michaela even volunteered to take the small "room" if there was one—just to have her own space away from Cara. Tom assured her neither side would be better than the other, just different.



Nearly 16 ft. wide and 16 ft. long, the attic room shared by Cara and Michaela Hardy was spacious. But with both beds at the end of the room shown at left above, neither girl could get away from the other. Now, Cara has the former bed area, with two skylights, to herself.

Tom listened to the family's comments and came up with a plan that satisfied Ann's concerns as well as the criteria he had in mind. The walls would be inexpensive but good-looking. They would need to be so simple that anyone with basic carpentry skills could put them up in a day, using just a few tools and causing minimal mess. And when the walls were eventually taken down, the room would appear untouched.

Tom's solution, which cost only $206 in addition to a few fasteners that he had on hand, departs in almost every detail from the usual way interior walls are built.

Most striking, instead of using screws or nails to fasten the walls to the floor and ceiling, Tom used pressure from furniture levelers—bolts with flat plates fastened to one end—to hold the wall sections in place. Because this hardware wouldn't work against the angled ceiling of the attic dormer, he fastened the tops of the walls with a new double-stick tape used mainly for affixing hooks and posters to walls. When the Hardys want to remove the walls, they can simply pull a tab on the tape to stretch and loosen the adhesive without damaging paint or any other wall covering.

Interior walls are usually a skeleton of 2x4s covered on both sides with spackled, sanded and painted plasterboard. Tom's streamlined walls are just one layer thick, designed to look handsome from both sides. First, he screwed together frames of clear pine. Around the inside, he nailed on a band of quarter-round molding, creating a ledge for a panel of wallboard that he held in place with a second round of molding. He painted both sides—no spackling or sanding needed—and the walls were done.

Tom's intriguing choice for wallboard: Homasote, which is composed of ground-up newspapers molded with paraffin and which has not changed since it was introduced to this country from England in 1909. Homasote costs so little (about $20 for a 4-by-8-foot sheet) that contractors often buy big stacks of it to protect floors during remodeling. But it has a textured surface that looks rich, and it's soft enough to press thumbtacks into—perfect for use as a bulletin board.

The bulletin board, in fact, became an issue as Cara and

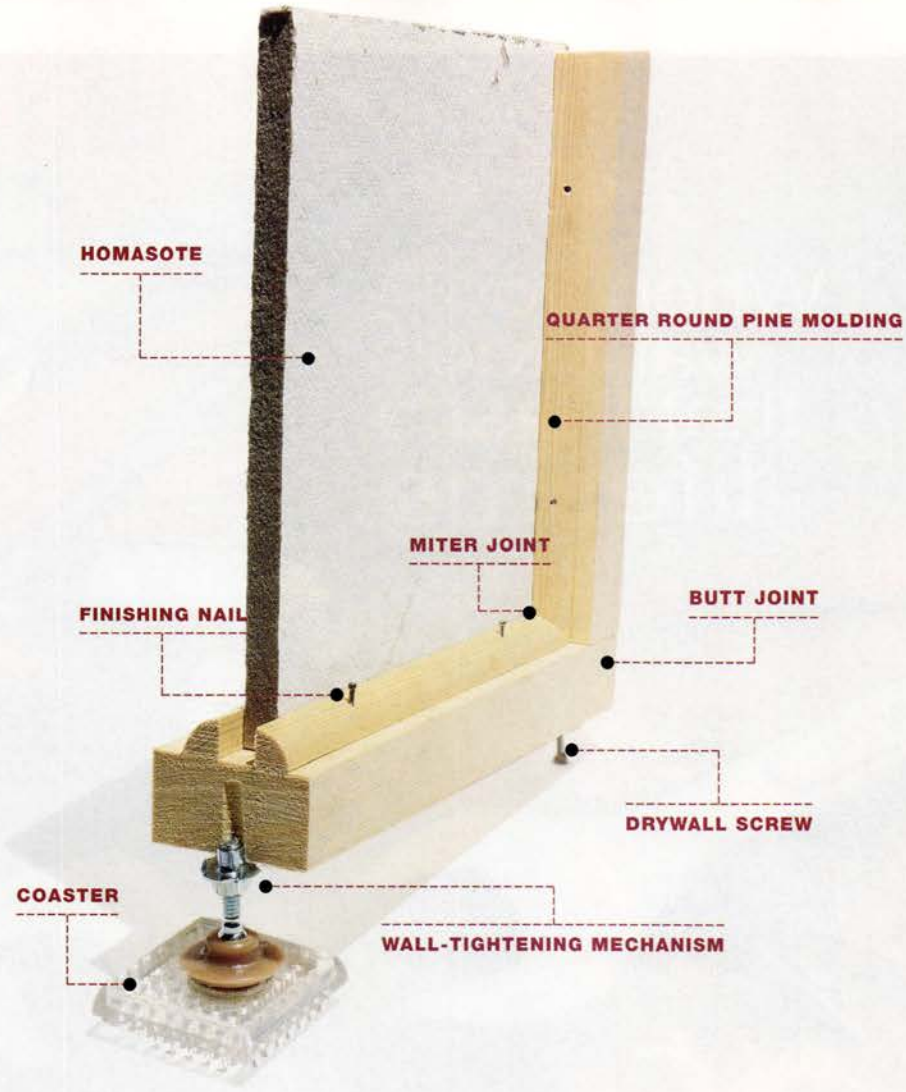
A MASTER SIMPLIFIES A WALL

Building walls like these doesn't take many tools. 1. *This Old House* contractor Tom Silva figures the top angle in this attic bedroom using a level and a pencil. Holding scrap wood perfectly plumb, he runs the pencil lead down the corner of the ceiling. He later sets his miter saw to match that mark, never bothering to measure the angle in degrees. 2. With help from his son, TJ, Tom screws together sections of the bare frame to test their fit. Tom then removes the screws and finishes the panels. 3. Tom uses a brad gun to secure the molding that holds the wallboard, although a hammer and a nailset would work too. The Silvas work in the driveway, then maneuver the small panels to the upstairs, where they put the wall together. 4. With the panels complete and painted, the Silvas screw them back together after first applying a special two-sided tape to the top edge. They erect one leg of the L-shaped wall, then the other, and unscrew nuts on the furniture levelers at the bottom to stabilize the walls. This step takes some fiddling because this wall section, closest to the outside, keeps slipping loose. Once the other wall is set, however, this one behaves.

FLOOR PLAN: FRED FREE; CROSS SECTION: DARRIN HADDAD

WHAT'S IN A WALL

- The clear pine frame, 1⅛-inch thick and 2⅛-inch wide, was ripped from stock sold as "five-quarter by 6-inch."
- The butt joint is fastened with 3-inch drywall screws. Where screws show, Tom used 2½-inch trim screws, which have narrower heads.
- From the bottom up, the wall-tightening mechanism consists of a self-stick felt pad to prevent slippage, a furniture leveler, two ¼-inch nuts, one of which has wings to grip the wood.
- Tom used furniture levelers with 1⅝-inch legs but wished he'd gotten longer ones to allow for more adjustment.
- Tom drilled a ⅝-inch diameter hole to accommodate the outer width of the wing nut and screw portion of the leveler.
- As a further safeguard against leveler slippage, Tom drilled a shallow depression into the coaster, which also protects the carpet.



Michaela bickered over who would get which side of the room. Cara wanted the back because it would be more private and she could decorate as she pleased, free of Mom's prohibition against posting anything on the walls visible from the doorway. Michaela had said earlier that she wanted the side with two windows that overlook the backyard. But when she heard what Cara wanted, she decided privacy mattered to her as well.

With a little coaching in reverse psychology, Cara started talking about how much she liked windows. Suddenly, Michaela switched back to favoring the side with the windows.

Ann says she couldn't be more pleased: "The room still has that openness. And because nothing is screwed in, if you want to take the wall down, you can get rid of it without any big mess. And most important, the girls like it." ■

FOR SOURCES, SEE DIRECTORY – PAGE 153

trust the folks in the red vest.

Steve
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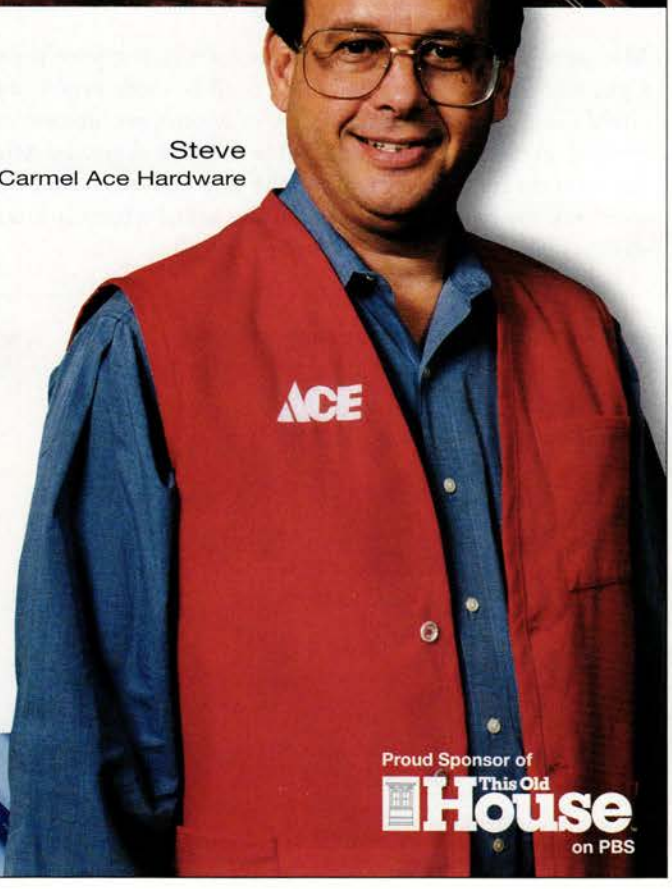

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ASK **NORM**

DANIEL ROLLA, NEW YORK, NY Dear Norm: My home has a brick fireplace that the previous owners inexplicably coated with several layers of latex paint. I've tried wire brushes and muriatic acid, but paint remains embedded in the pores of the brick. I may try sandblasting next. Any ideas?

NORM ABRAM *This question comes up so often that hundreds of basement geniuses must be working on it, and they still haven't found a solution. I don't know anyone who has gotten every little speck of paint off brick. Sandblasting is messy and risky. Some brick is pretty soft inside, and blasting ruins it. Maybe the room will look good by candlelight.*

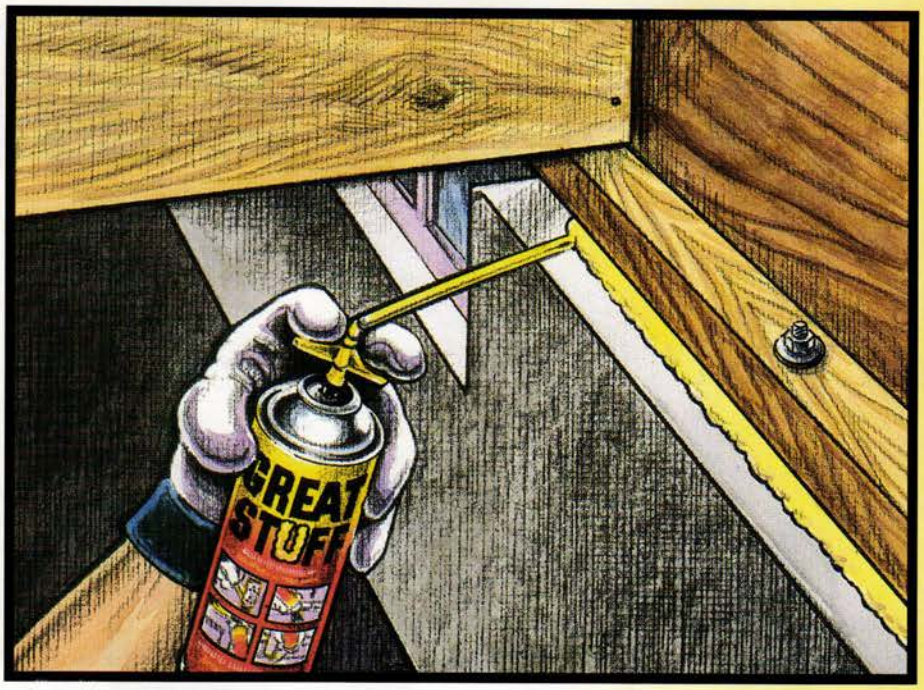
LEONARD DICK, SANTA MONICA, CA Dear Norm: Our telephone wire extends from a pole off our property, passing over our entire backyard and wood deck. Birds perch on the wire and leave enormous amounts of droppings, particularly on the deck. Since it would be prohibitively expensive to have the phone company bury the wire, are there any simple ways to drive off the birds?

NORM ABRAM *It shouldn't be prohibitively expensive if you bury the wire yourself. I'd call the phone company and say, "Look, if I bury a PVC conduit and put a pull-line in it, will you pull me in a new line?" If they agree, get the specs from them about what kind of conduit you need and how high up it has to run on the pole end. If the phone company wants to charge a lot just for the connection, you might get a better price from an independent installer. If that's still too expensive, you might try hanging a bell or some other noisemaker on the wire. But birds quickly get used to such devices and you probably won't scare them away for long.*

JOHN MARRS, LAKE SUTHERLAND, WA Dear Norm: In winter, the roof of our vacation cottage on the Olympic Peninsula gets so little sun and so much rain that the moss grows thick on our composition shingles. We're tired of scraping it off every summer and would like to switch to a metal roof. Can we simply clean the roof and install metal over it, or must we strip off the shingles first?

NORM ABRAM *I think the metal roof is an excellent idea, although it doesn't mean that you'll be moss-free. And I'd take the shingles off first. Whenever I change to a new material, I like to start on a clean surface. That way I also get to see what's underneath. I don't like to take the chance of covering up an ongoing problem.*

DAVID KATZENSTEIN



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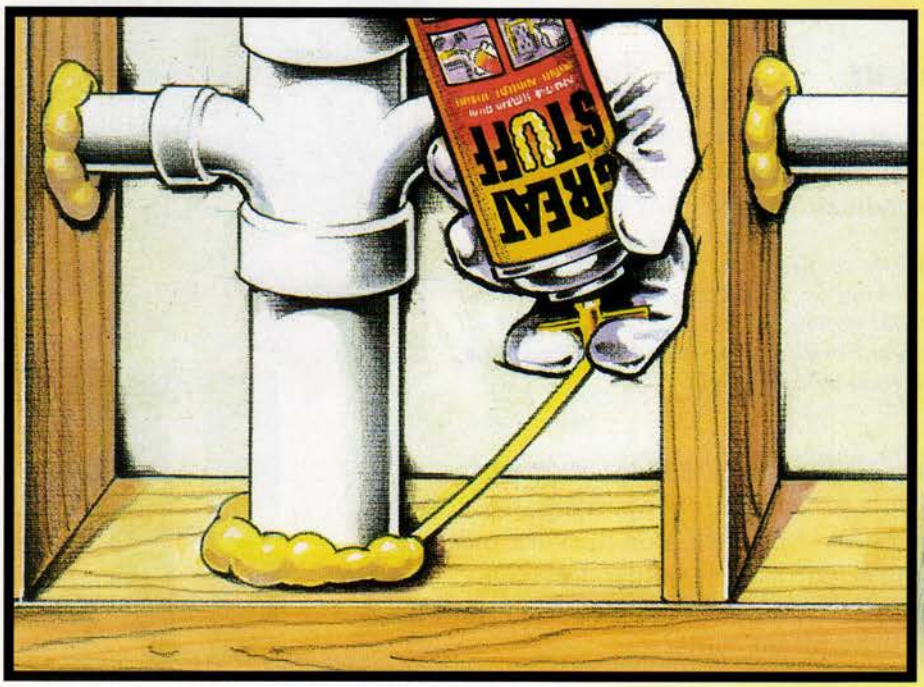

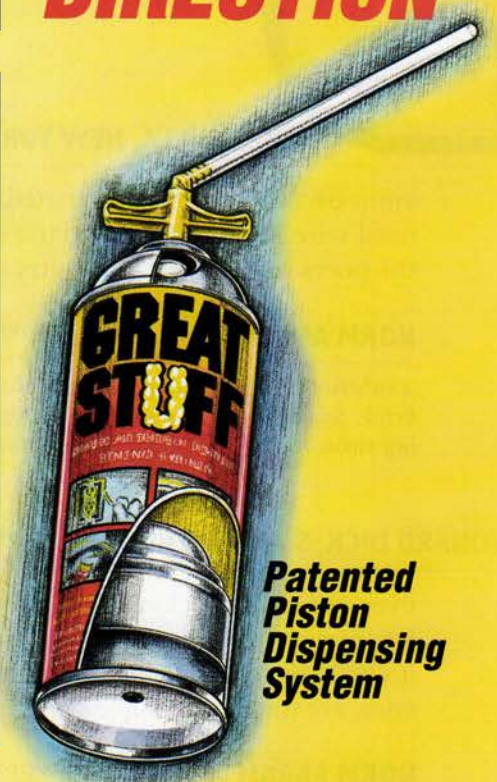

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ASK **NORM**

GARDNER KENNESON, ACTON, MA Dear Norm: I would like to know whether you've ever published plans for the New Yankee Workshop. I'm planning to retire soon and would like to build a similar shop at a home I hope to get in Maine.

NORM ABRAM *No, I never got around to doing that. But a few years ago I built a dollhouse; it's a 1/16 scale version of the actual workshop. The window sizes and placements are pretty accurate, so if you want to try scaling up, call 800-892-0110 and order measured drawing NY602P.*

ALLEN HELD, WHEAT RIDGE, CO Dear Norm: Last winter I got the bad news that my forced-air furnace was rusting and would last only one more season. I'm thinking of replacing the whole system with hot-water heat. Is that a good idea?

NORM ABRAM *Here in the Northeast we've always been big advocates of hot-water heat over hot air, but if your ducts are in good condition, a new furnace is the most cost-effective fix. Putting in a new hot-water system—radiators or baseboard units, hot pipes going up and cold-water returns coming down—would be an expensive retrofit.*

A.D. KITE, PINE MOUNTAIN, GA Dear Norm: We have an old lake house that needs an additional bathroom. The problem is that the logical site is about 6 feet below grade. I know a pump would be involved, but the mechanics escape me.

NORM ABRAM *The problem is making water go uphill. You can put in a separate pump or one of the units that have the pump and toilet built into one fiberglass unit. There are also small incinerator toilets for residential installations. Check with a good plumbing-supply house. But first check your sewer connection; you may find that it is below the lowest point in your house. If that happens to be the case, you'll have gravity flow even from your basement.*

PAUL ST. GERMAIN, ROCKPORT, MA Dear Norm: How do you cut the inside and outside miters of molding that is at an angle to the ceiling and the wall?

NORM ABRAM *You're talking about coping and mitering crown molding, which is an art. You get good at it the same way you get to Carnegie Hall: practice. Get your equipment, some molding scraps and the article "Crowning Touch" in the September/October 1996 issue of* This Old House *magazine, and keep working until you get it right.*

ED ST. JOHN, MIDLAND PARK, NJ Dear Norm: For the past three months I've been finding little piles of sawdust in my attic. My brother and I think the cause is a mouse, squirrel or chipmunk gnawing at the rafters. We've tried to trap and even poison the little invaders, but with no luck. Is there some way we can treat the wood to make it unpalatable to rodents?

NORM ABRAM *Treating the wood with some kind of poison? I don't think that's an option; maybe you need to get yourself a pellet gun. The source of the problem is access; if they can get in, they will get in. Look outside and see whether you have tree branches hanging close to your roof. And look for holes around the foundation. Mice can get through very small holes, which means you have to look very carefully. Of course, once you deny access, what about the animals still inside the house? If it were me, I'd call in a professional. Who needs the aggravation of trying to do it yourself?*

Beginning with this issue, master carpenter Norm Abram answers readers' questions. Write to Ask Norm, *This Old House* magazine, 1185 Avenue of the Americas, New York, NY 10036. Letters must include complete address and daytime phone number. Letters may be edited for clarity and brevity.

BY WILLIAM G. SCHELLER

Hovering just a few feet off the ground, a 40-foot-tall Japanese maple inches toward its new home. A tether tied to an upper branch keeps the top from swinging.

MOVING A TREE

A really big tree

Soaring four stories high, the majestic Japanese red maple in Cambridge, Massachusetts, was a beauty, especially when cloaked in its deeper burgundy of autumn. But real-estate developer Steven Cohen saw a different glow in its patch of dirt off Linnaean Street, just north of Harvard Square: If the tree were gone, he could build condos.

In another community, a landowner with that opportunity might simply cut down the tree. Not in Cambridge. This city—where Longfellow's "spreading chestnut tree" sheltered the village smithy and where George Washington took command of the Continental army under a stately elm—takes trees seriously. Cohen knew neighbors would scream if he felled the maple. Besides, "I love trees," he says. So he proposed the audacious: Pick

PHOTOGRAPHS BY KELLER AND KELLER

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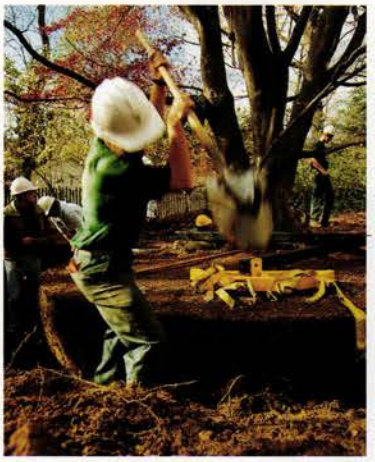
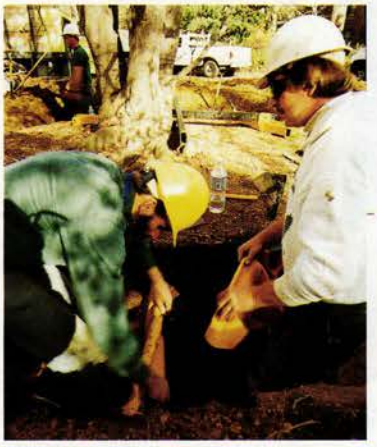


Spade flying, a crew member trenches around the tree. Says supervisor Jim Ingram: "On a tree this size, it's important to dig it in a day and transplant it in a day or two so the roots don't dry out."



Hitting a big root extending into the trench, the crew swaddles it in felt impregnated with indolebutyric acid, called IBA. It's the same rooting hormone that gardeners use to propagate new shrubs from cuttings.

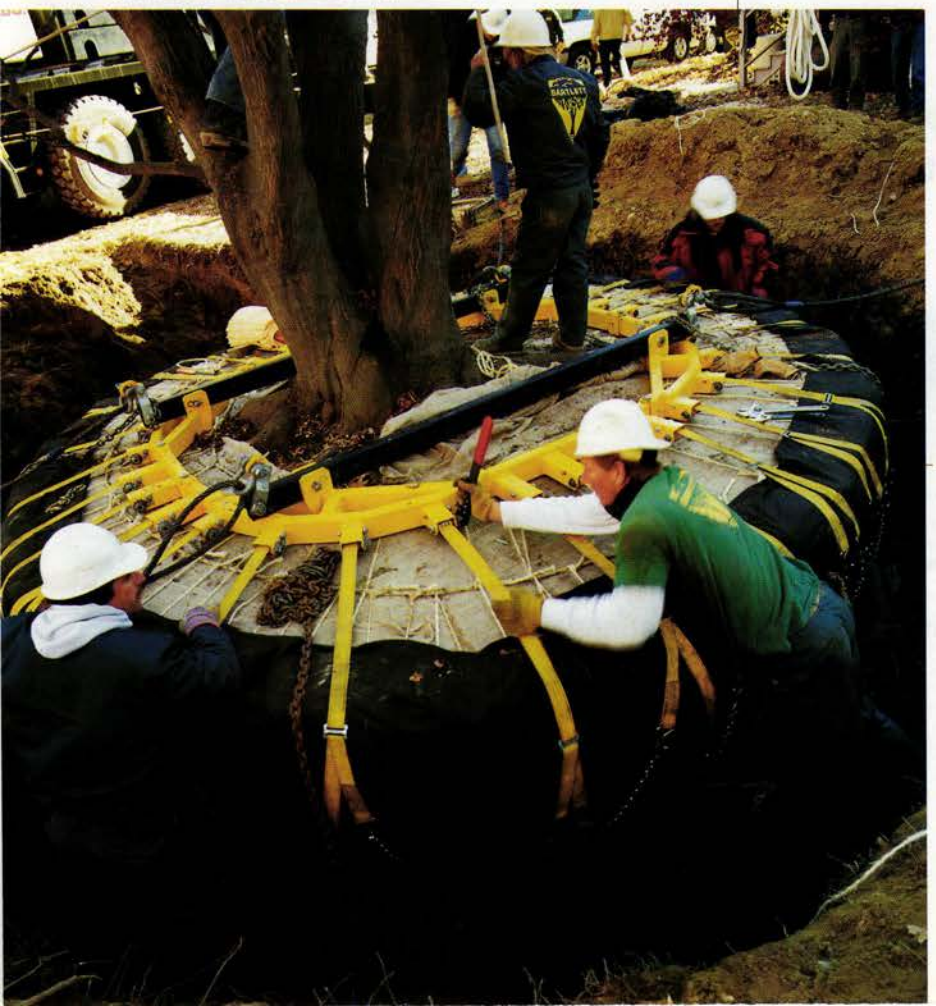
up the tree and move it. A year later, the giant is getting ready for its winter nap 28 feet away from where it started, a textbook study in the art of moving behemoths.

The price was $14,000, typical for a tree 28 inches wide at its base. Although that is beyond what many budgets can bear, for other homeowners that money would be well spent as a way to open up views, add to a house or change grades without sacrificing what they love most about their yards. Jim Ingram, who supervised the move for the F.A. Bartlett Tree Expert Co., an international firm, says that in New England alone the company moves four or five trees of similar size each year, plus dozens more with trunks 10 to 12 inches across. Most cost just hundreds, not thousands, of dollars to hoist from one spot in a yard to another—often less than a quarter of what nurseries charge for similar-size boxed trees. Tree movers sometimes play matchmaker, linking property owners whose trees have outgrown their lots with others who yearn for specimens that they, not their grandchildren, can picnic under. In such cases, Bartlett usually charges only for the cost of the move, not for the tree itself.

Big trees, of course, are not as nimble as saplings fresh from a nursery. "When you move a big tree, it's a long-term commitment," says Gary Watson, a tree root expert at the Morton Arboretum near Chicago who who was tapped by the International Society of Arboriculture to write its manual on transplanting.

Bartlett began prepping the Cambridge maple nearly two months before the move. Each week, a crew dumped on 1,000 gallons of water, charging the tree with as much moisture as it could store and lessening the chance that the sandy soil would crumble off during the move. To keep the soil from freezing as the late-November move approached, the crew spread mulch about 3 inches deep over the roots. And they inoculated the roots with slow-release fertilizer and mycorrhizal fungi, types that enhance a tree's ability to absorb water and nutrients. These symbiotic fungi are abundant in forests but can be lacking in bulldozed soil.

Bartlett owns 1,600 pieces of heavy equipment but, when the three-day move began, the critical task of digging up the roots fell to 10 men with sharp spades. Ingram ruled out using both a backhoe and a tree spade, a device with clawlike blades that slice into the soil around and beneath a tree's primary roots. A tree spade big enough for this specimen couldn't maneuver into the tight lot. "And in my experience, big trees really warrant the attention of a knife-sharp spade to sever their roots," Ingram says.



With a buddy low in the trench, a crew member tightens experimental straps. Some later popped, so the tree was lifted instead on conventional cables threaded under the delicate root ball.

Defining the root ball of a large tree is more complicated than tipping a philodendron out of its pot. Many roots must be cut, and it's not easy for a novice to tell which ones are critical. "The idea behind root ball sizing is to get roots that are small enough in diameter that they will callus and generate new roots that have an absorption capability," says Tom Cox, owner of Environmental Design, a Texas company that planted a whole hillside with pines up to 50 feet tall for a resort Kevin Costner is building in Deadwood, South Dakota.

One rule of thumb is to dig at the drip line (the circumference defined by the outermost leaves). Another is to make the root ball a foot wide for every inch of trunk diameter. Ingram took a more precise approach, digging test holes to check the diameter of roots at various distances from the trunk. Eventually, he decided a 14-foot ball was right.

Working out from that distance, the crew dug a circular trench 3 feet wide and about 4 feet deep, aiming to go roughly 2 feet deeper than the lowest major lateral root. Then they started tapering under to define the root ball's bowl shape. Ingram figured the taproot, the one that grew first when the tree was but a sprouting seed, would run a foot, maybe a foot and a half, below the bottom of the root ball and would pull out easily from the sandy soil. But a probe with a spade revealed that the taproot didn't protrude beyond the ball.

With the trench tapered in about 1½ feet, the crew stopped digging for the day. They sprayed the crown with an antidesiccant to prevent moisture transpiration from the leaves and buds and sprayed the bottom with rooting hormone. Then they wrapped the exposed portion of the root ball in burlap and black felt to keep it moist in dry weather and intact in case of rain.

After the ball was secure, Ingram hopped across the trench to settle one puzzling question: Just how old was this tree? Using an increment borer, a device that takes a core sample of the trunk, he got his answer: a mere 55 years, give or take a ring. This meant that the tree, the fast-growing variety of Japanese red maple, was relatively young and vigorous—all the more likely to survive the move but not nearly as historic as neighbors had claimed.

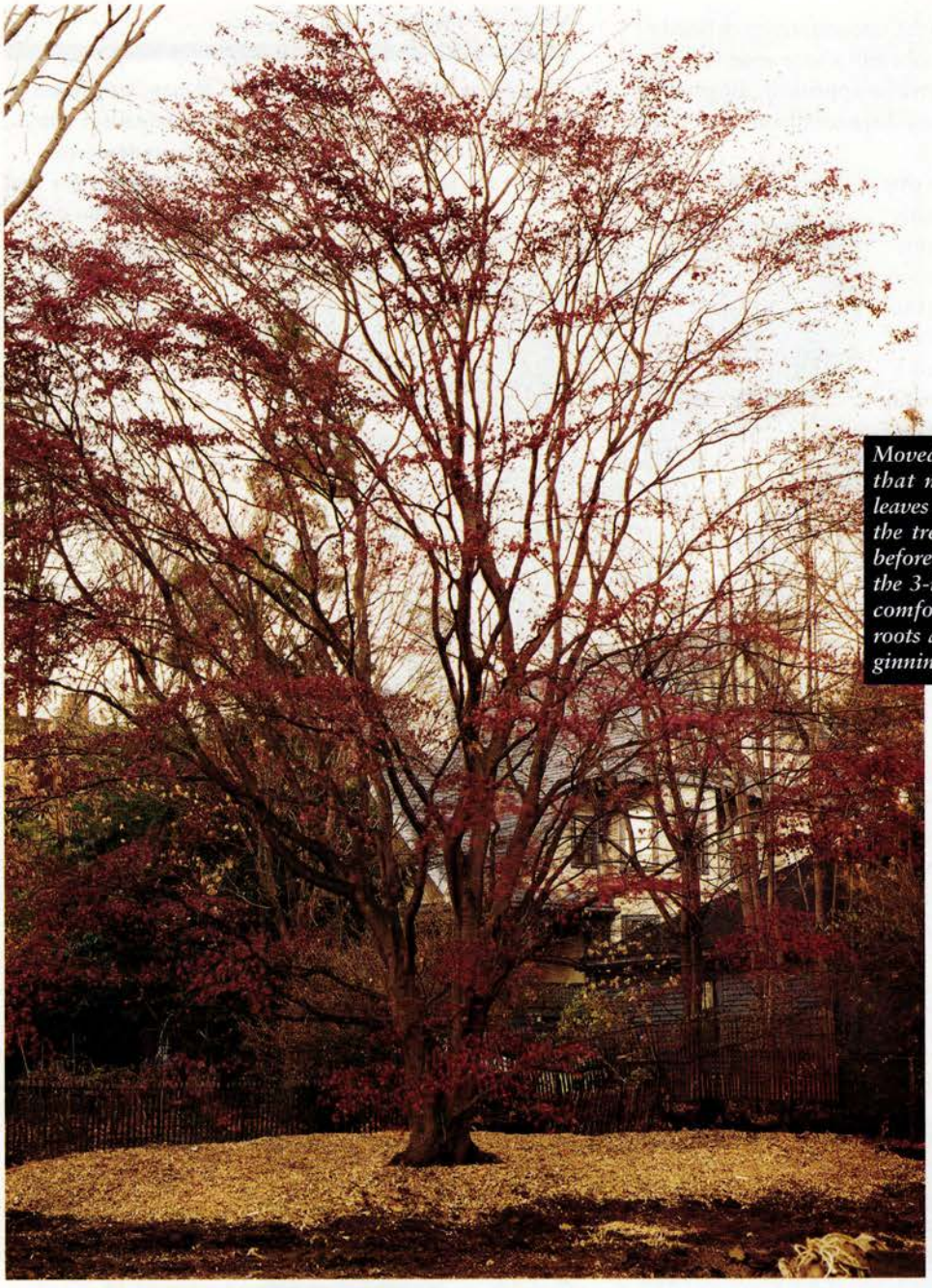
The crew sliced the root ball free on the second day by slicing back and forth with a steel cable attached to a backhoe. The day's other main task was to dig the tree's new home and prime it with 2,000 gallons of water. The hole was about a foot shallower than the root ball so the backfill would slope gently away from the trunk, even after the tree settled 6 to 8 inches. This allows better drainage and virtually eliminates the risk of suffocating the tree by heaping soil against the trunk.

On day three, the Japanese maple headed skyward, lifted by a crane that can hoist 120 tons. The Bartlett crew had a bet on what the whole package would weigh. Once the roots were clear of the ground, the digits on the cab's built-in scale flickered to a stop and revealed the answer: 54,600 pounds.

The tree's airborne passage was almost anticlimactic, over in less than five minutes. Then the crew removed the rigging,

Yankee Thrift in the Garden

Russ Morash, director of *This Old House,* treasured his dwarf evergreens and other rare plants but didn't like his yard's overall design. So he remodeled the landscape last spring, reusing many of his shrubs and small trees. He dug deep and wide to get generous root balls but suggests a more foolproof method would be to begin a year ahead. "Go out about a foot from the trunk with a spade and cut down about a foot deep all around the tree. It's what they do in nurseries." On moving day, few of the large roots will need to be severed. Two adults can move trees with 3-inch trunks and root balls 2½ feet across. Don't lift by the trunk; wrap roots in burlap and grab onto that or rope binding to scoot or "walk" the plant along. After sliding his bushes to a holding area, Russ shoveled on wood chips to keep the roots cool and moist until he could replant, taking care to set trunks no deeper than before. Homeowners can skip the mycorrhizal fungi and rooting hormone used on the Cambridge maple, say Jim Ingram of the F.A. Bartlett Tree Expert Co. and Gary Watson of the Morton Arboretum. Inoculation requires special equipment, and the fungi are usually present in established gardens. "And even without rooting hormone, you get up to a dozen little roots being produced from every cut root, probably in excess of what that tree needs," Watson says. Don't plant anything on top of the root ball or even walk across it. "That's like beating up someone after he's had a heart transplant," says Texas tree-mover Tom Cox. "The root ball has to be sacred territory."



Moved so gently that most of its leaves are still on, the tree looks as before. But under the 3-inch mulch comforter, shorn roots are just beginning to heal.

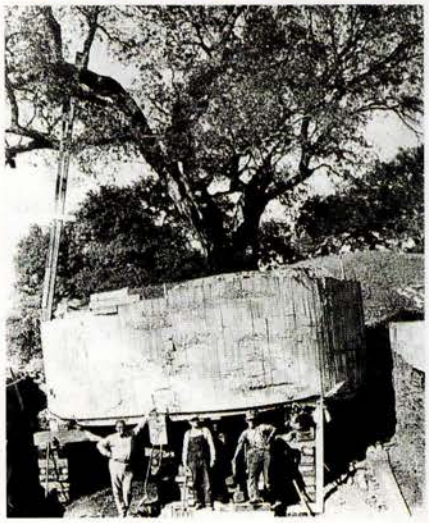
unwrapped the root ball and began filling in the hole, stopping every 6 to 8 inches to add water to tamp down the mix of soil and leaf mulch gathered under maples in a forest. Watson, who was not involved in the job, called the leaf litter a neat touch because it mimicked the care and feeding that nature provides.

"Backfilling is a very important part of the job," Ingram says. "But aftercare is most crucial."

Researchers have found that, even in a successful move, a tree retains only 5 to 18 percent of its roots and that the system will take years to regrow. Until it is reestablished, the tree must draw all its water from the root ball. "The water in that area is going to be used up very fast," Watson says. Even when most of a yard is plenty moist, a newly transplanted root ball can become critically dry in just two or three hot days. "Water does not move fast enough from the surrounding soil into the root ball."

The Bartlett crew left nothing to chance on the Cambridge maple. Someone visits the tree at least weekly, using two soil-moisture monitors to guide irrigation. "If moisture is the same inside and out of the root ball, it's the best situation for the roots to grow," Ingram says. "Until it stabilizes, we'll keep a close eye on it. After that, the tree will tell us what to do."

By summertime the maple was in gorgeous full leaf and seemed to be telling its custodians that whatever they were doing was fine. The neighbors were happy. And Linnaean Street did have a historic tree, after all. ■



HEARST CASTLE/HEARST SAN SIMEON HISTORICAL MONUMENT

The House-Moving Technique

William Randolph Hearst shipped architectural treasures from around the globe to outfit his sprawling hilltop estate at San Simeon, California. And he viewed living pieces of the landscape there as similar props, to be trundled about as needed. While adding two wings to his castle, he moved four massive coastal live oaks. Hearst had no crane. Instead, crews tunneled under the trees and cast reinforced concrete girders beneath the main root mass, then poured a concrete cradle 2 to 3 inches thick into a circular trench dug beneath the outermost branches. The whole gigantic package was jacked out of the earth with house-moving equipment and moved on rollers to its new location. The root ball was buried with the cradle still intact, so that the roots could eventually push their way through holes in the concrete and break it apart. As the estate's longtime groundskeeper recalled, the weight of the biggest oak, moved in 1946, was 400 tons—cradle and all. The six-month job cost $18,000.

FOR SOURCES, SEE DIRECTORY – PAGE 153

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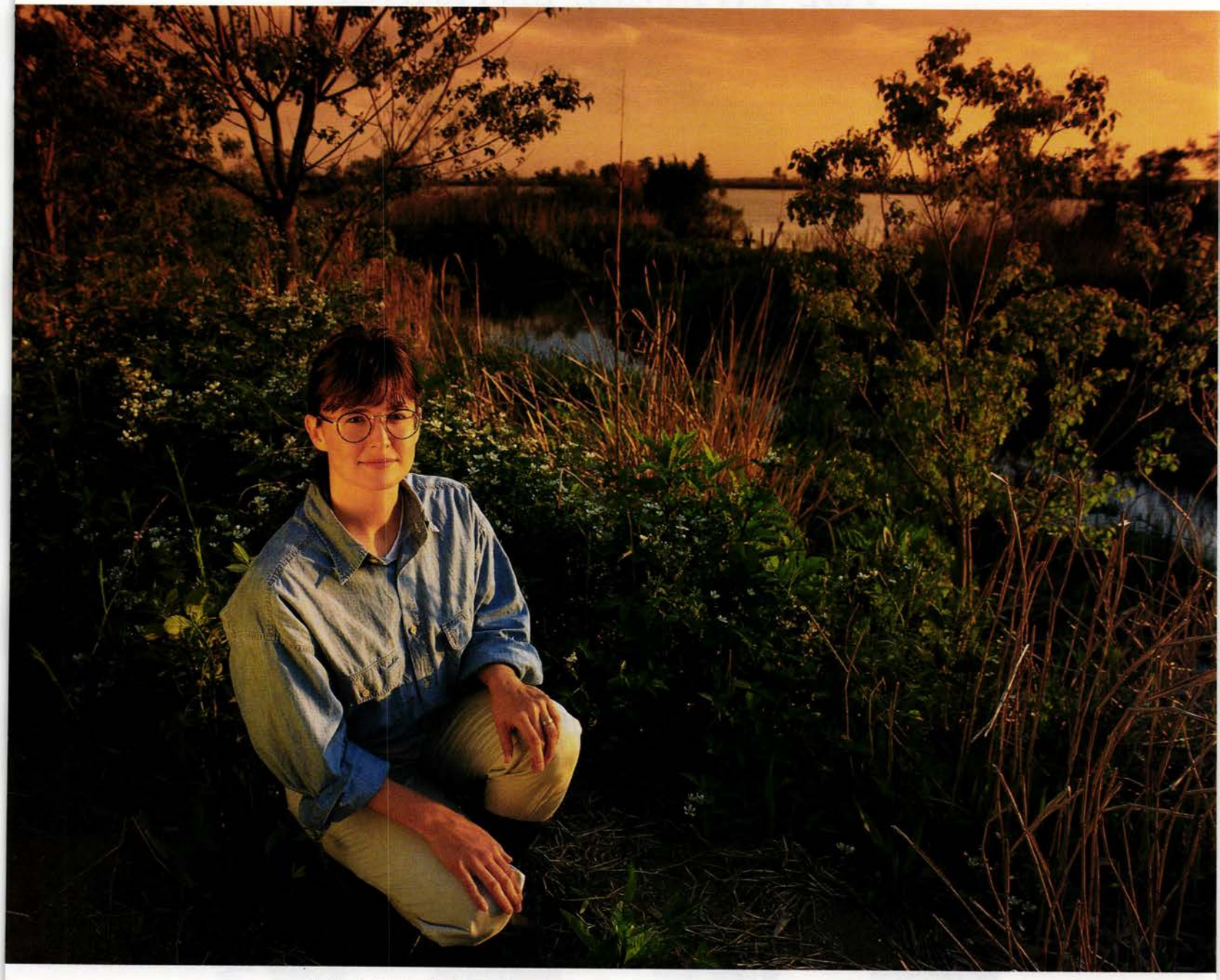

Lita Lowder, Fuji Photo Film, Inc., Regulatory Compliance Coordinator, photographed in South Carolina's ACE Basin

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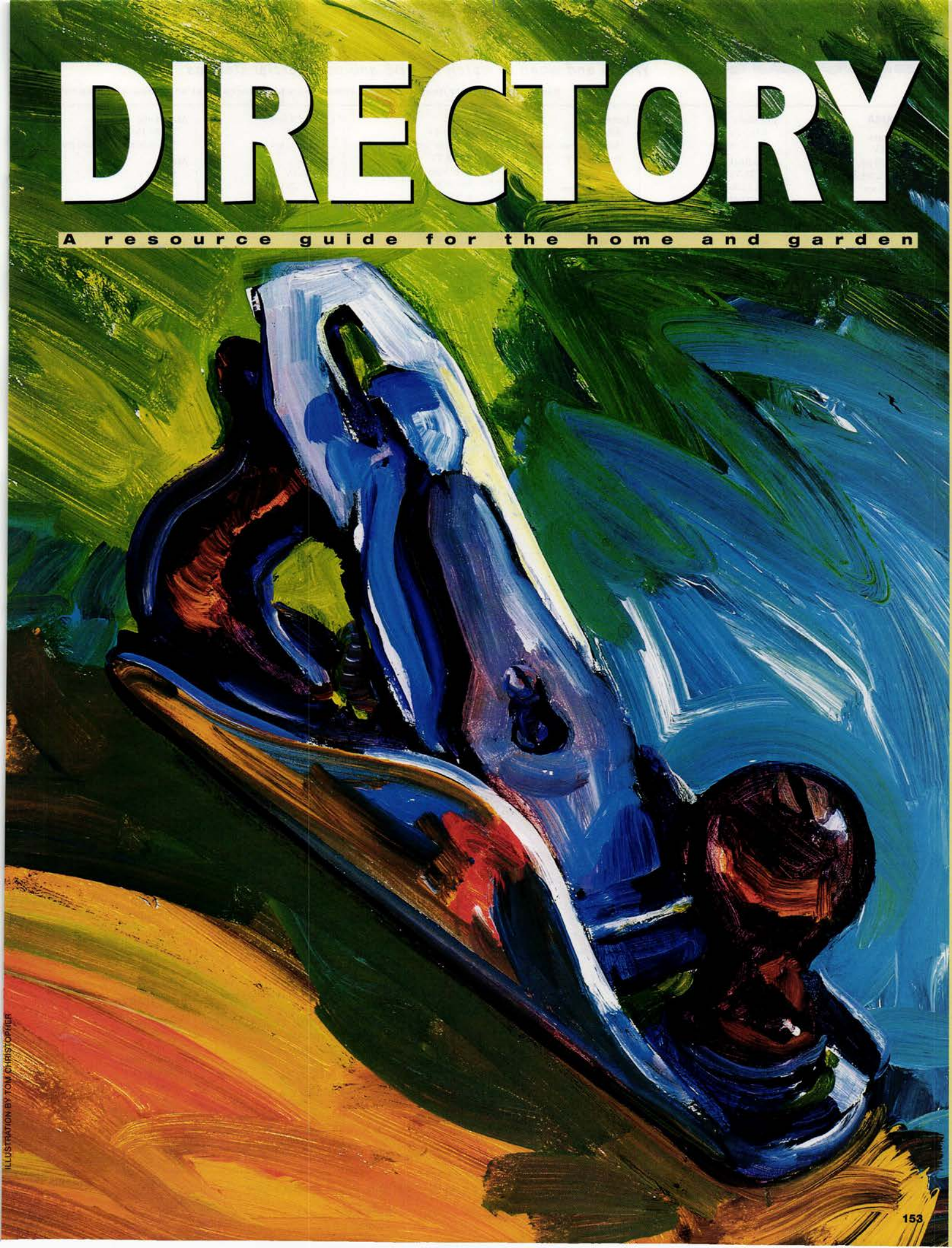

ILLUSTRATION BY TOM CHRISTOPHER

This Old House

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● indicates *This Old House Classics*, vintage episodes rebroadcast on commercial stations

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Thu. 8:30 pm, Sat. 8 pm
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Sat. 6:30 am

Demopolis
WIIQ-TV
Thu. 8:30 pm, Sat. 8 pm

Dozier
WDIQ-TV
Thu. 8:30 pm, Sat. 8 pm

Florence
WFIQ-TV
Thu. 8:30 pm, Sat. 8 pm

Huntsville
WHIQ-TV
Thu. 8:30 pm, Sat. 8 pm
● WZDX-TV
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Louisville
WGIQ-TV
Thu. 8:30 pm, Sat. 8:30 pm

Mobile
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WEIQ-TV
Thu. 8:30 pm, Sat. 8 pm

Montgomery
WAIQ-TV
Thu. 8:30 pm, Sat. 8 pm

Mount Cheaha
WCIQ-TV
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Sun. 5 pm

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KEET-TV
Wed. 7:30 pm
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KRCB-TV
Sun. 7:30 pm

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Thu. 8 pm, Sat. 8:30 am
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Sat. 6 am

San Bernardino
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Thu. 8 pm

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Sat. 11 am
● KGTV-TV
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San Francisco
KQED-TV
Sat. 5 pm
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Sun. 10:30 am

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● KRDO-TV
Sun. 11:30 am

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New Haven
WEDY-TV
Tue. noon, Thu. 11 pm
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Norwich
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Tue. noon, Thu. 11 pm
Sat. 7 pm, Sun. 10:30 am

DISTRICT OF COLUMBIA

WETA-TV
Sat. 9 am
● WRC-TV
Sun. 5 am

FLORIDA

Bonita Springs
WGCU-TV
Sat. 1:30 pm, Sun. 5 pm

Daytona Beach
WCEU-TV
Tue. 8 pm, Sat. 6 pm

Fort Myers
● WTVK-TV
Sat. 5:30 am

Gainesville
WUFT-TV
Sat. 1:30 pm
● WCJB-TV
Sun. 1:30 pm

Jacksonville
WJCT-TV
Sat. noon and 5:30 pm

Miami
WLRN-TV
Sun. 10 am
WPBT-TV
Sat. 3 pm
● WPLG-TV
Sun. 8 am

Orlando
WMFE-TV
Sat. 9 am
Sun. 9 am, Thu. 8 pm

Pensacola
WSRE-TV
Sat. 12:30 pm and 6:30 pm

Sarasota
● WWSB-TV
Sun. 11:30 am

Tallahassee
WFSU-TV
Sat. 1:30 pm and 6:30 pm

Tampa
WEDU-TV
Sat. 11:30 am
WUSF-TV
Wed. 9 pm
Sun. 5:30 pm
● WTVT-TV
Sat. 9:30 am

West Palm Beach
● WPTV-TV
Sun. 6 am

GEORGIA

Albany
● WGVP-TV
Sun. 2:30 pm

Atlanta
WGTV-TV
Sat. 9:30 am, 5:30 pm
Sun. 8 pm
WPBA-TV
Mon. 8 pm, Wed. 2 pm
Sat. 6 pm
● WXIA-TV
Sat. 5:30 am

Chatsworth
WCLP-TV
Sat. 9:30 am, 5:30 pm
Sun. 8 pm

Cochran
WDCO-TV
9:30 am
Sat. 5:30 pm, Sun. 8 pm

Columbus
WJSP-TV
Sat. 9:30 am and 5:30 pm
Sun. 8 pm

Dawson
WACS-TV
Sat. 9:30 am and 5:30 pm,
Sun. 8 pm

Macon
● WMAZ-TV
Sat. 11 am

Pelham
WABW-TV
Sat. 9:30 am, 5:30 pm
Sun. 8 pm

Savannah
WVAN-TV
Sat 9:30 am and 5:30 pm
Sun. 8 pm
● WTOC-TV
Sun. 5 pm

Waycross
WXGA-TV
Sat. 9:30 am and 5:30 pm
Sun. 8 pm

Wrens
WCES-TV
Sat. 9:30 am and 5:30 pm
Sun. 8 pm

HAWAII

Honolulu
KHET-TV
Sat. 1:30 pm
● KHNL-TV
Sun. 3 pm

Wailuku
KMEB-TV
Sat. 1:30 pm

IDAHO

Boise
KAID-TV
Sun. 4:30 pm
● KIVI-TV
Sun. 6:30 am

Coeur d'Alene
KCDT-TV
Sun. 3:30 pm

Moscow
KUID-TV
Sun. 3:30 pm

Pocatello
KISU-TV
Sun. 4:30 pm

Twin Falls
KIPT-TV
Sun. 4:30 pm

ILLINOIS

Carbondale
WSIU-TV
Thu. 7 pm, Fri. 12:30 pm
Sat. 12:30 pm

Champaign
● WAND-TV
Sat. 5:30 am

Charleston
WEIU-TV
Sat. 8:30 pm

Chicago
WTTW-TV
Tue. 7:30 pm, Sat. 5 pm
● WFLD-TV*

Jacksonville
WSEC-TV
Thu. 10 pm, Sun. 1:30 pm

Macomb
WMEC-TV
Thu. 10 pm, Sun. 1:30 pm

Moline
WQPT-TV
Tue. 7 pm, Sat. 5:30 pm

Olney
WUSI-TV
Thu. 7 pm, Fri. 12:30 pm
Sat. 12:30 pm

Peoria
WTVP-TV
Thu. 10 pm, Sat. 12:30 pm
● WHOI-TV*

Quincy
WQEC-TV
Thu. 10 pm, Sun. 1:30 pm

Rockford
● WTVO-TV
Sat. 6:30 pm

Springfield
● WICS-TV
Sat. 7:30 am

Urbana
WILL-TV
Thu. 7:30 pm, Sun. 3:30 pm

INDIANA

Bloomington
WTIU-TV
Mon. 5 pm, Thu. 11 pm,
Sat. 12:30 pm

Evansville
WNIN-TV
Sat. 12:30 pm and 6 pm
Sun. 4:30 pm
● WFIE-TV
Sun. 6 am

Fort Wayne
WFWA-TV
Sat. 10 am

Indianapolis
WFYI-TV
Sat. 10 am and 5 pm
Sun. 7 pm
● WTHR-TV*

Merrillville
WYIN-TV
Thu. 8:30 am, Sun. 3:30 pm

Muncie
WIPB-TV
Sun. 4:30 pm

South Bend
WNIT-TV
Wed. 7 pm, Sat. 2 pm

Terre Haute
● WTWO-TV
Sun. 6 am

Vincennes
WVUT-TV
Sat. 12:30 pm

IOWA

Cedar Rapids
● KWWL-TV
Sat. 2:30 am

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

Davenport
KQCT
Tue. 7 pm, Sat. 5:30 pm
● WQAD-TV
Sun. 11 am

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

KANSAS

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

Lakin
KSWK-TV
Thu. 7 pm, Sat. 12 pm

Topeka
KTWU-TV
Sat. 9:30 am

Wichita
KPTS-TV
Sat. 11:30 am, Sun. 11 am
● KSNW-TV
Sun. 6:30 am

KENTUCKY

Ashland
WKAS-TV
Mon. 6:30 pm, Sun. 5 pm

Bowling Green
WKGB-TV
Mon. 5:30 pm, Sun. 4 pm
WKYU-TV
Tue. 1 pm and 6:30 pm
● WBKO-TV
Sun. 6:30 am

*check your local listings

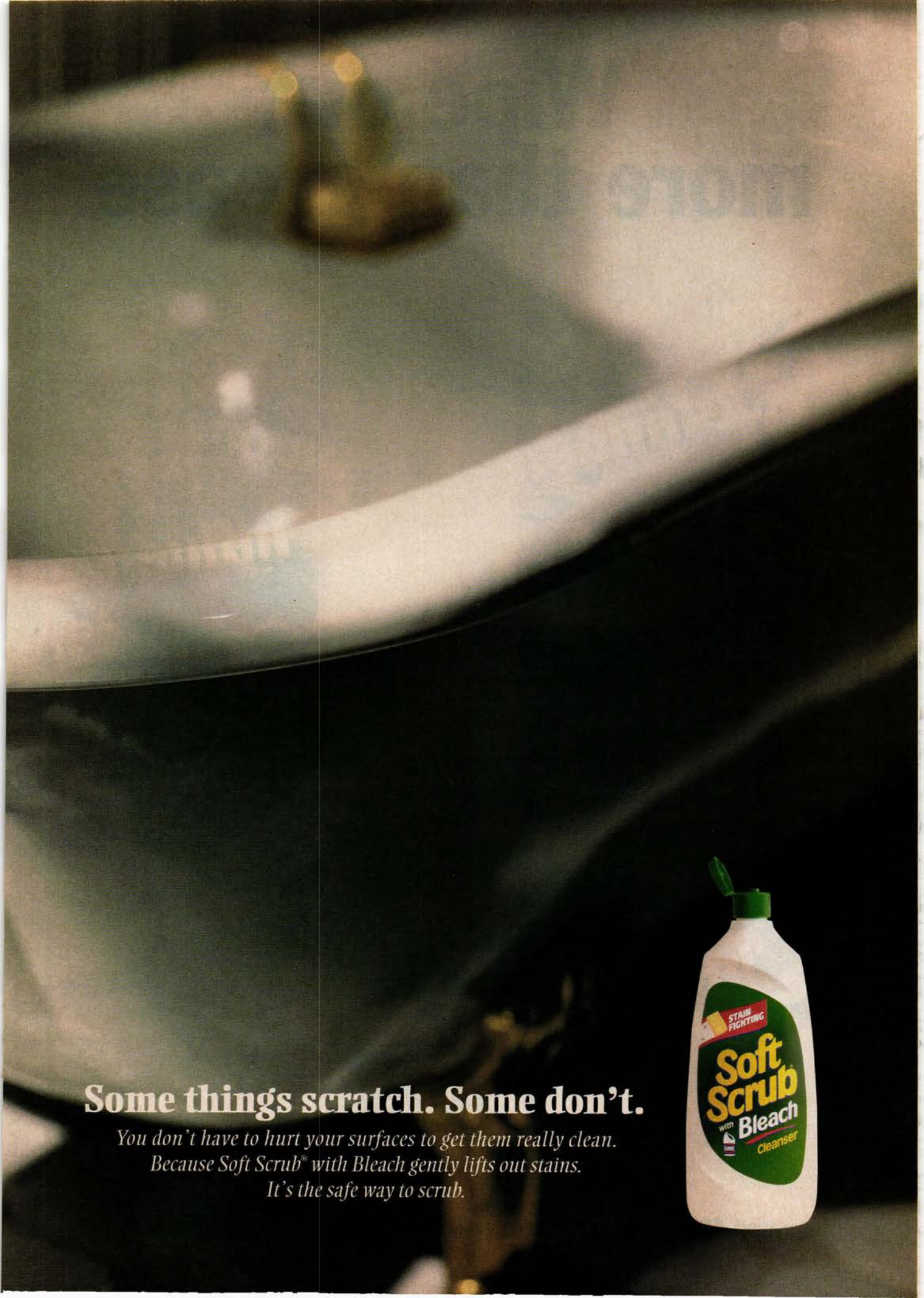
This Old House is a production of WGBH Boston

Soap scum's tough.

New Tilex® is tougher.

Got a "scum situation?" Get rid of it in a wipe with new Tilex® Soap Scum Remover. Its powerful formula beats all the others. On soap scum, new Tilex is clearly the best.

Use only as directed.



Some things scratch. Some don't.

You don't have to hurt your surfaces to get them really clean.
Because Soft Scrub® with Bleach gently lifts out stains.
It's the safe way to scrub.

Wipe out more than grease.

Improved 409® kills 99.9% of germs like Salmonella, E. coli and Influenza.

Covington
WCVN-TV
Mon. 6:30 pm, Sun. 5 pm

Elizabethtown
WKZT-TV
Mon. 6:30 pm, Sun. 5 pm

Hazard
WKHA-TV
Mon. 6:30 pm, Sun. 5 pm

Lexington
WKLE-TV
Mon. 6:30 pm, Sun. 5 pm
WKMJ-TV
Mon. 6:30 pm, Sun. 5 pm
WKPC-TV
Sat. 1:30 pm, Sun. 3 pm
● WTVQ-TV*

Louisville
WKMJ-TV
Mon. 6:30 pm, Sun. 5 pm
WKPC-TV
Sat. 1:30 pm, Sun. 3 pm
● WAVE-TV*

Madisonville
WKMA-TV
Mon. 5:30 pm, Sun. 4 pm

Morehead
WKMR-TV
Mon. 6:30 pm, Sun. 5 pm

Murray
WKMU-TV
Mon. 5:30 pm, Sun. 4 pm

Owensboro
WKOH-TV
Mon. 5:30 pm, Sun. 4 pm

Owenton
WKON-TV
Mon. 6:30 pm, Sun. 5 pm

Paducah
WKPD-TV
Mon. 5:30 pm, Sun. 4 pm
● KBSI-TV
Sun. 10:30 pm

Pikeville
WKPI-TV
Mon. 6:30 pm, Sun. 5 pm

Somerset
WKSO-TV
Mon. 6:30 pm, Sun. 5 pm

LOUISIANA

Alexandria
KLPA-TV
Sat. 4 pm, Sun. 10 am

Baton Rouge
WLPB-TV
Sat. 4 pm, Sun. 10 am
● KWBJ-TV
Sun. noon

Lafayette
KLPB-TV
Sat. 4 pm, Sun. 10 am

Lake Charles
KLTL-TV
Sat. 4 pm, Sun. 10 am

Monroe
KLTM-TV
Sat. 4 pm, Sun. 10 am

New Orleans
WYES-TV
Sat. 8:30 am
● WVUE
Sun. 6 pm

Shreveport
KLTS-TV
Sat. 4 pm, Sun. 10 am
● KTBS*

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
● WPXT-TV
Sun. 11 am

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
● WMAR-TV*

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 pm, Sat. 5:30 pm
WGBX-TV
Sun. 9 am
● WFXT-TV
Sun. 11 am

Springfield
WGBY-TV
Thu. 8 pm, Sat. 5:30 pm

MICHIGAN

Alpena
WCML-TV
Sat. 2:30 pm

Bad Axe
WUCX-TV
Tue. 12:30 pm, Sun. 5 pm

Cadillac
WCMV
Sat. 2:30 pm
● WWTV/WWUP
Sun. 10:30 am

Detroit
WTVS-TV
Thu. 8:30 pm, Sat. 10 am
● WDIV-TV*

East Lansing
WKAR-TV
Thu. 9 pm, Sat. 1:30 pm
Sun. 5 pm

Flint
WFUM-TV
Thu. 9 pm, Sat. 1:30 pm
● WEXI-TV
Sun. 10:30 am

Grand Rapids
WGVU-TV
Thu. 8:30 pm, Sat. 10 am
● WOOD/WOTV-TV*

Kalamazoo
WGVK-TV
Thu. 8:30 pm, Sat. 10 am

Lansing
● WILX-TV
Sun. 11 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 pm

MINNESOTA

Appleton
KSMN
Sat. 12:30 pm, Thu. 8 pm
KWCM-TV
Sat. 12:30 pm, Thu. 8 pm

Austin
KSMQ-TV
Sat. 12:30 pm, Sun. 7 pm

Bemidji
KAWE-TV
Thu. 7:30 pm
Sat. 12:30 pm

Brainerd
KAWB-TV
Thu. 7:30 pm
Sat. 12:30 pm

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

Rochester
● KAAL-TV
Sat. 6 am

St. Paul/Minneapolis
KTCA-TV
Wed. 7:30 pm, Sat. 6:30 pm
KTCI-TV
Wed. 7:30 pm, Sat. 6:30 pm
● KSTP-TV
Sun. 11:30 am

MISSISSIPPI

Biloxi
WMAH-TV
Sat. 7 pm

Booneville
WMAE-TV
Sat. 7 pm

Bude
WMAU-TV
Sat. 7 pm

Greenwood
WMAO-TV
Sat. 7 pm

Jackson
WMPN-TV
Sat. 7 pm

Meridian
WMAW-TV
Sat. 7 pm

Mississippi State
WMAB-TV
Sat. 7 pm

Oxford
WMAV-TV
Sat. 7 pm

MISSOURI

Columbia
● KRCG-TV
Sun. 11 am

Joplin
● KOAM-TV
Sun. 6 am
KOZJ-TV
Sat. 12:30 pm

Kansas City
KCPT-TV
Thu. 7:30 pm
Sat. 12:30 pm
● KMBC-TV
Sat. 6:30 am

St. Louis
KETC-TV
Wed. 12:30 pm
Sat. 6:30 pm
● KTVI-TV*

Sedalia
KMOS-TV
Sat. 12:30 pm

Springfield
KOZK-TV
Sat. 12:30 pm
● KSPR-TV
Sun. 11 am

MONTANA

Bozeman
KUSM-TV
Sat. 11:30 am

Missoula
KUFM-TV
Sat. 11:30 am

NEBRASKA

Alliance
NETV-TV
Sat. 10 am and 5:30 pm

Bassett
NETV-TV
Sat. 10 am and 5:30 pm

Hastings
NETV-TV
Sat. 10 am and 5:30 pm

Lexington
KLNE-TV
Sat. 10 am and 5:30 pm

Lincoln
KUON-TV
Sat. 10 am and 5:30 pm
● KHAS-TV
Sat. 5 pm

Merriman
NETV-TV
Sat. 10 am and 5:30 pm

Norfolk
NETV-TV
Sat. 10 am and 5:30 pm

North Platte
NETV-TV
Sat. 10 am and 5:30 pm

Omaha
NETV-TV
Sat. 10 am and 5:30 pm

NEVADA

Las Vegas
KLVX-TV
Sun. 6 am, Tue. 9 pm
Sat. 9 am and 12:30 pm
● KTNV-TV
Sun. 8:30 am

Reno
KNPB-TV
Sat. 10:30 am, Sun. 5 pm
● KAME-TV
Sat. 11 am

NEW HAMPSHIRE

Durham
WENH-TV
Thu. 8:30 pm, Sun. 10 am

Keene
WEKW-TV
Thu. 8:30 pm, Sun. 10 am

Littleton
WLED-TV
Thu. 8:30 pm, Sun. 10 am

Manchester
● WNUR-TV
Sun. 8 am

NEW JERSEY

Camden
WNJS-TV
Thu. 8 pm, Sat. 8 pm
Sun. 5:30 pm

Montclair
WNJN-TV
Thu. 8 pm, Sat. 8 pm
Sun. 5:30 pm

New Brunswick
WNJB-TV
Thu. 8 pm, Sat. 8 pm
Sun. 5:30 pm

Trenton
WNJT-TV
Thu. 8 pm, Sat. 8 pm
Sun. 5:30 pm

NEW MEXICO

Albuquerque
KNME-TV
Thu. 7 pm, Sun. 10 am

Las Cruces
KRWG-TV
Sat. 11:30 am

Portales
KENW-TV
Sat. 3:30 pm
Wed. 10:30 pm

NEW YORK

Albany
● WXXA-TV
Sun. 10 am

Binghamton
WSKG-TV
Sat. 8 am, 1:30 pm
and 6:30 pm, Sun. 7 am
● WBNG-TV
Sat. 7:30 am

Buffalo
WNED-TV
Sat. 10:30 am
WNEQ-TV
Sun. 7 pm
● WIVB-TV
Sun. 8:30 am

Elmira
● WYDC-TV*

Long Island
WLIW-TV
Sat. 10:30 am, Sun. 8 pm

New York City
WNET-TV
Sat. 5:30 pm
● WCBS-TV
Sun. 7:30 am

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
● WHEC-TV
Sun. 6 am

Schenectady
WMHT-TV
Tue. 1:30 pm, Sat. 10:30 am

Syracuse
WCNY-TV
Sat. 10:30 am
● WSTM-TV
Sun. 6 am

Watertown
WNPE-TV
Sat. 10:30 am

NORTH CAROLINA

Asheville
WUNF-TV
Sat. 5:30 pm, Thu. 8 pm

Chapel Hill
WUNC-TV
Sat. 5:30 pm, Thu. 8 pm

Charlotte
WTVI-TV
Thu. 8 pm, Sat. 5 pm
Sun. 11 am
WUNG-TV
Sat. 5:30 pm, Thu. 8 pm
● WBTV-TV
Sat. 2:30 pm, Sun 1:30 pm

Columbia
WUND-TV
Sat. 5:30 pm, Sun. 8 pm

Greensboro
● WGHP-TV
Sat. 6:30 am

Greenville
WUNK-TV
Sat. 5:30 pm, Thu. 8 pm
● WLOS/WFBC-TV
Sat. 10 am

Jacksonville
WUNM-TV
Sat. 5:30 pm, Thu. 8 pm

Linville
WUNE-TV
Sat. 5:30 pm, Thu. 8 pm

Lumberton
WUNU-TV
Sat. 5:30 pm, Thu. 8 pm

Raleigh
● WTVD-TV
Sun. 11:30 am

Roanoke Rapids
WUNP-TV
Sat. 5:30 pm, Thu. 8 pm

Wilmington
WUNJ-TV
Sat. 5:30 pm, Thu. 8 pm

Winston-Salem
WUNL-TV
Sat. 5:30 pm, Thu. 8 pm

NORTH DAKOTA

Bismarck
KBME-TV
Thu. 7 pm, Sat. 6 pm

*check your local listings

This Old House CLASSICS

Program Guide

Working on a Wayland Wonderland

An 1815 home meets the 20th century—and the local historic commission

Norm and Steve enjoy a respite beneath the Kirkside portico they will soon restore to its 1888 appearance.

Week 7 (November 1-2)
Outside the house, Tom and Norm talk drainage, homeowner Chris Hagger gets advice on lending a sense of sturdiness to the landscape, and licensed lead remover Dave Rugato removes the old paint. Inside, electrician Paul Kennedy shows Steve the tangled web of old wires. ***Watch and learn:*** How to fix a weakened wooden floor

Week 8 (November 8-9)
Norm explains the art of framing and decking. Tom discusses the advantages of wooden I beams. We learn the fate of the English garden and about septic system laws. ***Watch and learn:*** How to reconstruct a portico

Week 9 (November 15-16)
Excavation contractor Herb Brockert discusses the right way to make a septic field. Dave Rugato pressure-washes the house's exterior. Also: the efficiency benefits of faux historic windows. ***Watch and learn:*** How to reveal the original paint color

Week 10 (November 22-23)
Paint technology specialist Walt Gozden talks about preparing for repainting. As they tour the kitchen-to-be, Steve and home owners Joan and Chris Hagger discuss lighting. ***Watch and learn:*** How to install a skylight.

Week 11 (November 29-30)
Norm replaces a rotted wooden bulkhead. Herb Brockert installs the septic system. Chris visits the Wayland historic district commission. ***Watch and learn:*** How to color-match via computer

Week 12 (December 6-7)
Steve checks on the progress of the plumbing and electrical work in the kitchen. Paul Kennedy moves electrical outlets to make way for radiant baseboard panels. Richard Trethewey discusses updating the existing radiators with thermostatic valves. Norm installs glass doors on the porch. ***Watch and learn:*** How to computer-model a new kitchen

Week 13 (December 13-14)
Richard Trethewey and a gas company representative discuss the benefits of under-floor heating for the kitchen and of aluminum reflectors for an upstairs bathroom. A concrete truck arrives, and owner George Newman talks about the virtues of on-site mixing. Tom outlines some molding possibilities. ***Watch and learn:*** How to choose energy-efficient lighting

Week 14 (December 20-21)
Tom offers a pre-plumbing insulation tip. Dual-purpose juniper trees debut on the property, and landscape architect Tom Wirth talks about landscaping on a tight budget. Using the originals as models, Norm cuts the rails for the porch. ***Watch and learn:*** How to install a light switch

Week 15 (December 27-28)
Tom sets up insulation in the ceiling and the walls, puts up a vapor barrier on the walls, uses foam insulation around the windows and caulks the back door for a better fit. Trying out a new electric screw gun, Jeff Larsen installs blue board in the bathroom. ***Watch and learn:*** How to make a biscuit-joint

Next episodes
Installing fence railings and the front porch, cleaning antique wallpaper and laying a new walkway.

Kirkside abounds with signs of age like these rotted wooden sills. Not to fear: Norm and Steve are here.

A Guide to Resources for the Classics TV Series

The following is an updated list of some of the suppliers and manufacturers featured during *This Old House*'s 1991-1992 television season, when the crew worked on the Kirkside house project in Wayland, Massachusetts.

Week 7

Electrician: Paul Kennedy Jr., Electrical Contracting, 20 West St., Methuen, MA 01844; 508-651-3643. **Landscape architect:** Thomas Wirth Associates Inc., 20 North Main St., Sherborn, MA 01770; 508-651-3643. **Dumpster:** Jet-A-Way, 47 Kemble Street, Roxbury, MA 02119; 617-288-7131.

Week 8

Engineered wood: Trus Joist MacMillan Ltd., 200 East Mallard Dr., Boise, ID 83706; 800-338-0515. **Excavator:** Construction Services Co. **Engineering:** Nelson Engineering.

Week 9

Excavator: Construction Services Co. **Optical Equipment for SPNEA Microscope:** Micro-Tech Optical (NE), Inc., 59 Old Windsor Rd., Bloomfield, CT 06002; 860-243-0280. **Windows:** Architect Series by Pella Corp., 102 Main Street, Pella, IA 50219; 515-628-1000.

Week 10

Concrete dry well: E.F. Shea Concrete Products Inc., Box 520, North Wilmington, MA 01887; 508-658-2645 or 800-696-7432. **Skylights:** Wasco Skywindows, Box 351, Sanford, ME 04073; 207-324-8060 or 800-866-8101. **Windows:** Architect Series by Pella Corp., 102 Main Street, Pella, IA 50219; 515-628-1000. **Shingles:** GAF Building Materials Corp. **Mahogany baluster stock:** Anderson & McQuaid, 170 Fawcett St., Cambridge, MA 02138; 617-876-3250. **Oil-base primer:** Sherwin-Williams, 101 Prospect Ave., Cleveland, OH 44115; 216-566-2000.

Week 11

Bulkhead: The Bilco Co., Box 1203, New Haven, CT 06505; 203-934-6363. **Excavator:** Construction Services Co. **Precast concrete tanks:** E.F. Shea Concrete Products Inc., Box 520, North Wilmington, MA 01887; 508-658-2645 or 800-696-7432. **Septic pump:** Lunt Moss Co. Inc., 236 Boston Ave., Medford, MA 02155; 617-395-0240.

Week 12

Paint: Sherwin-Williams Superpaint exterior latex. Sherwin-Williams, 101 Prospect Ave., Cleveland, OH 44115; 216-566-2000. **Electrician:** Paul Kennedy Jr., Electrical Contracting, 20 West St., Methuen, MA 01844; 508-651-3643. **Gas boiler:** Burnham Corp., Lancaster, PA; 717-397-4700. **Hot water heater:** Viessmann Manufacturing Co., 83 Vermont Ave., Warwick, RI 02888; 401-732-0667. **Water distribution manifold and pex tubing:** Stadler Corp., 3 Alfred Circle, Bedford, MA 01730; 800-370-3122. **Custom glass doors:** Pella Corp., 102 Main Street, Pella, IA 50219; 515-628-1000. **Computer modelers:** Profession Construction Associates Inc., 3 Bancroft Park, Hopedale, MA 01747; 508-478-2380.

Week 13

Service truck: Boston Gas, 1 Beacon St., Boston, MA; 617-742-8400. **Radiant heating:** Stadler Corp., 3 Alfred Circle, Bedford, MA 01730; 800-370-3122. **Concrete delivery service:** Concrete Express Inc., Box 8, Natick, MA 01760; 508-653-1512. **Planes:** collection of SPNEA Conservation Center, 185 Lyman Street, Waltham MA 02154; 617-891-1985. **Low-voltage halogen lamps, MR-11 or MR-16:** Jewel Lights by Creative Systems Lighting Manufacturing, 27615 Avenue Hopkins, Valencia, CA 91355; 805-257-4155. **Screw-in halogen lamps for normal fixtures:** GE and Sylvania. **Undercabinet fluorescents:** Alko Manufacturing Co., 2906 N. Birch St., Franklin Park, IL 60131; 847-455-4590.

Week 14

Wallboard: Gold Bond Building Products, Division of National Gypsum, 2001 Rexford Road, Charlotte, NC 28211; 704-365-7300. **Tub and shower unit:** Kohler Plumbing Products, 444 Highland Drive, Kohler, WI 53044; 414-457-4441. **Plastic piping:** Charlotte Pipe & Foundry Co., Box 35430, Charlotte, NC 28235; 800-438-6091. **Plants:** Weston Nurseries Inc. of Hopkinton, Box 186, Hopkinton, MA 01748; 508-435-3414. **Jointer in shop:** Grizzly Imports, Inc., 1821 Valencia St., Bellingham, WA 98226; 360-647-0801.

Week 15

Insulation: Owens-Corning Fiberglass Corp., 1 Owens Corning Parkway, Toledo, OH 43659; 800-267-8787. **Drywall crew:** Larco Wallboard, 477 Trull Road, Tewksbury, MA 01876; 508-851-6440. **Screw gun attachment:** Dana Wallboard Supply Inc., 6 Cummings Road, Tyngsboro, MA 01879; 508-649-4000. **Air-conditioning unit:** Unico Inc., 4160 Meramec St., St. Louis, MO 63136; 800-527-0896. **Air-conditioning installer:** Custom Heating & Cooling, 10 Lakeview St., Blackstone, MA 01504. **Heat pump:** York International, 631 S. Richland Ave., York, PA 17403-3445; 717-771-7890.

This Old House

Where and when to watch on PBS and commercial stations

● indicates *This Old House Classics*, vintage episodes rebroadcast on commercial stations

Dickinson
KDSE-TV
Thu. 7 pm, Sat. 6 pm

Ellendale
KJRE-TV
Thu. 7 pm, Sat. 6 pm

Fargo
KFME-TV
Thu. 7 pm, Sat. 6 pm

Grand Forks
KGFE-TV
Thu. 7 pm, Sat. 6 pm

Minot
KSRE-TV
Thu. 7 pm, Sat. 6 pm

Williston
KWSE-TV
Thu. 7 pm, Sat. 6 pm

OHIO

Akron
WEAO-TV
Sat. 10:30 am and 5 pm
Sun. 4 pm

Athens
WOUB-TV
Sat. 5 pm

Bowling Green
WBGU-TV
Sat. 1:30 pm, Mon. 3 pm

Cambridge
WOUC-TV
Sat. 5 pm

Cincinnati
WCET-TV
Thu. 8 pm
Sat. 9 am and 6 pm
● WCPO-TV
Sun. 6 am

Cleveland
WVIZ-TV
Tue. 7:30 pm, Sat. 1 pm
Sun. 12:30 pm
● WEWS-TV
Sun. 6 am

Columbus
WOSU-TV
Thu. 8 pm, Sat. 4:30 pm
● WSYX-TV
Sun. 9:30 am

Dayton
WPTD-TV
Thu. 8 pm, Sat. 9:30 am
Sun. noon
● WRGT-TV
Sun. 10 am

Portsmouth
WPBO-TV
Thu. 8 pm, Sat. 4:30 pm

Toledo
WGTE-TV
Thu. 8 pm, Sat. 1 pm
Sun. 1 pm
● WTVG-TV*

Wheeling
● WTRF-TV*

Youngstown
WNEO-TV
Sat. 10:30 am and 5 pm
Sun. 4 pm
● WFMJ-TV
Sun. 10 am

OKLAHOMA

Cheyenne
KWET-TV
Sat. 9:30 am and
12:30 pm, Sun. 4 pm

Eufaula
KOET-TV
Sat. 9:30 am and 12:30 pm
Sun. 4 pm

Oklahoma City
KETA-TV
Sat. 9:30 am and 12:30 pm
Sun. 4 pm
● KOCO-TV
Sat. noon

Tulsa
KOED-TV
Sat. 9:30 am and 12:30 pm
Sun. 4 pm
● KJRH-TV
Sun. 12:30 pm

OREGON

Bend
KOAB-TV
Thu. 8 pm, Sat. 5 pm

Corvallis
KOAC-TV
Thu. 8 pm, Sat. 5 pm

Eugene
KEPB-TV
Thu. 8 pm, Sat. 5 pm
● KEZI-TV
Sun. 12:30 pm

Klamath Falls
KFTS-TV
Sat. 10:30 am, Thu. 8 pm

La Grande
KTVR-TV
Thu. 8 pm, Sat. 5 pm

Medford
KSYS-TV
Sat. 10:30 am, Thu. 8 pm
● KOBI/KOTI-TV
Sun. 4 pm

Portland
KOPB-TV
Thu. 8 pm, Sat. 5 pm
● KATU-TV
Sun. 5:30 am

PENNSYLVANIA

Allentown
WLVT-TV
Fri. 7:30 pm, Sat. 6 pm

Erie
WQLN-TV
Sat. 6:30 pm
● WJET
Sat. 6:30 am

Harrisburg
WITF-TV
Thu. 8 pm
Sat. 9 am and 6 pm
● WGAL-TV
Sun. 11 am

Johnstown
● WWCP/WATM-TV
Sun. 9 am

Philadelphia
WHYY-TV
Sat. 5:30 pm, Sun. 7 pm
● WTXF-TV*

Pittsburgh
WQED-TV
Sat. 5 pm
WQEX-TV
Wed. 8:30 pm, Sun. 11 am
KDKA-TV
Sun. 5:30 am

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

University Park
WPSX-TV
Sat. 9 am and 5:30 pm
Sun. 4:30 pm

Wilkes Barre
● WYOU-TV*

RHODE ISLAND

Providence
WSBE-TV
Tue. 8:30 pm, Sun. 6 pm
● WLNE-TV
Sat. 6:30 am

SOUTH CAROLINA

Charleston
● WCSC-TV
Sun. 5:30 am

Columbia
● WLTX-TV
Sun. 6 am

SOUTH DAKOTA

Aberdeen
KDSD-TV
Sat. 4:30 pm

Brookings
KESD-TV
Sat. 4:30 pm

Eagle Butte
KPSD-TV
Sat. 3:30 pm

Lowry
KQSD-TV
Sat. 4:30 pm

Martin
KZSD-TV
Sat. 3:30 pm

Pierre
KTSD-TV
Sat. 4:30 pm

Rapid City
KBHE-TV
Sat. 3:30 pm
● KCLO-TV
Sun. 10 am

Sioux Falls
KCSD-TV
Sat. 4:30 pm
● KELO-TV
Sun. 10 am

Vermillion
KUSD-TV
Sat. 4:30 pm

TENNESSEE

Chattanooga
WTCI-TV
Sat. 1:30 pm

Cookeville
WCTE-TV
Sat. 1 pm

Knoxville
WKOP-TV
Sat. 1:30 pm
WSJK-TV
Sat. 1:30 pm
● WATE-TV
Sun. 5:30 am

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

Memphis
WKNO-TV
Sat. 9:30 am
Sun. 5:30 pm
● WPTY/WLMT-TV
Sun. 11:30 am

Nashville
WDCN-TV
Sat. 4:30 pm
● WKRN-TV
Sun. 12:30 pm

Tri-Cities
● WKPT/WAPK-TV
Sat. 10:30 am

TEXAS

Amarillo
KACV-TV
Sat. 12:30 pm
● KFDA-TV
Sat. 5 pm

Austin
KLRU-TV
Sat. 5:30 pm
● KTBC-TV
Sat. 7 am

Beaumont
● KBMT-TV
Sun. 6:30 am

College Station
KAMU-TV
Sat. 12:30 pm, Mon. 10 pm,
Wed. 2 pm

Corpus Christi
KEDT-TV
Sat. 12:30 pm, 9:30 pm
● KRIS/KDF-TV*

Dallas/Fort Worth
KERA-TV
Sat. 9 am and 6:30 pm
● KXAS/KXTX-TV
Sat. 5 pm

El Paso
KCOS-TV
Sat. 5 pm

Harlingen
KMBH-TV
Sat. 12:30 pm
● KVEO-TV
Sun. 6 am

Houston
KUHT-TV
Sun. 11:30 am
● KTRK-TV
Sun. 11 am

Killeen
KNCT-TV
Sat. 12:30 pm, Sun. 9:30 am

Lubbock
KTXT-TV
Sat. 12:30 pm
● KLBK-TV
Sun. 5 pm

Odessa
KOCV-TV
Sun. 12:30 pm

San Antonio
KLRN-TV
Sat. 5:30 pm

Tyler
● KLPN-TV
Sat. 9 am

Waco
KCTF-TV
Mon. 12:30 pm
Sat. 9 am and 6:30 pm
● KXXV-TV
Sun. 11 am

UTAH

Provo
KBYU-TV
Sat. 12 pm

Salt Lake City
KUED-TV
Sat. 8 am and 5 pm
● KTVX-TV*

VERMONT

Burlington
WETK-TV
Thu. 8 pm, Sat. 11 am
● WCAX-TV
Sun. 8:30 am

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

Saint 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

Falls Church
WNVT-TV
Sun. 3 pm

Harrisonburg
WVPT-TV
Sat. 1:30 pm

Marion
WMSY-TV
Sat. 1:30 pm

Norfolk
WHRO-TV
Thu. 8 pm

Norton
WSBN-TV
Sat. 1:30 pm

Richmond
WCVE-TV
Sat. 8:30 am
WCVW-TV
Fri. 8:30 pm
● WAWB-TV
Sun. 6 am

Roanoke
WBRA-TV
Sat. 1:30 pm
● WSLS-TV
Sun. 6:30 am

WASHINGTON

Centralia
KCKA-TV
Thu. 6:30 pm
Sat. 12:30 pm and 5:30 pm

Pullman
KWSU-TV
Mon. 7:30 pm
Wed. 7:30 am, Sat. 2 pm

Richland
KTNW-TV
Thu. 7 pm
Sat. 2 pm, Sun. 4:30 pm

Seattle
KCTS-TV
Sun. 5 pm
● KIRO-TV*

Spokane
KSPS-TV
Sat. 9:30 am, Sun. 5:30 pm
● KXLY-TV
Sun. 9:30 am

Tacoma
KBTC-TV
Thu. 6:30 pm
Sat. 12:30 pm and 5:30 pm

Yakima
KYVE-TV
Sun. 5 pm

WEST VIRGINIA

Beckley
WSWP-TV
Sat. 2:30 pm

Bluefield
● WOAY-TV*

Charleston
● WCHS-TV
Sun. 6 am

Huntington
WPBY-TV
Sat. 2:30 pm

Morgantown
WNPB-TV
Sat. 2:30 pm

Wheeling
● WTRF-TV*

WISCONSIN

Green Bay
WPNE-TV
Wed. 7:30 pm, Sun. 4 pm
● WGBA-TV
Sun. 7 am

La Crosse
WHLA-TV
Wed. 7:30 pm, Sun. 4 pm
● WEAU-TV
Sun. 9 am

Madison
WHA-TV
Wed. 7:30 pm, Sun. 4 pm
● WMTV-TV
Sat. 5 pm

Menomonie
WHWC-TV
Wed. 7:30 pm, Sun. 4 pm

Milwaukee
WMVS-TV
Thu. 7:30 pm, Sat. 8 am
● WTMJ-TV
Sun. 6 am

Park Falls
WLEF-TV
Wed. 7:30 pm, Sun. 4 pm

Wausau
WHRM-TV
Wed. 7:30 pm, Sun. 4 pm
● WJFW-TV
Sun. 10:30 am

WYOMING

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EXTRAS
pp. 26-33

p. 26—Castle Tucker: The mansion, at Lee and High streets in Wiscasset, will be open for tours next summer, but the hours haven't been set. For details, contact the regional office of the Society for the Preservation of New England Antiquities; 603-436-3205. *Reported by Jeanne Huber.* **PVC glue:** Gorilla PVC (available in January 1998), The Gorilla Group, 122 Powers Ave., Santa Barbara, CA 93103; 805-963-2234. *Reported by Laura Fisher Kaiser.* **p. 27—Christmas trees:** For locations of ranger stations issuing tree-cutting permits, call the local U.S. Forest Service office, listed under the U.S. Department of Agriculture in the government pages of telephone directories. Other resources include state Christmas tree associations and the National Christmas Tree Association, 611 East Wells St., Milwaukee WI 53202; 414-276-6410. **Our thanks to:** Gary Chastagner, research plant pathologist, Washington State University, Puyallup, WA. *Reported by Craig Kellogg.* **p. 28—KAPLA blocks:** Set of 200 blocks, $60; 133 blocks, $50; 75 blocks, $30, each with instruction booklet; hard-bound design books available for different levels of expertise, $15, KAPLA Inc.; 888-447-5275. *Reported by Craig Kellogg.* **Rent-a-Husband:** 217A Commercial St., Portland, ME 04101; 207-879-7425. *Reported by William Marsano.* **p. 29—Books:** *Built-in Furniture,* by Jim Tolpin, 1997, 215 pp., $34.95, The Taunton Press, 63 South Main St., Box 5506, Newtown, CT 06470-5506; 800-283-7252; tp@taunton.co. *Rustic Garden Architecture,* by Ralph Kylloe, 1997, 144 pp., $37.95, Gibbs Smith Publisher, Box 667, Layton, UT 84041; 801-544-9800. *Wooden Houses,* by Judith Miller, 1997, 192 pp., $45, Stewart, Tabori & Chang, 115 West 18th St., N.Y., NY 10011; 800-815-8328. **Grinder Pad:** EZ View set of 4½-inch disc pad and three abrasive discs (coarse, medium, fine), $20, Norton Company, 1 New Bond St., Worcester, MA 01606; 800-551-4415. **Daffodils:** For tips on planting bulbs in pots, see *Bulbs for Indoors: Year-round Windowsill Splendor,* 1996, 112 pp., $9.95, (plus $4 s/h) one in the series "21st Century Gardening" from the Brooklyn Botanic Garden, 1000 Washington Ave., Brooklyn, NY 11225; 718-622-4433, ext. 274. A $35 annual membership in the garden includes a subscription to the series; new titles are published four times a year, ext. 265, E-mail: membership@bbg.org. Details on growing bulbs in pots are at www.bulb.com, the Web site of the Netherlands Flower Bulb Information Center. *Reported by JH.* **pp. 29, 32—Quotations:** "There is nothing more pitiful..." from *All Over But The Shoutin',* Rick Bragg, 1997, 359 pp., $24.50, Pantheon Books; 800-733-3000. "The physician can..." from Frank Lloyd Wright, *New York Times Magazine,* October 4, 1953. **p. 32—Trebuchet:** Timber Framers Guild of North America, Box 1075, Bellingham, WA 98227; 360-733-4001; www.tfguild.org. E-mail: tfguild@telcomplus.com. *Reported by Nathaniel Reade.* **A Toolbox Christmas:** Compact disc, $14.98; cassette $9.98, distributed by Gourd Music; 408-425-4939; www.gourd.com. *Reported by Ben Kalin.* **Cellular-phone tree:** Arcnet, 670 N. Beers St., Building 2, Holmdel, NJ 07733; 908-739-3200. *Reported by JH.* **Gatelatch: Our thanks to:** the late Gary McLean, forest archaeologist, and Gordon Ash, ranger, Spotted Bear Ranger District; Fred Flint, ranger, Hungry Horse Ranger District, Flathead National Forest, Montana. *Photographed by* This Old House *host and roving photographer Steve Thomas. Reported by CK.* **Crisp veggies:** Directions for building root cellars are included in *The New Organic Grower's Four-Season Harvest,* by Eliot

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Glidden

This photograph has been color-enhanced to represent colors available in Glidden Dulux exterior paints, not that the house depicted was actually painted with these products.

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Coleman, 1992, 212 pp., $19.95; Chelsea Green Publishing Co.; 800-639-4099. *Reported by JH.* **Mice:** "The Pest Identification Guide," free from Orkin Exterminating Co., 2170 Piedmont Rd. NE, Atlanta, GA 30324; 800-563-4687; www.orkin.com. *Reported by Rebecca Reisner.*

COUNTER INTELLIGENCE
pp. 35-42

Solid surfacing: *Surell:* Formica Corp., 10155 Reading Rd., Cincinnati, OH 45241; 800-367-6422. *Avonite:* Avonite Inc., 1945 South Highway 304, Belen, NM 87002; 800-866-8324. *Swanstone:* The Swan Corp.; 314-231-8148. *Fountainhead by Nevamar:* International Paper Decorative Products Division, 8339 Telegraph Rd., Odenton, MD 21113; 800-638-4380. *Corian:* E.I. DuPont de Nemours, Barley Mill Rd.; 800-426-7426. **Solid and veneer:** *Gibraltar:* Wilson Art International; 800-433-3222. **Spray-on:** Granicoat, Safas Corp.; 800-472-6854.

DUCTS
pp. 45-52

Duct Dusters, 120 Kimball Terrace, Yonkers, NY 10704; 914-776-5700. **For more information:** National Air Duct Cleaners Association; 202-737-2926. **Further reading:** *"Should You Have The Air Ducts In Your Home Cleaned?"* Order document EPA-402-K-97-002. (Expected to be available in print, free of charge, during November from Indoor Air Quality Information Clearinghouse; 800-438-4318. Available now at www.epa.gov/iaq/ *Engineering Solutions to Indoor Air Quality Problems,* 1995, $85; Air & Waste Management Association; 412-232-3444.)

Our thanks to: *Russell Kulp,* senior research engineer, U.S. Environmental Protection Agency, National Risk Management Research Laboratory Research; 919-541-7980. *James Hanley,* Research Triangle Institute; 919-541-6000. *Thomas Hopen,* executive director, MVA, Inc., 5500 Oakbrook Parkway, Suite 200, Norcross, GA 30093: 770-662-8509. *Nancy Sander,* Allergy and Asthma Network; Allergy and Asthma Network/Mothers of Asthmatics Inc.; 800-878-4403. Robert Axelrad, Indoor Environments Div., Environmental Protection Agency. *Dr. Thomas Platts-Mills,* Head, Div. of Asthma, Allergy & Immunology and director, UVA Asthma and Allergic Diseases Ctr., University of Virginia.

Ducts Done Right: Contractors followed these duct-cleaning guidelines in the EPA's 1997 air-quality study.

- Collect dust indoors with high-efficiency filter vacuums, or exhaust to outdoors.
- Remove and clean all grilles.
- Pull out blower; wipe and vacuum by hand.
- Open ductwork to the air conditioner coil and clean evaporator, drain pan, piping and condensate pump.
- Replace or wash out air filter.
- Inspect ducts (with camera, through access ports) to verify they're clean.
- Seal accessible duct seams against leaks.

DETAIL SANDERS
pp. 53-56

Detail sanders: *MSXE636 triangle sander,* $250, Fein Power Tools; 800-441-9878. *Detail sander kit* 6035-21, $190,

Milwaukee Electric Tool Corp.; 800-414-6527. *Contour sander kit* 6000, $134, Dremel Power Tools; 800-437-3635. *Finishing sander* BO4551K, $86, Makita USA, 14930 Northam St., La Mirada, CA 90638; 800-462-5482. *Cordless Versapak detail sander,* $68, Black&Decker, 701 E. Joppa Rd., Towson, MD 21286; 800-762-6672. *Bosch detail sander 1294* (available in early 1998), Skil/Bosch Power Tool Co., 4300 West Peterson Ave., Chicago, IL 60646; 800-815-8665. *Profile sander kit* 9444 (single-speed), $195, Porter Cable, 4825 Highway 45 North, Jackson, TN 38302; 800-321-9443. *Detail sander DS2000* $69, Ryobi America Corp, 5201 Pearman Dairy Rd., Suite 1, Anderson, SC 29622; 800-525-2579.

• **The Bosch Compact Belt Sander** (not shown in story) is the newest, most aggressive member of the detail sander clan. Instead of orbiting or oscillating, the 4-pound tool spins a 1½ inch wide belt over a wedge-shaped head. Bosch 1278, with variable speed and integral dust port. Suggested retail price is $139.

CLEAN SWEEP
pp. 61-64

Chimney sweep: Dave Galucci, Chimney King, 2267 Westlake Court, Oceanside, NY 11572; 516-766-1666. **Brushes:** chimney cleaning kit 35006, $61.99, Rutland Products, Box 340, Rutland, VT 05702; 800-544-1307. **For more information:** Chimney Safety Institute of America; 301-963-6900; Web site: www.csia.org. **Further reading:** "Chimney and Stove Cleaning," (Bulletin 14), by Christopher Curtis and Donald Post; 1994, 30 pp., $2.95; Storey Communications Inc., Schoolhouse Rd., Pownal, VT 05261; 800-441-5700.

JAWS OF STEEL
pp. 65-69

Pliers: *Vise-Grip:* Large-jaw locking pliers, 12LC, $22.50, American Tool Co., 92 Grant St., Box 829, Wilmington, OH 45177; 800-866-5740. *Needle-nose pliers:* Mechanic's pliers, 8-inch bent, KN3821, $32; 6¼-inch electrician's pliers, KN1301, $36; Circlip (SnapRing) pliers, KN4611-A2, $20.50; 8-inch Grabber mechanic's pliers, KN3831, $33; 8-inch Dolphin mechanic's pliers, KN3831, $33; 6¼-inch round-nose pliers, KN3031, $22; all from Anglo American Enterprises Corp., Box 10, Somerdale, NJ 08083; 609-784-8600.

DIRECTORY

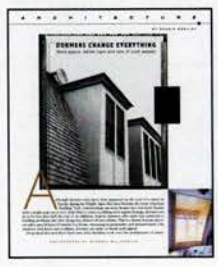
Slip-joint pliers: Six-inch, 84-106, $5.50, Stanley Tools, 600 Myrtle St., New Britain, CT 06053; 860-225-5111. *Ratcheting Slip joint,* 10-inch, 8224, $47; Sandvik Saws & Tool Co., Box 2036, Scranton, PA 18501; 800-828-9893. *Diamond fencing pliers* with staple puller R510H, $16-$18, and *Crescent ironworker's pliers,* 2050-9WSC, $17-$19, both from The Cooper Group, Box 728, Apex, NC 27502; 800-423-6175. *PVC pipe plier:* KN8103, 9-inch, $32, Anglo American Enterprises. *Tongue & groove adjustable pliers:* 442, 12-inch, $18, Channellock Inc., 1306 Main St., Meadville, PA 16335; 800-724-3018. *Craftsman Robogrip,* 45029, 9-inch, $24, Sears Craftsman Catalog, 800-377-7414.

FINANCES GUIDE
pp. 74-80

THE ZEN OF FRUGALITY:
Further reading: "The Tightwad Gazette" newsletters have been compiled into three books, all by Amy Dacyczyn, *The Tightwad Gazette,* 1992, 295 pp., $12.99; *The Tightwad Gazette II*, 1995, 274 pp., $12.99; *The Tightwad Gazette III*, 1996, 256 pp., $12.99, Villard Books, Random House, 201 East 50th St., N.Y., NY 10022; 800-733-3000. *Your Money or Your Life: Transforming Your Relationship With Money and Achieving Financial Independence* by Joe Dominguez and Vicki Robin, 1993, 384 pp., $12.95, Penguin USA, 375 Hudson St., N.Y., NY 10014; 800-253-6476; 212-366-2000. **Our thanks to:** Gopal Ahluwalia, National Association of Home Builders, 1201 15th St. NW, Washington, DC 20005; 800-368-5242. Iverson Moore, National Association of Realtors, 700 11th St. NW, Washington, DC 20001; 202-383-1000. American Bankruptcy Institute, 44 Canal Center Plaza, Suite 404, Alexandria, VA 22314; 703-739-0800, www.abiworld.org.

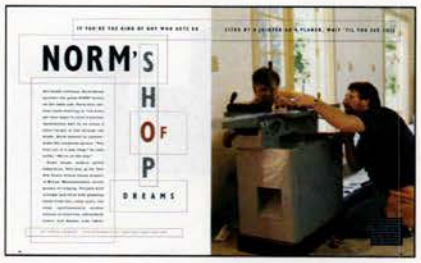
LOAN RANGER:
Low-cost lenders: American Finance and Investment Inc., 10306 Eaton Pl., Ste 220, Fairfax, VA 22030; 800-562-5674, www.loanshop.com. Countrywide Home Loans, 400 Countryway, Simi Valley, CA 93065; 800-327-9877; www.countrywide.com; Eastern Mortgage Services Inc., 2655 Interplex Dr., Trevose, PA 19053; 888-562-6367; www.eastmortg.com. Inland Mortgage Corp., Box 7189, Indianapolis, IN 46207-7189; 800-284-4462; www.inlandmortgage.com. To find mortgage brokers in different parts of the U.S., contact the National Association of Mortgage Brokers, 8201 Greensboro Dr., Ste 300, McLean, VA 22102; 703-610-9009; www.namb.org. **Further reading:** *100 Questions Every First-Time Home Buyer Should Ask*, by Illyce R. Glink, 1994, 451 pp., $15, Random House, 201 East 50th St., N.Y., NY 10022; 800-733-3000. *The Mortgage Hunter*, by Peter G. Miller, 1997, 338 pp., $14; HarperCollins, 10 E. 53 St., N.Y., NY 10022; 800-242-7737. *Home Buying For Dummies,* by Eric Tyson & Ray Brown, 1996, 344 pp., $17; IDG Books Worldwide Inc., 919 E. Hillsdale Blvd., Ste 400, Foster City, CA 94404; 415-655-3200.
SKIP THE CUSTOM TILE:
Our thanks to: Dennis Wedlick Architect, 133 Fifth Ave., N.Y., NY 10003; 212-614-9147. Michelle Belden, AIA, Palo Alto, CA; 415-321-9677. Susan Goddard Interior Design, Montclair, NJ 07043; 201-744-8588.

ARCHITECTURE
pp. 85-90



Dennis Wedlick Architect, 133 Fifth Ave., fourth floor, N.Y., NY 10003; 212-614-9147.

NORM'S SHOP OF DREAMS
pp. 98-103



Stationary tools: Special Edition Unisaw 36-821, 10-inch tilting-arbor table saw (with 3-horsepower, 230V, 60Hz motor); 50-inch Biesemeyer fence system; 78-925 right-extension table), $1,568; 6-inch precision jointer 37-154 DJ-15 with 55½-inch table, $1,279; 14-inch bandsaw and enclosed stand 28-280, $699; 12-inch Sidekick compound miter saw 36-235, with 79-806 Biesemeyer miter saw table system, $409; 16½-inch drill press 17-900, $395; 12½-inch portable planer 22-560, $399; bench router/shaper 43-505, $319; bench oscillating spindle sander 31-780, $199; 12-inch variable-speed wood lathe with stand 46-701, $519; sharpening center 23-710, $175; all from Delta International Machinery Corp., 246 Alpha Drive, Pittsburgh, PA 15238; 800-438-2486. **Hand-held power tools:** Keyless-chuck cordless drill 9863 (12-volt, ⅜-inch), $218; 1½-horsepower plunge router 693, $201; Sawboss 6-inch circular saw 345, $123; variable speed belt sander 360VS, with 3-by-24-inch belt, $255; 5-inch random-orbit finishing sander with dust collection 333, $72; 6-inch variable-speed random-orbit sanding kit with dust collection 97366, $173; quarter-sheet palm grip finishing sander 340, $54; variable-speed profile sander kit 9444VS, $129; pocket-cutter 551, $226; 1½ horsepower 4-gallon side-stack compressor CF1540, $320; 18-gauge 2-inch brad nailer kit BN200, $148, all from Porter-Cable Corp., 4825 Highway 45 North, PO Box 2468, Jackson, TN 38302-2468; 800-487-8665. Plate joiner DW682K, $386, DeWalt Industrial Tool Co., PO Box 158, 626 Hanover Pike, Hampstead, MD 21074; 800-433-9258. Bosch 1584DVS variable-speed barrel-

grip jigsaw, $159, Skil/Bosch Power Tool Co.; 4300 W. Peterson, Chicago, IL 60646; 800-815-8665. Finish nailer SFN40, $397, Senco Products, 8485 Broadwell Rd., Cincinnati, OH 45244; 800-543-4596. **Dust collection:** Central-system dust collector 50-903 and drum 50-183, $2,249. Delta International Machinery Corp. **Structural insulated panels:** Insulspan panels, LeRoy the Panel Pros, Box 1689, Keene, NH 03431; 603-352-8007. **Metal roof:** Galvalume panels, $500 per 100 square feet installed, Al Smith Seamless Gutter Systems, 247 Crystal St., Lenoxdale, MA 01240; 800-660-3189 (in Massachusetts only); 413-637-3189. **Our thanks to:** John Dumke, director of sales and marketing, Roll Former Corp., 2425 Maryland Rd., Willow Grove, PA 19090; 215-830-9757.

MONTICELLO
pp. 104-111

Sources consulted: *Jefferson and Monticello,* Jack McLaughlin, 1990, $15.95, Henry Holt & Company, 115 West 18th St., N.Y., NY 10011; *Thomas Jefferson's Architectural Drawings,* with commentary by Frederick Doveton Nichols, 1995, $9.95; Thomas Jefferson Memorial Foundation, Monticello Museum Shops, Box 316, Charlottesville, VA 22902; 804-984-9840. **Monticello:** Located on Thomas Jefferson Parkway (Route 53), about 2 miles southeast of Charlottesville; 804-984-9822. **Poplar Forest:** Jefferson's retreat is off Route 661, six miles southwest of Lynchburg. Mailing address: PO Box 419, Forest, VA 24551-0419; 804-525-1806. Open 10 am-4 pm, Wednesday through Sunday, April 1-Nov. 30. Admission: adults $5, seniors $4.50, children 6-16, $1.

FINISHING SCHOOL
pp. 112-113

New York program: Neighborhood Housing Services of New York City, 121 West 27th St., 4th floor, N.Y., NY 10001. For the closest home maintenance course, call 212-645-6363. **Programs elsewhere:** Shelter Institute, 38 Center St., Bath, ME 04530; 207-442-7938. Yestermorrow Design/Build School, RR 1, Box 97-5, Warren, VT 05674; 888-496-55410; classes from March through October. Building Education Center, 812 Page St., Berkeley, CA 94710; 510-525-7610. Southface Homebuilding School, 241 Pine St. NE, Atlanta, GA 30308; 404-872-3549. Heartwood Owner-Builder School, Johnson Hill Rd., Washington, MA 01235; 413-623-6677; classes April-October. Great Lakes School of Log Building, Snowshoe Trail, Sand Lake, Isabella, MN 55607; 218-365-2126. Timber Framers Guild of North America; 306-733-4001. Houston Community College, 4141 Costa Rica, Houston TX 77092; 713-956-1178; year-round classes.

AN AMERICAN CRAFTSMAN
pp. 114-119

Ornamental plaster: For a catalog of Lorna Kollmeyer's products, 1440 Carleton St., Berkeley, CA 94702; 415-822-6269. **Further reading:** *The Prop Builder's Molding & Casting Handbook* by Thurston James, 1989, 238 pp., $20, Betterway Books, 1507 Dana Ave.,

Cincinnati, OH 45207; 800-289-0963. **Our thanks to:** Management and staff of The Hotel Majestic, 1500 Sutter St., San Francisco, CA 94109; 415-441-1100.

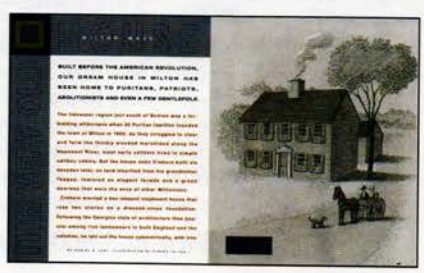
WINGSPREAD
pp.120-121

Wingspread Restoration Team: Principal architects: The Hillier Group, Princeton, NJ 08543; 609-452-8888. **General Contractor:** Bentley & Son, Milwaukee, WI53223. **Structural engineer:** Robert Silman, N.Y., NY; 212-620-7970. **Preservation consultant:** Annabelle Radcliffe-Trenner. **Preservation consultant:** Kirsten Kingsley, Vinci/Hamp Architects, Chicago. **Our thanks to:** The Johnson Foundation, P.O. Box 547, Racine, WI 53401-0547; 414-639-3211. **For more information:** The Frank Lloyd Wright Building Conservancy; 312/663-1786. Roofers: Palmer•Johnson Inc., Sturgeon Bay, WI.

GOT SNOW?
pp. 122-127

Craftsman: 536.886350 (now 536.88622), from Sears stores or the Sears Craftsman Catalog; 800-377-7414. **Honda:** HS828K1TA, American Honda Motor Co., Power Equipment Div.; 800-426-7701. **Husqvarna:** 1030E, Husqvarna Forest & Garden Co., 9006 Perimeter Woods Drive, Charlotte, NC 28216; 800-438-7297. **John Deere:** 1032D, John Deere Inquiry Dept., PO Box 12795, Research Triangle Park, NC 27709-2795; 800-537-8233. **Noma:** G2794010 (now called Noma Performance 627104X8, available only at certain Home Depot home centers), Murray Inc., 219 Franklin Rd., Brentwood, TN 37027; 800-528-5087. **Simplicity:** 970M, Simplicity Manufacturing Inc., 500 N. Spring St., PO Box 997, Port Washington, WI 53074; 800-987-5296. **Toro:** 1028 Power-Shift, The Toro Co., 8111 Lyndale Ave. S., Bloomington, MN 55420; 800-348-2424. **Troy-Bilt:** 42012, Garden Way Inc., 102nd St. and 9th Ave., Troy, NY 12180; 800-437-8686.

THIS VERY OLD HOUSE
pp. 128-135



For more information, write to: The Milton Historical Society, Suffolk Resolves House, 370 Canton Ave.,

Milton, MA 02186. **Our thanks to:** Jonathan Beecher, Virginia and Christopher Devine, Holly Beecher Field, Mary Beecher Price; Andrea Gilmore, regional director, Building Conservation Associates Inc., Dedham, MA; Daniel D. Hacker, senior librarian, Milton Public Library; Jeannette Peverly, librarian, Milton Historical Society; and David Webb, architectural preservationist, Newbury, MA. **Further reading:** *A Brief History of Milton Massachusetts,* edited by Mrs. James B. Ayer, the Milton Historical Society, Milton, MA, 1956, 44 pp., $5; *A History of Milton,* Edward Hamilton Pierce, The Milton Historical Society, Milton, MA, 1957, 275 pp., $35. To order either book, write to the Milton Historical Society (see address, above).

THE INSTANT EXTRA BEDROOM
pp. 136-139

Materials: Furniture levelers (also called swivel adjustable glides), 1 5/16-inch long, 39 cents each; tee nuts, 13 cents; Raybern Company of Massachusetts dba Builder's Specialty Hardware; 617-666-3000. Clear pine, 5- or 4-inch stock, $1.40 a foot; ½-inch quarter-round molding, 19 cents a foot; ½-inch-thick Homasote, $14.95 per 4x8-foot sheet; purchased from Arlington Coal and Lumber; 617-643-8100. Homasote is manufactured by Homasote Company; 800-257-9491. Benjamin Moore latex primer, $8.97 per gallon, and semi-gloss paint, $16.41 per gallon; Felt Gard 1-inch pads, $2.98 per pkg. of eight; 3M Replacement Strips with Command Adhesive, $2.46; square spiked cups to protect carpet, $1.98 per pkg of eight; Home Depot., 75 Mystic Ave., Somerville MA 02145; 617-623-0001. Forsner drill bit 62891, 1-inch, $19.50, Primark Tool Group; 800-242-7003. Three-inch drywall screws, 2½-inch trim screws and 1¼-inch brads

available in hardware stores and home centers. **Contractor:** Tom and TJ Silva, Silva Brothers Contruction, 41 Locust St., Reading, MA 01867; 781-944-3462 or 781-863-1962.

HANDSAWS POSTER
pp. 141-142

Two-man timber, $400-$600 special order, Pacific Arborist Supplies Ltd., 154 Riverside Drive, North Vancouver, B.C. V7H 1T9; 604-929-6133; **Reversible gent's** 18102.01, $18.50; **slotting** 35108.01, $23.45; 10-inch **fret** 14101.01, $27.50; 24-inch **English bow** 50I01.02, $80; 6-inch **French fine veneer,** 94101.04, $15.20; 12-inch **French flush cut** 70I02.01, $17.95; **dovetail** 35108.03, $39.95; all from Garrett Wade, 161 Ave. of the Americas, N.Y., NY 10013; 800-221-2942. **Japanese keyhole** T15.119.1, $11.95; **pole** (three-section) 02.068, $160; **Japanese mortise (Azabiki)** 15.121.05, $23.95; **Japanese rip** 05.114.21, $133; all from The Japan Woodworker; 800-537-7821. **Japanese veneer** 899-649, $16.95, Woodworker's Supply, 1 Woodworker's Way, Seabrook, NH 03874; 800-645-9292. **Coping** 15O03, $16.99; 32-inch **timber** 03P52, $50; 22-inch **crosscut** 17Z05, $65; all from Woodcraft, 210 Wood County Industrial Park, Box 1686, Parkersburg, WV 26102-1686; 800-225-1153. Six-inch **wallboard** 15206, $6, and 10-inch mini **utility** 20221, $14; both from Stanley Tools, 600 Myrtle St., New Britain, CT 06053, 860-225-5111. Six-inch **bow** 333, $25, and 11-inch **pruning** 4211-116T, $25, both from Sandvik Saws & Tool Co.; 800-828-9893. **Flush-cut** 05K36.01, 11½-inch, $16.95, Veritas Tools Inc., 12 East River St., Ogdensburg, NY 13669; 800-667-2986. **For more information on timber saws:** Crosscut Saw Co.; 315-568-5755. Free catalog.

MOVING A TREE
pp. 148-149

Tree movers: Bartlett Tree Experts Co., PO Box 3067, Stamford, CT 06905-0067; 203-323-8239; www.bartlett.com. Environmental Design, 23556 Coons Rd., Tomball, TX 77375; 800-376-4260.

Root-strapping device: Newman Tree Frame, The Tree Moving Network, PO Box 51, Oxford, MI 48371; 888-505-0866. **Morton Arboretum:** Open daily 7 am-5 pm during fall and winter, longer hours during spring and summer;

4100 Illinois Route 53, Lisle, IL 60532; 630-719-2465, www.mortonarb.org. Annual membership, $45 includes newsletter. **Hearst Castle:** Visitors to Hearst San Simeon State Historical Monument can see three of the huge oaks moved in Hearst's lifetime. Two of the trees, moved in 1926 to make room for a new wing, stand on the north side of the main house. Tours are offered daily; $14 for adults, $8 for children. Tours are by reservation for specific times; call 800-444-4445. **Further information:** International Society of Arboriculture, PO Box GG, Savoy, IL 61874; 217-355-9411; fax 217-355-9516; www.ag.uiuc.edu/~isa/. The society publishes *The Principals and Practice of Planting Trees and Shrubs*, by Gary Watson and Gene Heimlich, 200 pp., $40 ($30 for members).

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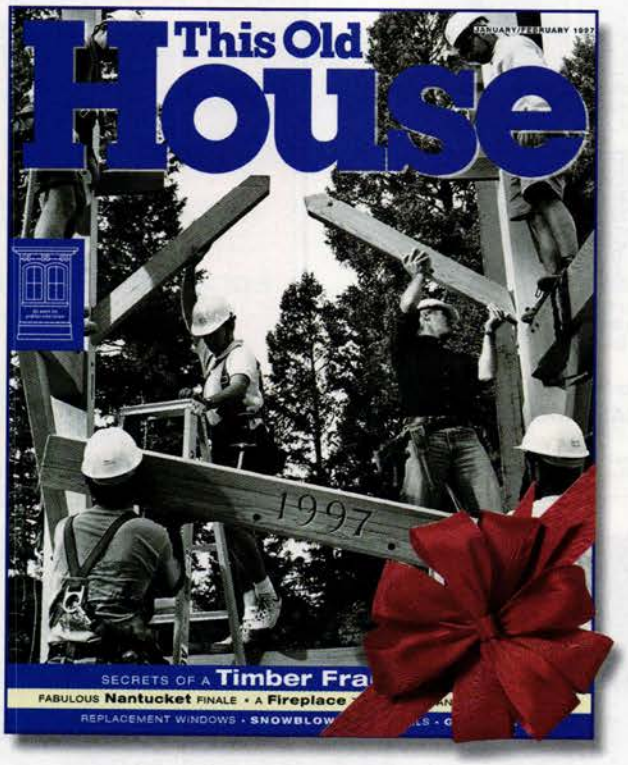

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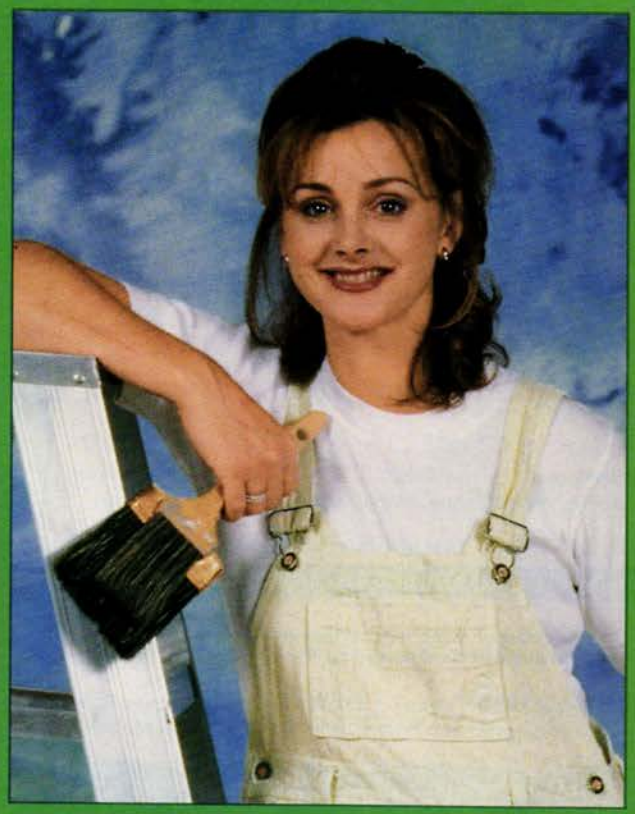

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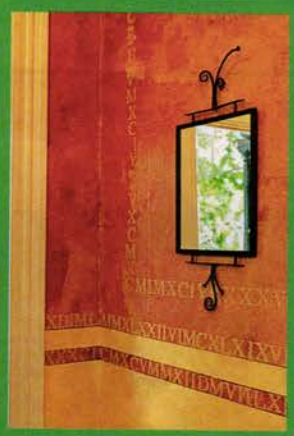

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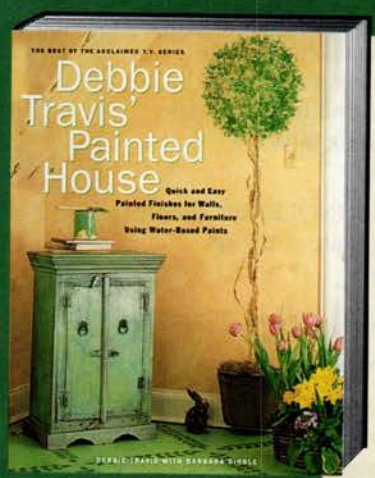

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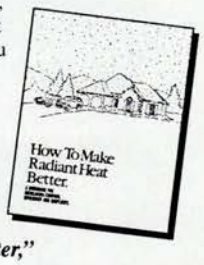

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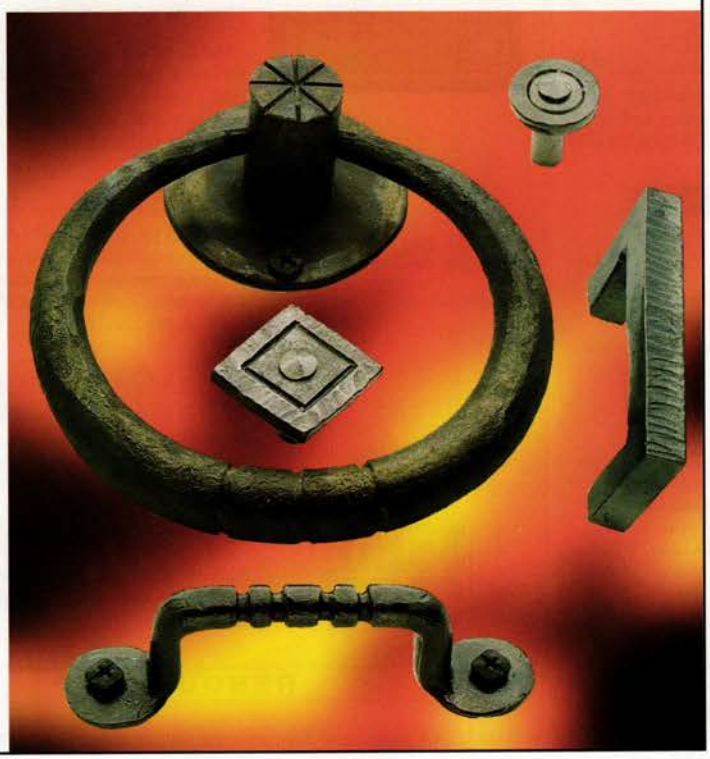

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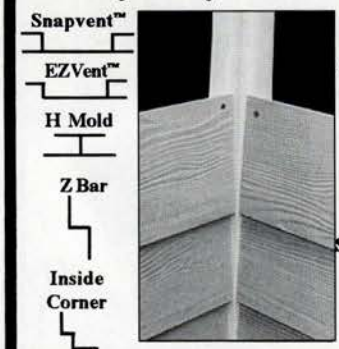

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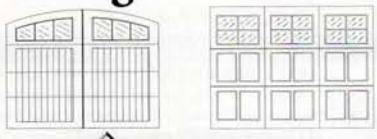

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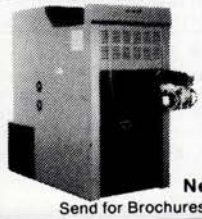

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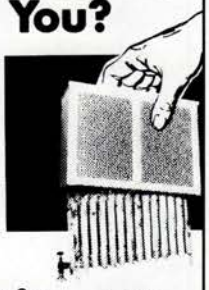

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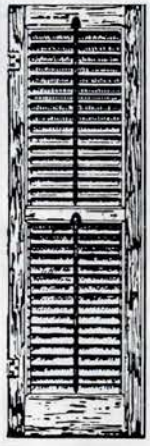

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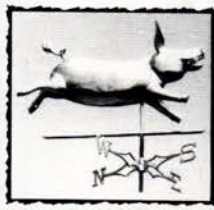

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Now Audubon wants to sell the house with about a quarter acre and use the proceeds to preserve and maintain the rest of the property, a pristine example of a transition zone from salt marsh to deciduous forest. A 1996 inspection by the New York Landmarks Conservancy found the six-bedroom, three-bath house structurally sound, and the paneled wainscoting, window seats and many other details have survived decades of neglect and occasional vandalism. Still, the cost of the renovation is estimated at $100,000, close to what Audubon believes the house should sell for. But after restoring it, the new owners will have something quite rare just 16 miles from Manhattan and only a 60-minute ride on a different set of tracks, the New York subway.

CONTACT

Marcia Fowle
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The porch may need rebuilding, but inside, Sunset Lodge contains room after room of wonderfully crafted, never-painted details including Ionic columns, coffered ceilings and artfully divided windows.

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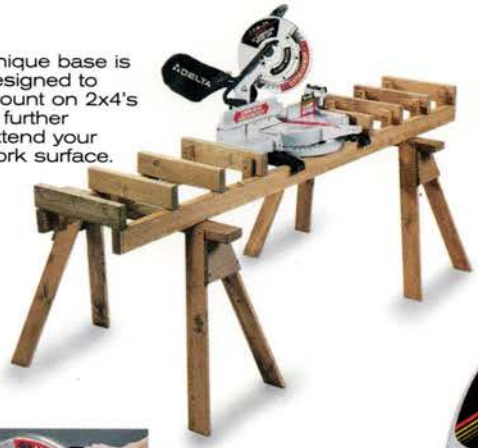

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