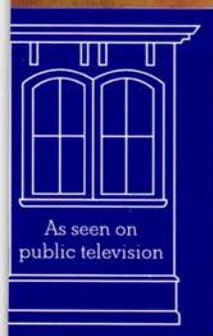


This Old House



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takes the measure
of the

Savannah project

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because it happens to be a pretty cool one. Seeing as most are dull enough to calm a terrier, we thought

we'd better point this out. 🐾 You see, a group of thirteen Saturn-owning scientists recently called and said that we should be spreading the word about all the new, high-tech thinking that goes into



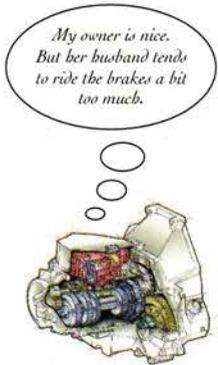
These scientists at Hughes Research Laboratories seem pretty clear on the concept of "fuzzy logic" and where to find it.

how it does this are, well, kind of dull. However, the performance you get is anything but. 🐾 So even if this high-tech science stuff isn't your bag, you can't argue with what physicist Jesse Matossian has to say

how our cars drive, not just how they're sold. And not being ones to argue with really smart people, we agreed. 🐾 That said, we'd like to introduce you to something on the new 1996 Saturns that our

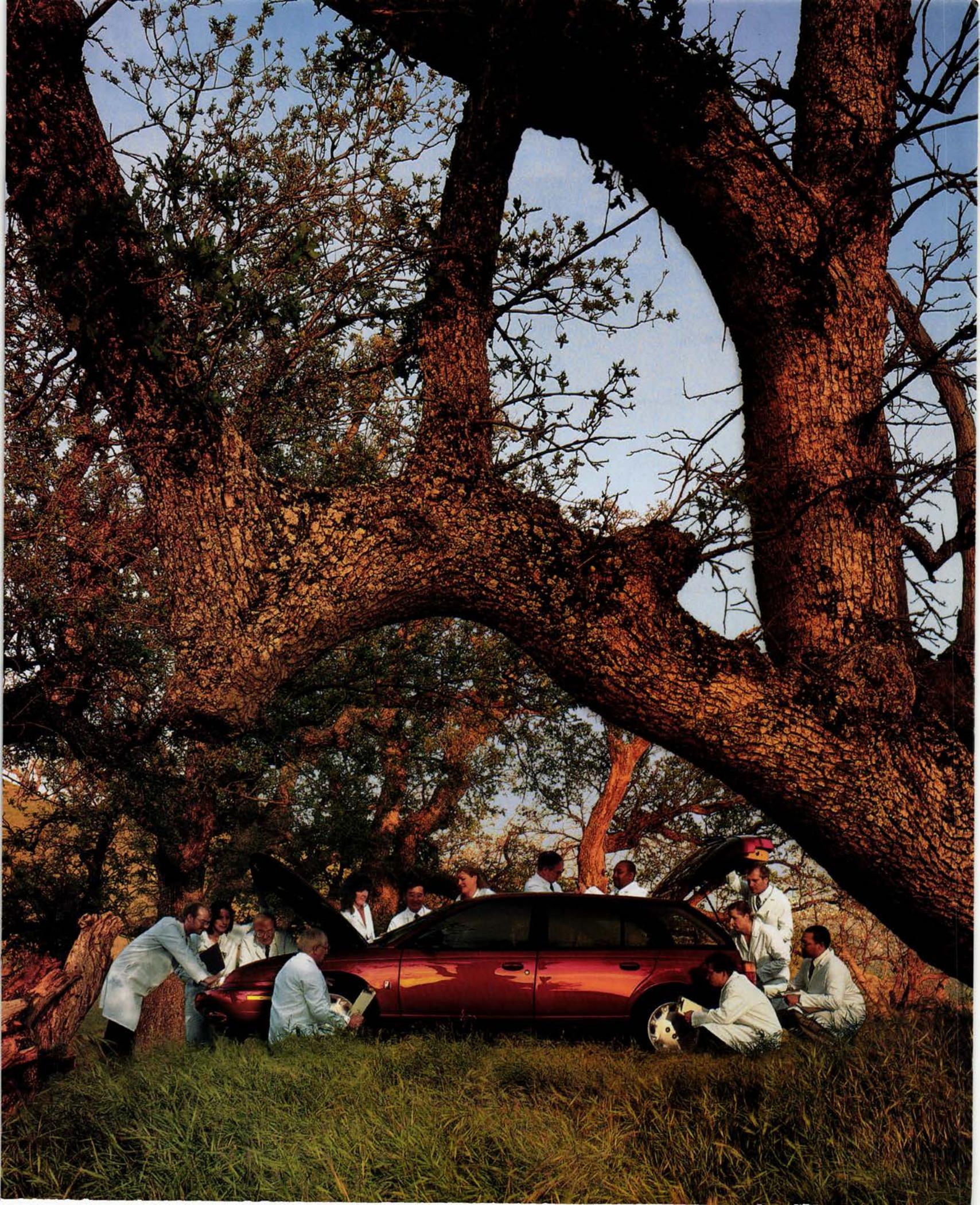
about it. "It makes it a fun car to drive. And despite what some people may think, we scientists want to enjoy life, too." And you know, we wouldn't be a bit surprised if he had the data to back it up.

 science friends know all about: "Fuzzy logic." **SATURN.** Fuzzy logic is a nifty program we designed



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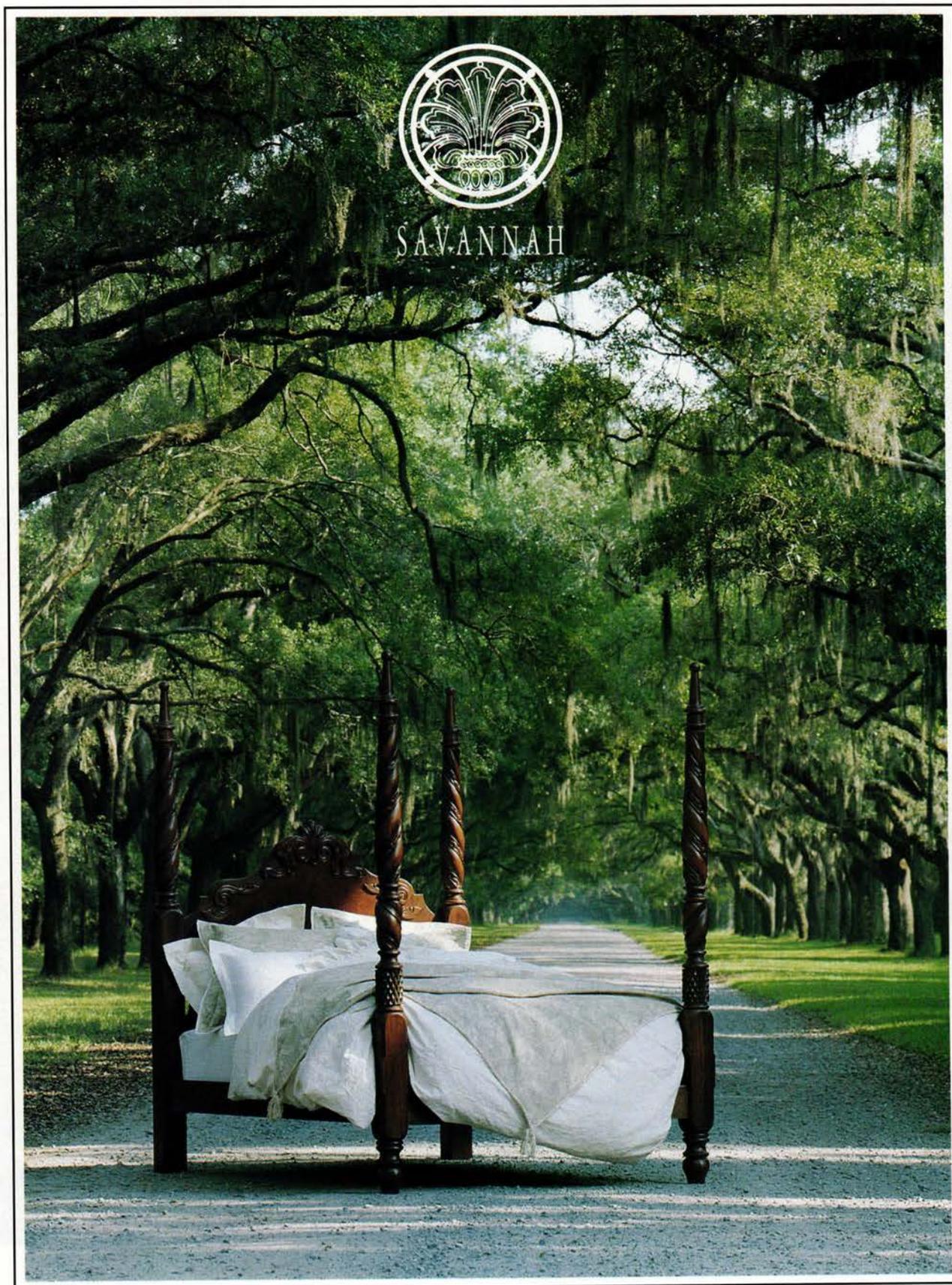
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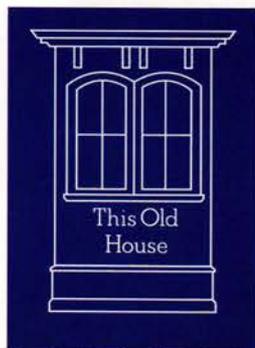
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Cover photograph of *This Old House* host Steve Thomas at the winter project site in Savannah, Georgia, by David Barry



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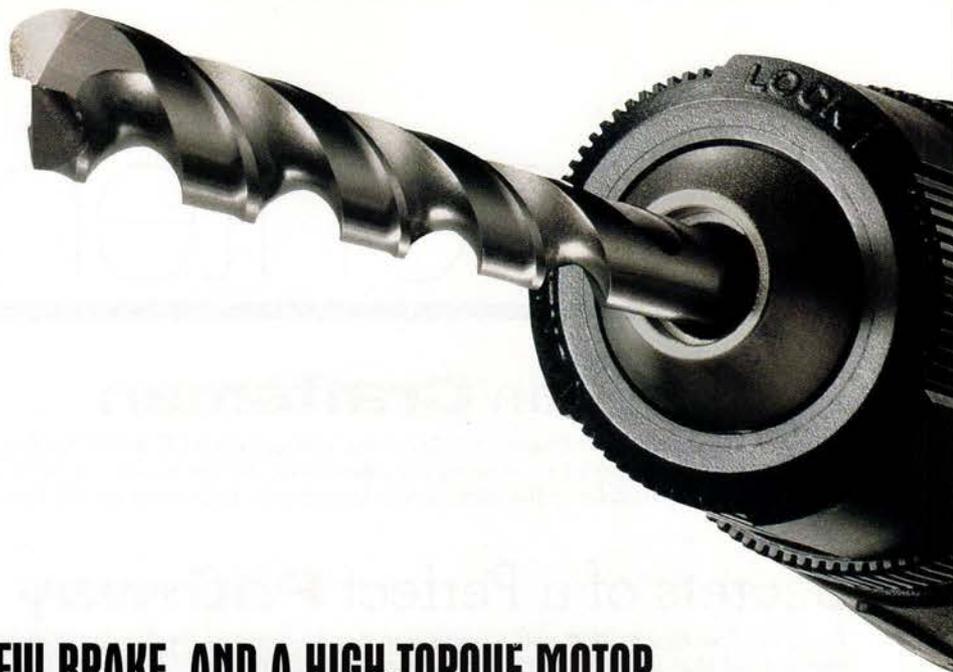
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It looks like the tool from hell and sounds even worse, but a chain saw used with care and skill makes short work of long projects. By Mark Feirer

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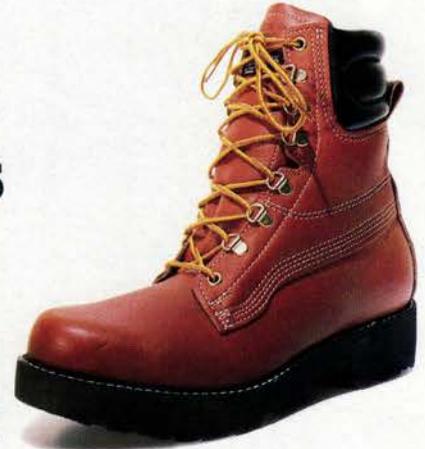
Peeled off a log like a sheet of paper toweling, plywood ends up light, strong and cheap. Although it doesn't get the respect of real wood, it was combat-tested in World War II. By Thomas Baker

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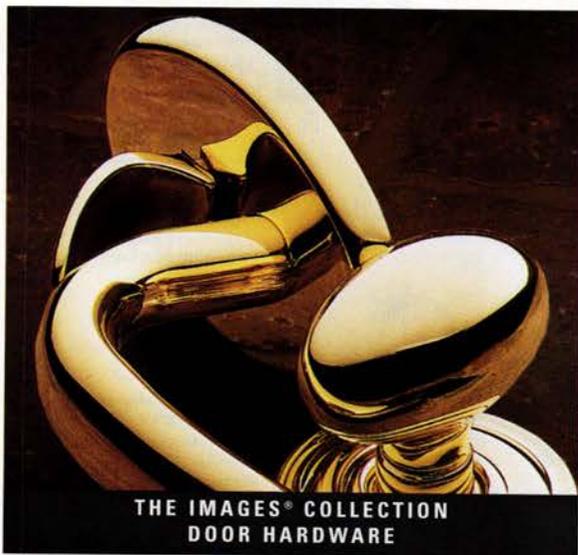
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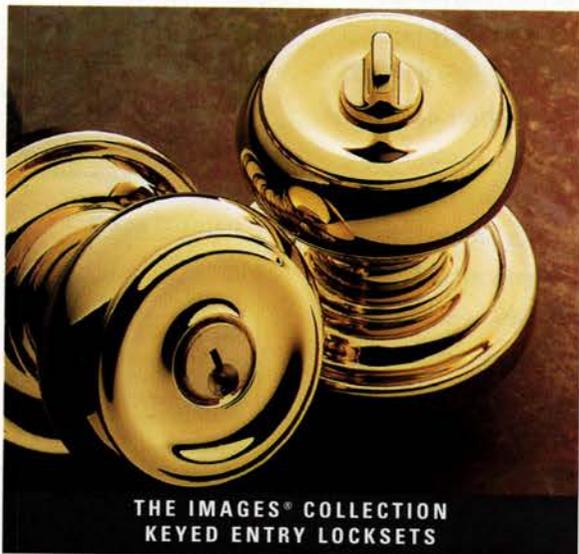


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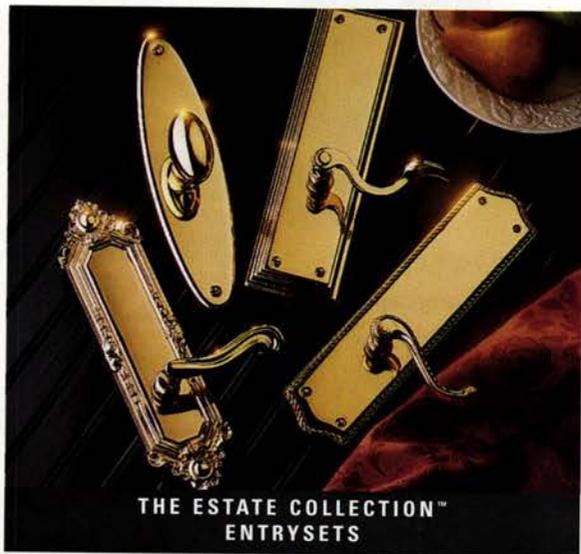
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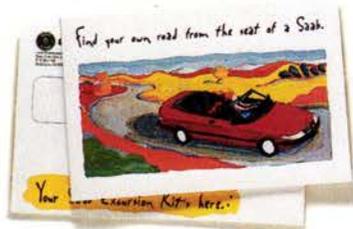
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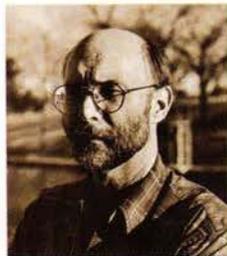
Advertising Offices New York: Nicole St. Germain,
 20 West 43rd Street, New York, NY 10036 (212-522-9465)
 California: Kate Knox, 11766 Wilshire Boulevard,
 17th floor, Los Angeles, CA 90025 (310-268-7140)
 Chicago: Brian Quinn (312-474-5905) and Tracy Saras
 (312-474-5911), 500 West Madison Street, Suite 3630,
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 Southeast: Peter S. Berezney (212-522-5943) Resources:
 Marie Isabelle, Media People Inc., 32 Shepherd Road,
 Norfolk, CT 06058 (800-542-5585 or 860-542-5535)
 Editorial Offices 20 West 43rd Street,
 New York, NY 10036 (212-522-9465)
 Editorial E-mail letters@toh.timeinc.com

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JACK McCLINTOCK (author, "An American Craftsman") has written for *Life*, *Harper's* and *Esquire* and coauthored a geographical quiz book, *Everything is Somewhere*. He is listed in *The Guinness Book of World Records* as the author of the longest sentence ever published.



A resident of Miami, he has renovated five houses. **STEPHEN HARRIGAN** (author,



"Fences") lives with his wife and three daughters in Austin, Texas, where he writes books, films and television scripts.

His books include *Water and Light*, which

recounts his experiences as a scuba diver, and a recent collection of essays titled *Comanche Midnight*. He is at work on a novel about the Alamo.

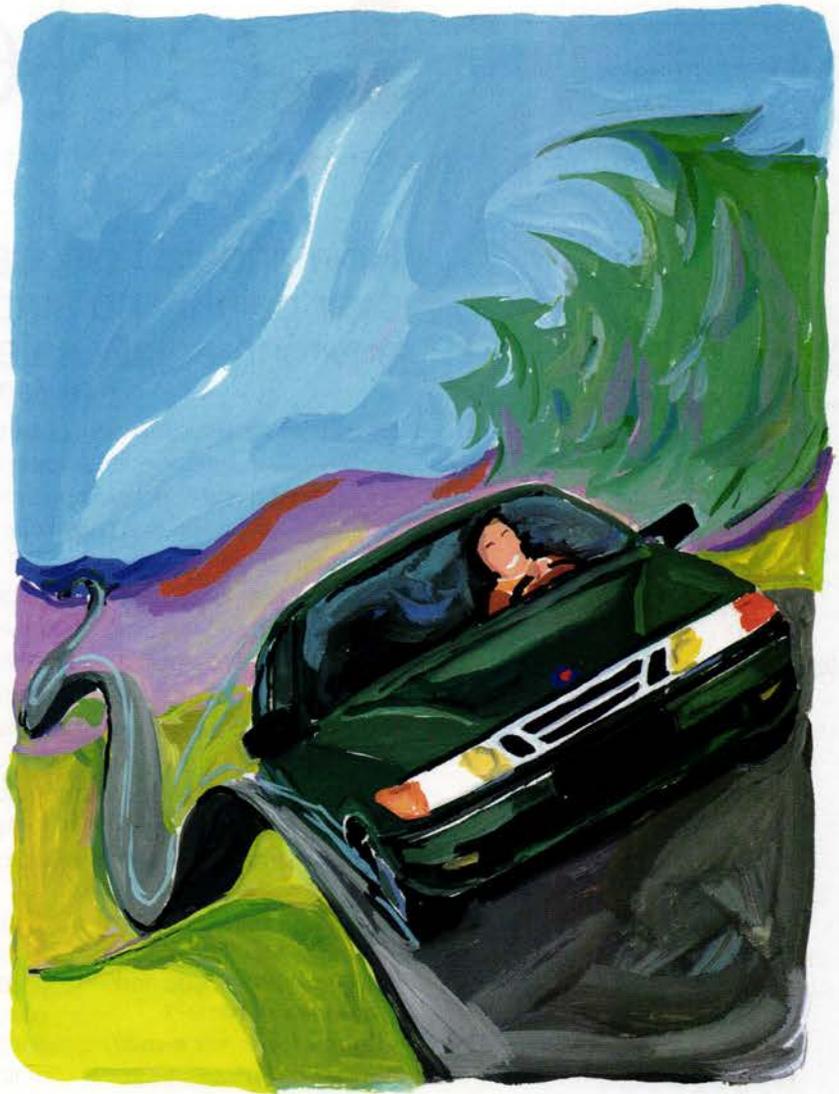
BRIAN SMITH (photographer, "Adding Life to a Garden") won the Pulitzer prize in 1985 for his photographs of the Los Angeles Olympics. His portraits have appeared in *Entertainment Weekly*, *Premiere*, *Rolling Stone*, *New York*, *GQ* and *Esquire*. **BERND AUERS** (photographer, "A Roof of Steel") lives in New York City. His photographs have appeared in *New*



York and *Keyboard* magazines. When not on assignment, Auers devotes time to a personal project: taking pictures of gambling casino architecture.



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Letters

How should I dispose of left-over paints and strippers in an environmentally safe way?

Fred DiTallo, New Haven, CT

Household materials that cannot be disposed of in a landfill—which include most strippers, solvents and latex- and oil-based paints—should be stored in the original containers and taken to a hazardous materials processing center for recycling or incineration. Empty cans with only a thin film of dry paint are safe for curbside recycling. Homeowners should take advantage of the more than 1,600 locally funded hazardous material “drop-off days” held in the spring and fall, and the 225 permanent collection facilities that accept residential hazardous waste. To find out about programs in your community, call your Department of Public Works. You can also contact the nonprofit Waste Watch Center at 508-470-3044 for technical information and a national database of waste programs.

How can I tell whether my main fuse is rated for 60 or 100 amps, and why does it matter?

Doug Moser, via e-mail

Paul Kennedy, electrician for *This Old House*, explains that a service panel is typically labeled with three numbers, such as 60/120/240. The first is the amperage capacity; on older boxes, you can read the number off the main fuse itself. Pre-1970 electrical systems are typically rated for 60 amps. Nowadays ratings

of at least 100 are required for new installations, and 200-amp boxes are increasingly common. Blowing the main fuse is a sign of exceeding amperage capacity. As homeowners accumulate major electrical appliances, they will need to upgrade.

Where can I learn more about building log houses?

**Chris Sigmund
Pittsburgh, PA**

The Log House Builder's Association of North

America has a library of approved plans for log homes and offers the only licensed apprenticeship program for log house builders. For more information, write to the association at 22203 State Route 203, Monroe, WA 98272; 360-794-4469.

What was the rubber-like compound you poured over the tub as a protective coating during the Salem bathroom renovation?

Jon Ulsaker, via e-mail

The water-based coating, called Scratch Protection, can be painted on porcelain or tile and peeled off when the work is done. It's made by Protective Products, 1205 Karl Court, Wauconda, IL 60084; 800-789-6633.



p u n c h l i s t definition: a list of items incorrectly done or remaining to be fixed on a construction job

- In our March/April “Contributors” column, we mistakenly used a photograph of Brad Lemley, the author of the sharpening article, along with the biography of writer Paul Engstrom.
- The Interbath shower pictured on page 35 of the March/April issue is a Classic II Massage, model BV923AWW.
- The phone number listed for Delta International Machinery, maker of the

table saw seen in Norm’s workshop in the November/December issue, was wrong. The correct number is 800-223-7278.

- After reading the screws article in the November/December issue, Alison Craig of Burnaby, British Columbia, wrote to tell us that square-drive screws, as they are known in the U.S., are properly called Robertson screws, after inventor P.L. Robertson—as we noted in our pullout screw chart.



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extras

Photographs by Darrin Haddad

Glove Story

When it comes to household chemicals, we know we need protection but don't know how to tell one pair of rubber gloves from another. Product labels don't specify the type of gloves to wear, and few gloves identify the chemicals they protect against. As a result, you can cover up for a messy wood-finishing project only to have the gloves dissolve on your hands. While it's best to ask the supplier what type of glove is right for your particular job, here are a few general guidelines:

Latex, a natural rubber, makes great dish-washing gloves but offers little protection against strong chemicals; use it mainly to keep hands clean. *Nitrile*, a synthetic rubber, is more puncture-resistant than latex, thus good for jobs like cleaning a barbecue grill. It resists some alcohols, alkalis, mild acids, motor oils, pesticides, fertilizers and mineral-spirit solvents (but not acetone). *Neoprene*, a synthetic rubber, is similar to nitrile. *Butyl*, also a synthetic rubber, is better for solvents such as acetone and ketones. *Fluoroelastomer*, another synthetic rubber, withstands such solvents as xylene and toluene. *PVC*, a plastic, is good for acids, caustics, cleaning materials, most alcohols, grease and motor oil. In general, synthetic rubber protects best against strong solvents.

Polyethylene gloves are cheapest (about 3 cents a pair in bulk) but they tear easily, fit poorly and don't resist most dangerous chemicals. They will keep hands clean and keep fingerprints off surfaces. *Laminates* are good when you don't know what chemicals are in the epoxies, solvents and paint strippers you're using; the ones shown here resist methylene chloride, used in many strippers, for at least eight hours. *PVA-coated* gloves are excellent for organic compounds, methylene chloride (no time limit) and chlorinated solvents such as those in degreasers. Water dissolves the coating, so don't use them in water or water-based solutions. Some of these gloves are expensive, but all are cheaper than skin grafts.



PVA \$26
per pair



Fluoroelastomer
\$43 per pair



Polyethylene
3 cents per pair



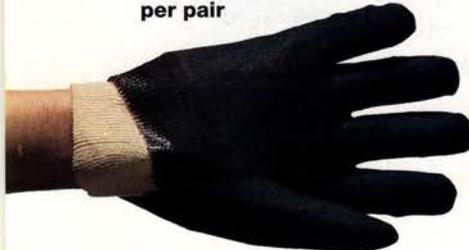
Nitrile \$7
per pair



Latex \$2
per pair



Neoprene \$6
per pair



PVC \$2 per pair



Save the Bogs

Before buying another bale of peat moss at your local garden center, consider its source. Every year, more than 40,000 acres of the crumbly brown stuff are strip-mined from sphagnum moss bogs in Canada and the United States. The peat industry says a harvested bog needs five to eight years to regain its vegetative cover, but the World Wildlife Fund says it takes at least a millennium to reestablish a bog's original depth and biological diversity. For gardeners, alternatives include kitchen scraps and fallen leaves. Composted, they loosen soil, retain moisture and attract worms. When replacements are near at hand and cheaper, peat moss is better left in the bog.





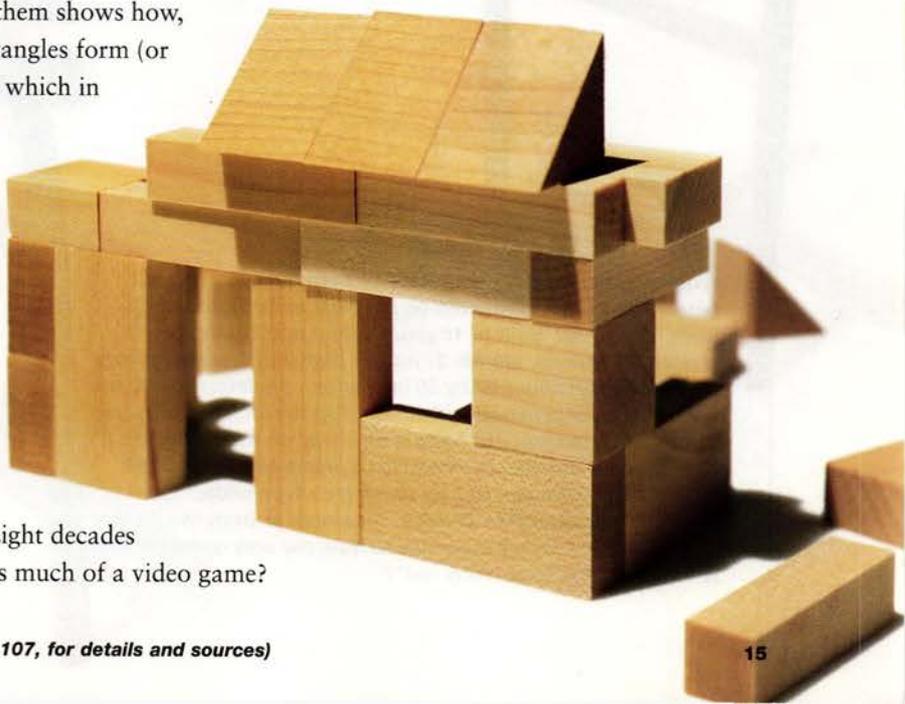
Laminate \$4 per pair

Their Old Houses

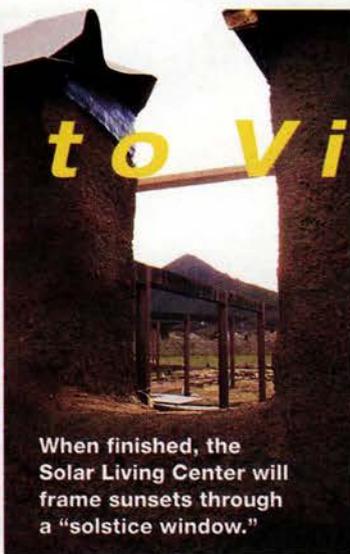
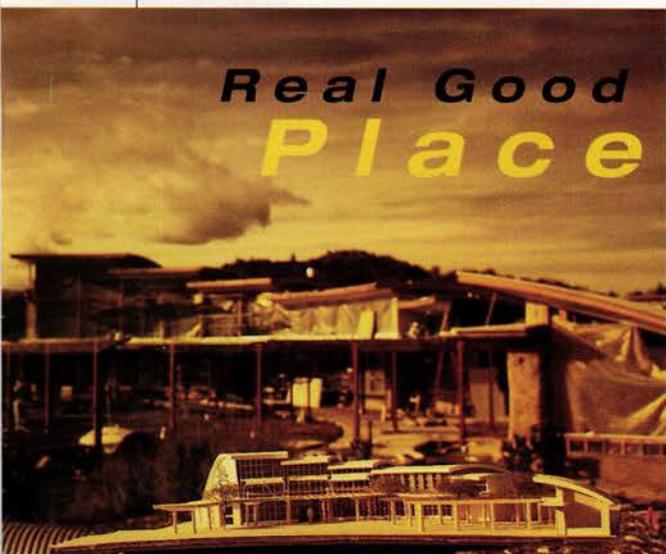
Can you pack up as easily as others settle down? Then check out Caretaker Gazette's bimonthly menu of other people's houses—all empty. In each issue, about 80 property owners offer housing in exchange for work—anything from mere house-sitting to maintenance and repair. Publisher Gary Dunn, with his wife, Thea, and their three children, has lived in Connecticut, New Jersey, Idaho, Washington and Namibia in the past three years. "Once you get the travel itch," he says, "it never really leaves." Most opportunities are in the U.S., but listings cover the world. Some recent offerings: Baja California ("prefer retired building tradesman"), Australia ("in a small fishing town, 40 miles north of Perth, beautiful view of the Indian Ocean") and Belize ("primitive retreat [requires] commonsense understanding of the hazards of nature").

CHIP OFF THE OLD...

In 1876, Anna Wright visited Philadelphia and, fortunately for world architecture, bought her son, Frank Lloyd, a set of wooden blocks. Designed in the 1830s by Friedrich Wilhelm August Froebel, the German pioneer who created kindergarten, the blocks were part of a system of "gifts" intended to inspire young imaginations. They inspired Wright, who would remember them all his life. "Mother found the 'gifts,' and what gifts they were," he once wrote. "I soon became susceptible to constructive pattern evolving in everything I saw. I learned to 'see' this way, and when I did, I did not care to draw casual incidentals of Nature. I wanted to design." Froebel blocks are deceptively simple. Playing with them shows how, for example, two rectangles form (or come from) a square, which in turn divides into two triangles. Concepts like proportion and spatial relationships are thus absorbed through play—and the memory is long-term. At the age of 88 Wright said, "The maple wood blocks are in my fingers to this day." Eight decades hence, who will say as much of a video game?



(See Directory, page 107, for details and sources)



Real Goods Trading Corp., the catalog seller of eco-inspired gadgets, wants to make a tourist draw out of environmental sense and sensitivity.

So the company is building its Solar Living Center in Hopland, about 100 miles north of San Francisco on

Highway 101. There'll be a retail store with walls made of straw bales, a photovoltaic array to provide power, huge south-facing windows to catch the sun and strategically sited plantings for shade (and food too). A gigantic solar calendar is in the works, as is an automotive memorial comprised of old cars "planted" outside the entrance. Planned events include "inspirational speakers," an electric-vehicle parade and other earnest concepts, but if things get a bit preachy you can always nip next door to the delights of Fetzer Vineyards or the Hopland Brewery.

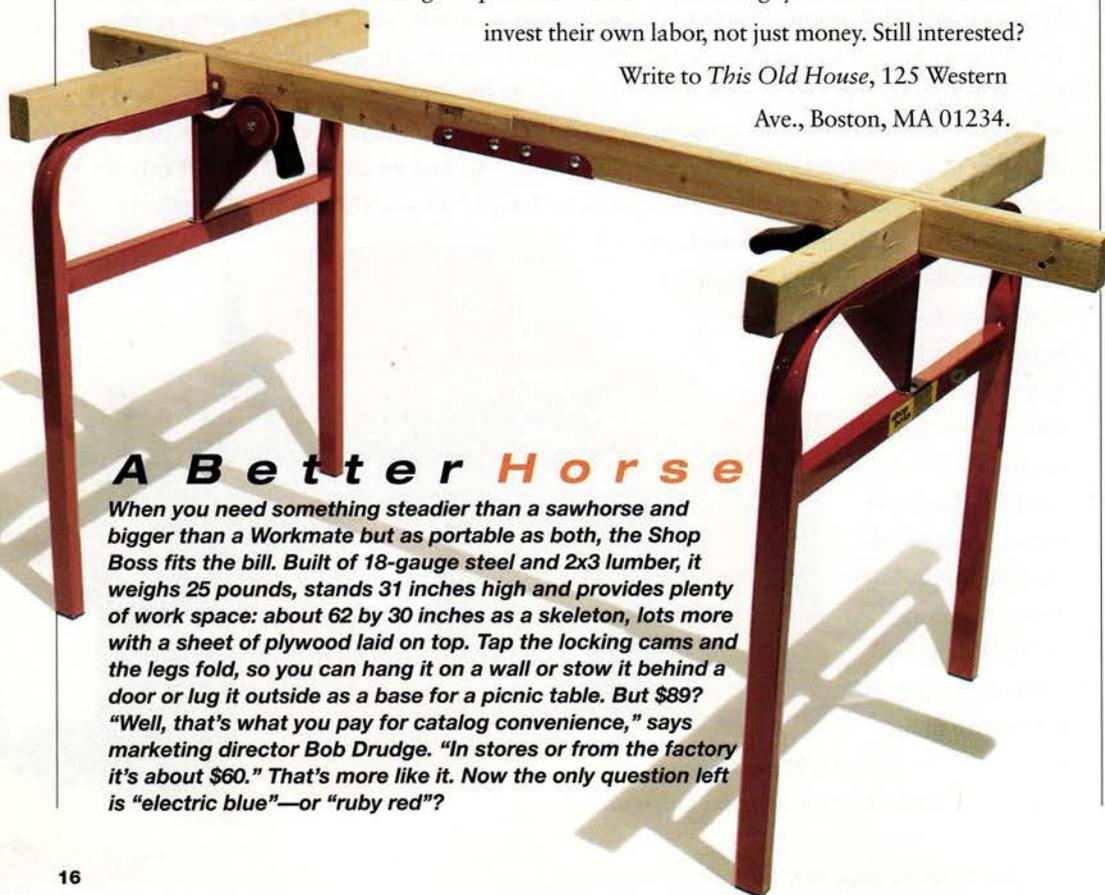
When finished, the Solar Living Center will frame sunsets through a "solstice window."

That's what people are thinking when they ask Norm and Steve, "Can my old house be your next project?" But consider this: *What if they say yes?* Your budget will have to cover the work, because *This Old House* does not pay for renovations, and any materials donated by man-

How soon can you get here?

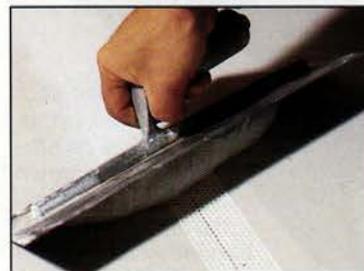
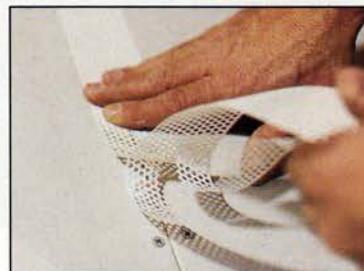
ufacturers are taxable at retail value, not wholesale. Norm and Steve prefer to pick the architect and contractor, and a television crew will also be on site. Only two houses a year are chosen. The summer project, which runs from late spring through Christmas, is in the Boston area so the crew can be close to family. The winter project (early January through mid-March) has to be somewhere warm enough to permit work outdoors. The guys like owners who will invest their own labor, not just money. Still interested?

Write to *This Old House*, 125 Western Ave., Boston, MA 01234.



A Better Horse

When you need something steadier than a sawhorse and bigger than a Workmate but as portable as both, the Shop Boss fits the bill. Built of 18-gauge steel and 2x3 lumber, it weighs 25 pounds, stands 31 inches high and provides plenty of work space: about 62 by 30 inches as a skeleton, lots more with a sheet of plywood laid on top. Tap the locking cams and the legs fold, so you can hang it on a wall or stow it behind a door or lug it outside as a base for a picnic table. But \$89? "Well, that's what you pay for catalog convenience," says marketing director Bob Drudge. "In stores or from the factory it's about \$60." That's more like it. Now the only question left is "electric blue"—or "ruby red"?



Paper Chase

Fiberglass drywall tape works well because the joint compound (which drywallers call "mud") gets a good grip through the perforations. Too bad it's a bit tricky to handle. And too bad easy-handling paper tape has to be "glued" in place with a separate application of mud. Weary of balancing these pros and cons, drywall contractor (and fireman) Sal Loscutto took the best of both and came up with Easy Joint Tape. Perforated paper with a self-stick backing, it eliminates the gluing step and also provides a "soft" stick, so the tape can be repositioned if necessary. It costs significantly more than conventional tapes (about \$7 per 200-foot roll), so you have to decide what you want to save: time or money.



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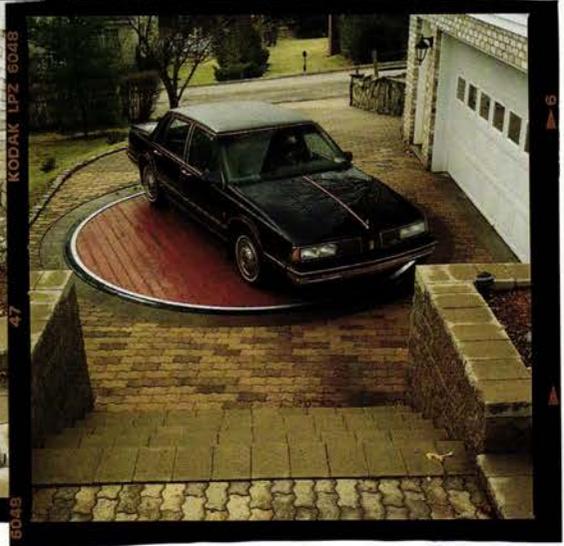
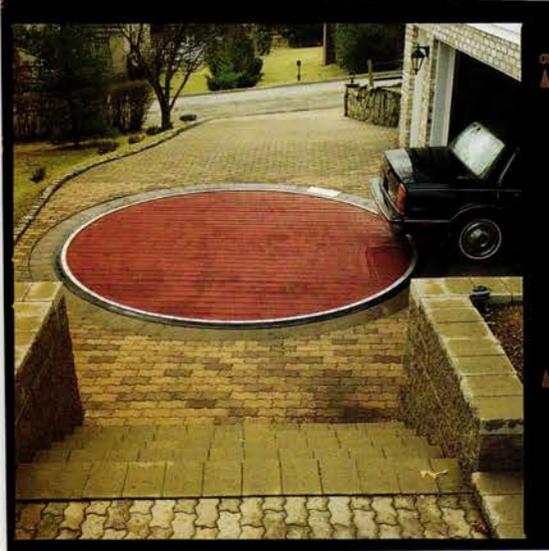
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Spin Doctor Backing out of a driveway is no fun. But if you have a 9-inch deep, 16½-foot-diameter hole in your drive and about \$6,000 to throw into it, Wieland Mueller can help. Observing that the turntable is a device capable of carrying anything from Top 40 disco hits to 100-ton locomotives, he designed the Auto Turn-About. It's electrically operated and can be remote-controlled (you could, in fact, just



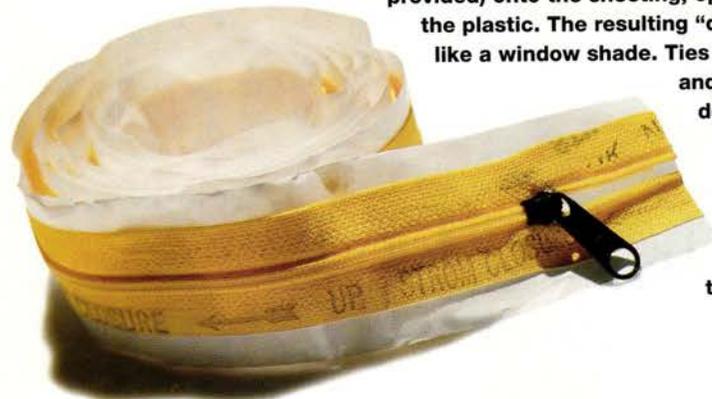
ED RIEKER

pro tips from Tom Silva

"When using a handsaw, be sure to get your shoulder in line with the saw—and both of them lined up with the cut you're planning to make," says contractor Tom Silva. "That way you can make a straight, clean cut." To those who have nearly forgotten what a handsaw is, Tom says, "Get reacquainted. Sometimes it's quicker than a power saw, when you consider the setup time. And it's always a good idea to try your hand at yesterday's skills."

D u s t B u s t e r

Is Bugs Bunny ever befuddled by a dead-end street? Is the mighty Road Runner? Not when they can simply draw a door and step right through it. In the real world there's Stik 'n Zip, which lets you make a functional doorway in plastic sheeting. The result is a renovation project in which the dust stays in the work area instead of migrating all over the house. To install, press the adhesive-backed zippers (two 83-inchers are provided) onto the sheeting, open the zippers and then cut the plastic. The resulting "door" can be rolled upward, like a window shade.



Ties are provided to keep it open, and the plastic can be saved, door and all, for reuse. One important point: Even if brand-new, the plastic must be thoroughly cleaned with the alcohol wipes provided to ensure the adhesive sticks properly.

Sun Tubes

From the outside they resemble round skylights or the navigation domes of propeller-driven DC-3 airliners, but in fact "light pipes" are conduits that bring outdoor light indoors, through the attic to a floor below. That saves the cost of installing and operating an electrical fixture while adding that most precious illumination—sunlight. Most light pipes are about 10 inches in diameter, so they fit between rafters for easy installation. Several models are on the market, starting at about \$170. Checkpoints: Some makes aren't bug-proof, others aren't airtight. To help prevent condensation where the pipe passes through the attic, wrap the tubing with insulation.

RENDERING BY WILTON DUCKWORTH

sit in your car and go for a spin without leaving your driveway). Best of all, it undercuts the price of industrial models by about \$30,000. So far the designer has gotten two requests for indoor turntables—one to rotate a living-room sofa, the other to spin a buffet. Mueller is mulling them over.



Events of Interest

■ **LOOKING FOR TIPS ON HOW TO DRESS UP YOUR GARDEN** without expending precious time and money? The Chicago Botanical Garden's "Renovating a Home Landscape" workshop presents ways to add multi-seasonal vegetation and spruce up a garden with creative design alternatives. May 8 and 15; for information call 847-835-5440.

■ **YESTERMORROW, A DESIGN/ BUILD SCHOOL** in Vermont, is offering an intensive two-week introduction to the basics of house design and building. The course, held in June, covers the essentials of new construction and renovation projects, from the use of power tools to the design and budgeting of the job. For a complete course catalog, call 802-496-5545.

■ **"LIVING WITH FRANK LLOYD WRIGHT,"** a lecture series of the New Millennium Institute, will be held June 16–21 at the institute's Wright-designed passive-solar hemicycle home in Waimea, on the island of Kona, Hawaii. Lectures and classes will take place in the morning, so afternoons can be spent on the beach. For information call 808-593-2297.

■ **HELP BUILD A LUMBER STORAGE BARN** and learn traditional and modern timber-framing techniques at a five-day workshop given by Harris Enterprise Corp. in Manchester, Connecticut. June 7 to 11; for information call 203-649-4663.

"New houses are nice;
old houses are better."

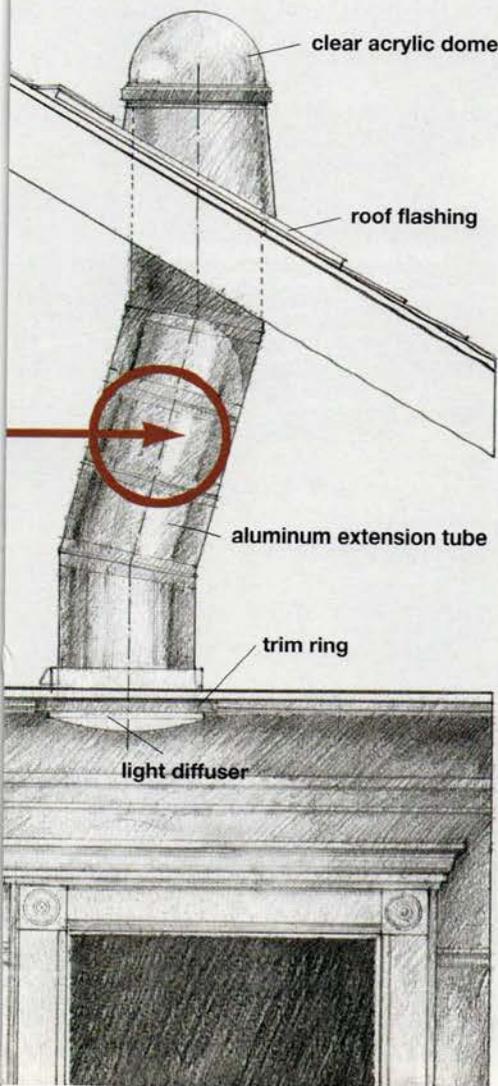
Steve Thomas

The Glory of Grout

Wonderful stuff, grout: tough, water-resistant, long-lasting. But it's a magnet for dirt and mildew, and horrid to clean. Enter White'N Brite, a potent liquid cleaner that, with the help of phosphoric acid (don't treat this stuff casually), can restore a 12-year-old shower stall to glacial whiteness. White'N Brite isn't magic: You must scrub it, hard. We found that toothbrushes work best (wear gloves and geek goggles). It works well on unglazed tile floors too—we scrubbed it with a floor polisher.



REINALDO SMOLEANSCHI



Let 'Er Rip

The fuming fury of a chain saw deserves constant respect

BY MARK FEIRER PHOTOGRAPH BY DARRIN HADDAD

Nasty, brutish and short: That's the ideal homeowner's chain saw. A smallish saw with no more than a 16-inch bar can transform a tangled mess of fallen tree into tidy piles of kindling and firewood. Cycling between a sputter and a wail, its single-cylinder engine always lets you know it's in the neighborhood. The chain saw's image is tarnished somewhat by movie massacres and gruesome logger lore. An unguarded row of razor-sharp teeth can, after all, do a lot of damage when

moving at 50 feet per second. Yet if used properly, no tool can match its furious efficiency. *This Old House* landscaping contractor Roger Cook has logged countless hours with chain saws big and small. "It's absolutely essential to respect what the saw can do to you," he warns. He makes limbing a downed tree and bucking it into rounds look no riskier than lopping off a Thanksgiving drumstick. But his technique, like a good chess player's, blends caution with strategy.



Chain Saws for **Carpentry**

You won't find them often, but chain saws do show up on job sites. A log home's painstaking joinery, for example, is possible only by means of phenomenal skill and a chain saw. Remodelers have less ambitious uses for the tool, which can quickly cut a beam or a post to length or cut out rotten joists flush with the subfloor. Production framers have been known to chainsaw bundles of studs to length—in their world, time is more precious than precision. When it comes to moving houses, a chain saw will size support timbers or slice a house in half.

BLADE BRAKE

Saw kickback drives hand into blade brake and instantly stops chain. Use it like a parking brake to lock the chain when you carry the saw. Always engage the brake when not cutting. Not found on all saws.

FRONT HANDLE

Always keep hand on top of handle, behind blade brake, with thumb locked underneath.

PULL ROPE

Starts engine. Keep spare on hand in case it breaks.

AIR FILTER

Brush off debris after each use. Clean with solvent recommended by manufacturer.

CHAIN-OIL RESERVOIR

Lubricates chain and bar to prevent overheating. Most saws have automatic oilers.

CHOKE

Open to start engine. Closes automatically.

TRIGGER LOCK

Press to free trigger. Releasing this lock idles the engine.

TRIGGER

Engages chain and controls engine speed.

FUEL TANK

Use recommended mix of unleaded gas and two-cycle oil.

STARTER

Keep the protective engine fins free of debris.

Confident Cuts

PHOTOGRAPHS BY JEFF VON HOENE



LIMBING

Work from tip to stump along the length of a tree; this takes weight off the tree and minimizes shifting. Slice off and pull limbs to the side so you won't trip over them. Roger cuts limbs flush with the log—stubs left behind make log rounds tougher to split later. Most hand injuries come from trying to hold the saw with one hand while steadying a limb with the other. Instead, **support the limb** so you can keep both hands on the saw.



STARTING THE SAW

Beginners find it easiest to start the saw on the ground. First, clear debris from a small area to avoid being skewered by sticks thrown backward by the chain. **Pin down the rear handle with your boot**, grasp the front handle firmly, then pull the starter handle across your chest. Several pulls are often needed to coax older engines; newer ones may be more cooperative. When the saw roars to life, get both hands on it before moving your boot.

NOTCHING

Sometimes you can slice a heavy limb from the top in one swipe, but long limbs may pinch the blade as they drop. To prevent this, Roger will **notch the underside of a big limb first** before finishing it off with a cut from the top. When you cut large limbs, be alert to signs of pinching. The saw will labor, then seem to "freeze" in the cut. Stop the saw and use a plastic wedge, not metal, to pry open the cut just enough to free the bar.



BUCKING

First, **make several cuts about two-thirds of the way** through a "resting" log (one that's fully on the ground). This prevents the chain from getting pinched and keeps it out of the dirt. If the saw has gripper spikes at the base of the blade, use them to pivot the saw through the log. Let the saw idle before pulling it from a cut. Use a peavey (see photo at right) to turn the log, then finish off the cuts from the other side, as Roger is doing here.



ROLLING

A peavey is a long, hooked lever that makes rolling logs easier. With the tool's hefty tooth dug into the log's underside, **lift or push the handle to turn the log**. Pulling on a peavey, as Roger is demonstrating here, is risky; an unexpected flip of the trunk could crush toes or worse. Once the log is turned just enough to expose its belly, release the peavey.



(Continued on page 26)

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Chain-Saw Chic

There's no substitute for proper cutting technique, but the gear below will increase your chances of leaving the woods in one piece. Chain-saw retailers usually stock a wide selection, as do mail-order sources.



HEAD GEAR
The hard shell absorbs impact; a flip-down face shield blocks flying chips; integral ear muffs silence a screaming saw.

GLOVES
Leather helps protect your hands from the saw, wood shards and insects. Choose 5-finger models for dexterity, 3-finger mitts for warmth.

GLASSES
The helmet's face shield isn't enough: wear polycarbonate safety glasses too. Look for ones with a rating from the American National Standards Institute.

CHAPS
The water-resistant outer surface keeps you dry, but more important, an inner layer of "warp-knit" polyester will choke a chain to a stop before it can lop off your leg. Cut-resistant jackets work the same way.

CHAIN GUARD
A plastic sheath protects the chain and you when the saw is not in use.

BOOTS
Beneath these saw-boots is more chain-choking polyester. High rubber boots (left) protect ankles, but leather offers better support. The heavy lugs on the soles of both boots improve traction.

PEAVEY
For moving wood, its leverage is far superior to brute strength and a lot easier on your back.

Roger's Rules

When using a chain saw—as he has for 20 years without an accident—Roger follows these guidelines:

1. Never cut with a dull chain. Before firing up a saw, inspect for worn, chipped or gouged teeth. Roger touches up his chains with a round file, but unless you know how to do it right, it's best to keep several sharp chains on hand and take dull ones to a pro for sharpening. One chain can last through about 20 sharpenings.
2. Walk around the entire tree to see what's supporting it. If the bulk of the log is off the ground, get it on terra firma fast. If it's hung up on vines or other trees, pull it down with ropes. If it's caught on a power line, call the power company or a tree service.
3. Check the terrain. Could the tree twist or roll if you cut off a limb? Plan an escape route.
4. Study the limbs. Bent ones can pop like springs; relieve pressure by backcutting small limbs (two inches or less in diameter) or by notch-cutting larger ones.
5. When cutting, keep the elbow of your non-trigger hand locked; if the saw kicks, you will have more control. Hold the saw close to your body, spread your feet slightly and nestle the engine against the tree. For small limbs, try to stand so the tree is between you and the chain.
6. When finished, run the fuel tank dry, clean the air filter and use an old paintbrush to clear sawdust and dirt from the bar and engine fins. Next session, fuel up with the right gas-oil mix and top off the chain-oil reservoir.



CHAIN PHOTOGRAPH BY DARRIN HADDAD

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Pipe Clamps

Versatility and strength make them a carpenter's main squeeze

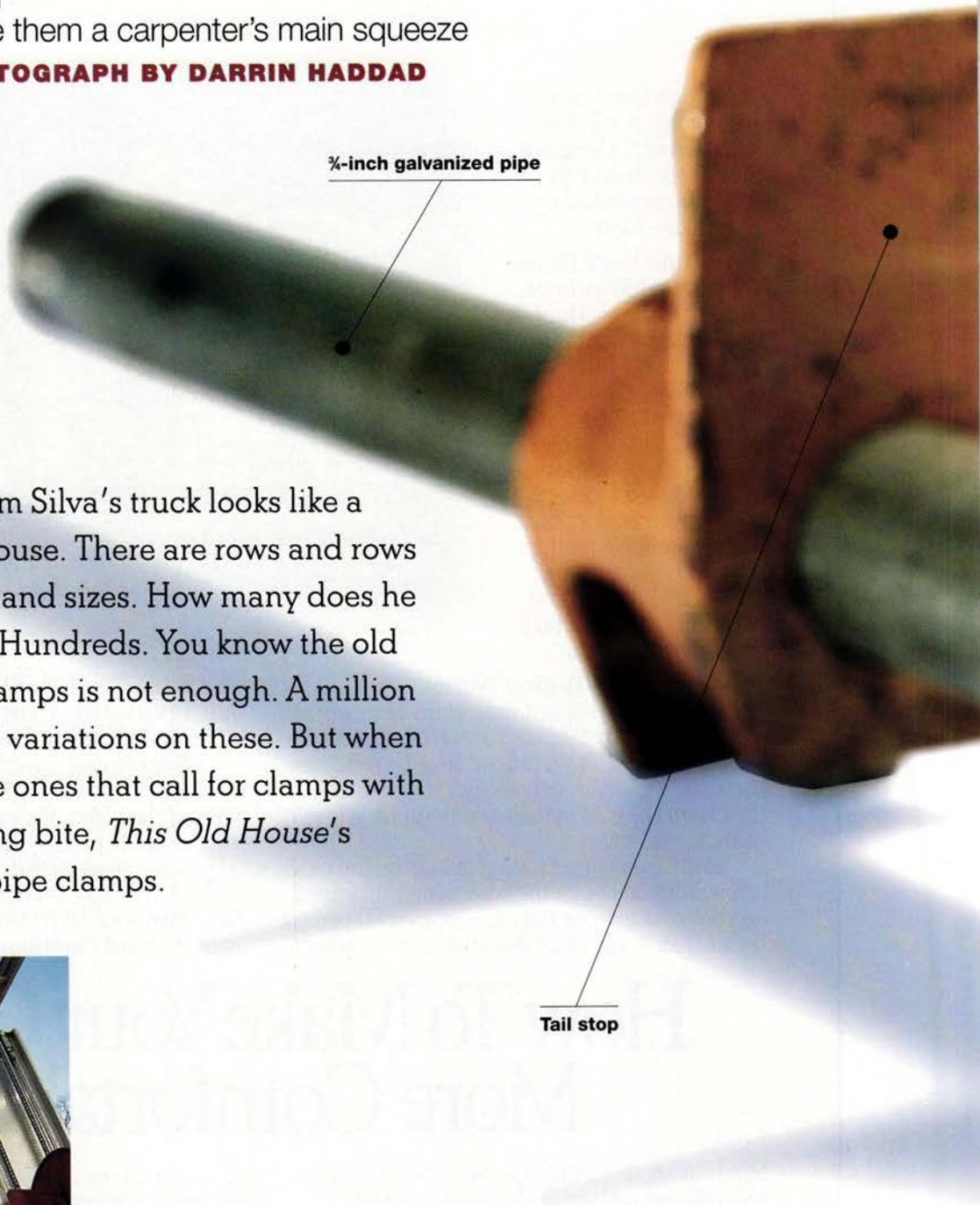
BY WENDY TALARICO PHOTOGRAPH BY DARRIN HADDAD

t

he back of Tom Silva's truck looks like a clamp warehouse. There are rows and rows of them in different shapes and sizes. How many does he have back there? "Dozens. Hundreds. You know the old sayings." Yep. Too many clamps is not enough. A million clamps is a good start. And variations on these. But when it comes to the big jobs, the ones that call for clamps with plenty of length and a strong bite, *This Old House's* contractor reaches for his pipe clamps.



KELLER & KELLER



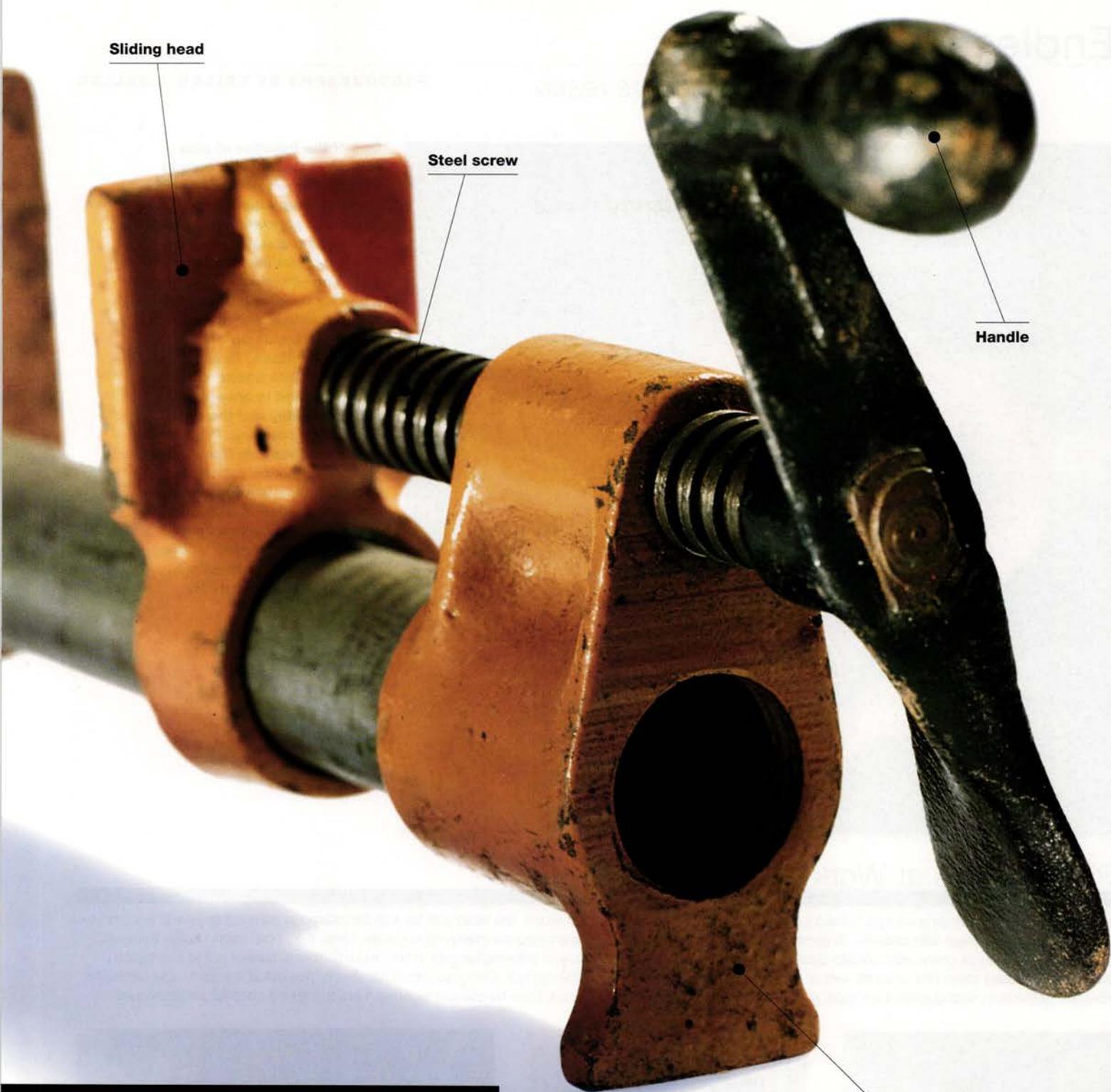
3/4-inch galvanized pipe

Tail stop

An extra pair of hands

"They're inexpensive and they're flexible. I can use them a dozen different ways," Tom says, tightening two 24-inch pipe clamps around a section of molding he's gluing up. A few minutes earlier, he used some 12-inch pipe clamps to squeeze together the stiles on a kitchen cabinet assembly. Later in the day, he'll use several 9-foot clamps to custom-build a door and hold it square while he fastens it.

Pipe clamps have two components: the clamp fixtures, including the tail stop and head assembly, and the pipe. The tail stop slides in from one direction while the screw (part of the head assembly) applies pressure from the other. Some brands have a reversible head and a specially designed crank handle so



the clamp can double as a spreader—handy for straightening bowed studs, for example. A spring-loaded clutch mechanism grabs the pipe and prevents the tail stop (and head assembly, if it's movable) from slipping around. This is the part of the fixture most likely to wear out. It's not worth replacing the mechanism, though parts are available from some manufacturers; it's easier and not much more expensive to simply pick up new clamp fixtures.

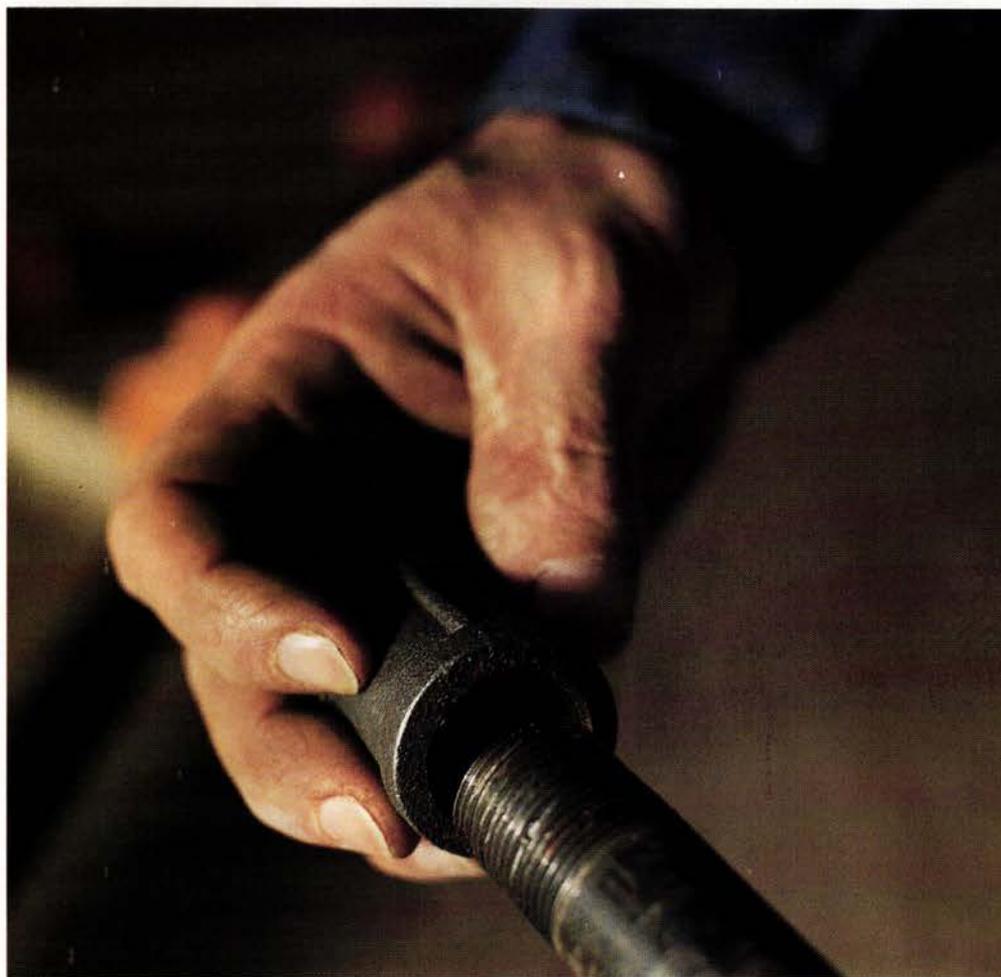
Fixtures are designed to fit $\frac{1}{2}$ - or $\frac{3}{4}$ -inch pipe. Inexpensive steel “black” pipe is preferred by some. The surface is less slippery than that of galvanized pipe, so the clutch mechanism can dig in. But most contractors, including Tom, find galvanized works just as well. Clamp fixtures and pipe are purchased separately at hardware stores or through tool suppliers. Tom picks up pipe free when he's demolishing old heating and plumbing systems.

Stationary head

Endless Pipe

Extending a pipe clamp's reach

PHOTOGRAPHS BY KELLER & KELLER

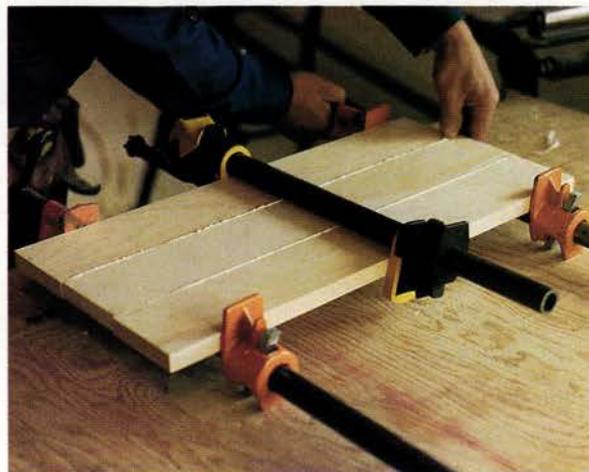
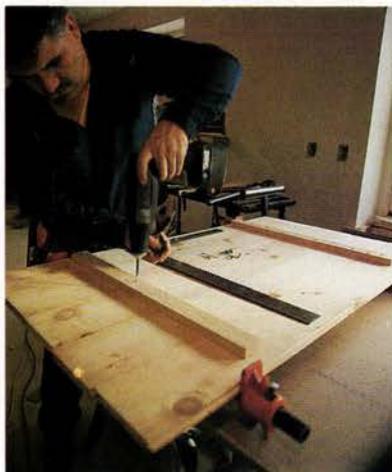


One of the beauties of pipe clamps is that they're easy to extend. There's no need to haul around heavy, cumbersome lengths of pipe when it's possible to use a coupling—a pipe fitting with female threads at each end—to join two or more pipes for the reach needed to clamp together an entire run of cabinetry or glue up a large piece of furniture. To extend a pipe it must be threaded at both ends, one end to accept the head assembly and the other end for the coupling. Prethreaded pipe is available from lumber or plumbing supply stores. Salvaged pipe like Tom uses can be threaded at a plumbing supply store for a couple of dollars. Or, if you have a pipe die and plenty of extra time, you can thread it yourself.

Pipe Clamps at Work

BELOW LEFT: Tom uses pipe clamps to hold tongue-and-groove V-boards in line while he joins them with battens. To prevent the jaws from marring the work, some clamps come with nonslip plastic pads. When they aren't available, Tom uses spare bits of cardboard or slices of wood, which he attaches to the jaws with double-stick tape. **MIDDLE:** Because pipe clamps

are round, the head and tail can be rotated at different angles to accommodate disparate clamping surfaces. Here, the upper clamp holds three cabinets of differing heights in line. **RIGHT:** Tom is careful not to overtighten pipe clamps. Doing so forces too much glue out of the joints and dents the wood. Here he clamps together 1x4s to make a shelf for a microwave.



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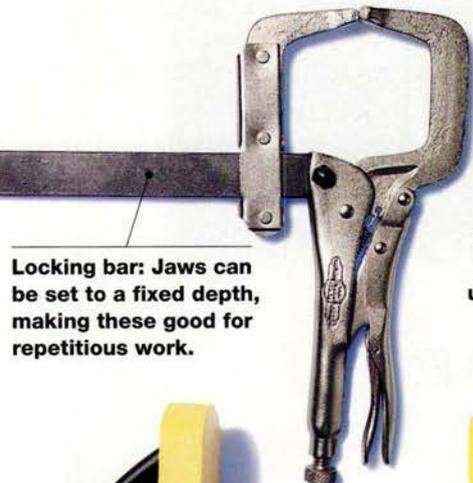


*Irwin Broh & Associates, Inc. 1995 Customer Satisfaction survey. **Based on resale value information obtained from the Intertec® Outdoor Power Equipment Blue Book®



a clamp for every job

Pipe clamps are great for big jobs, but you wouldn't use them to squeeze together the mitered corners on a picture frame. There are hundreds of different clamps, each suited to a different type of work. Most are versions of those shown here. When it comes to buying clamps, there are two rules to follow: Always buy them in pairs, and go for quality—there's nothing worse than having a clamp give way mid-project. **PHOTOGRAPHS BY DARRIN HADDAD**



Locking bar: Jaws can be set to a fixed depth, making these good for repetitive work.



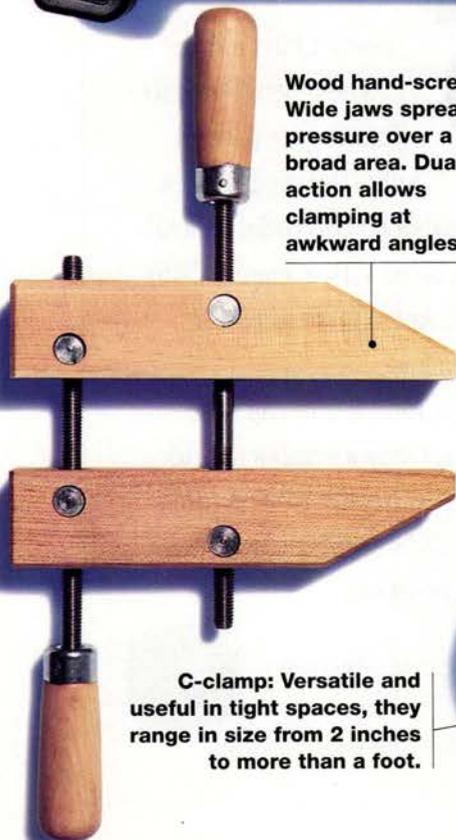
Spring clamp: Jaws snap closed when the handle is released. Easy to use and great when you're in a hurry.



Quick-action bar: Deep jaws are handy for clamping hard-to-reach areas or large projects.



One-handed bar: These have done for carpenters what automatic bread slicers did for bakers. "One-handers operate so quickly and smoothly, I rarely reach for anything else," Tom says. The sliding head is tightened and adjusted with the pistol grip. The clamp releases immediately when the trigger is squeezed.



Wood hand-screw: Wide jaws spread pressure over a broad area. Dual action allows clamping at awkward angles.



C-clamp: Versatile and useful in tight spaces, they range in size from 2 inches to more than a foot.

Ratchet band: Best for looping around several items or oddly shaped projects, like chair backs or columns.





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Ashley Stephenson



MIRACLE-GRO

The First Man-made Wood

Is plywood better than we thought?

BY THOMAS BAKER PHOTOGRAPHS BY PETE ECKERT

Rightfully shunned as a construction material because it fell apart in the rain, plywood finally gained acceptance in the 1930s when water-resistant glues gave it longevity and integrity. But it was probably World War II that proved the legitimacy of the first man-made lumber. With most loggers on the front lines and natural products of any sort in short supply, plywood was a natural for covering Mosquito airplane wings, sheathing PT boat hulls and spanning countless barracks floors.

Despite its wartime wonders and its desirability as a simple, easy-to-use material for putting up postwar houses, plywood has never entirely shaken its image as being inferior to real wood, even though plywood panels cover roofs, hold up floors and stiffen walls in the vast majority of American homes. Ironically, because so many builders these days use even cheaper wood-chip-and-glue panels, plywood-sheathed houses are now seen as a sign of higher-quality construction.

Composed of wood sheets so delicate a child could easily snap one in her hand and held together by inexpensive plastic glues, the assembled piece of plywood is stronger, stiffer and less prone to warping than solid wood of the same thickness. The secret is gluing the veneers so that each grain is perpendicular to the next. The resulting “wood” is so tough that a half-inch sheet can support a compact car.

The idea of laminating wood isn't new—cabinetmakers for Cleopatra used veneers to dress up their work—but no one realized the value of turning each veneer at right angles to its neighbor until

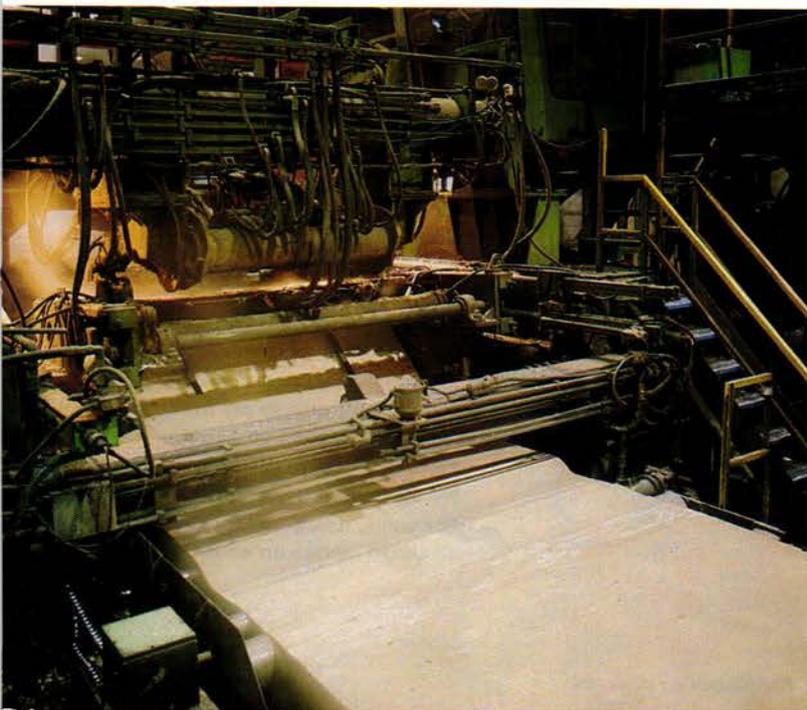
A continuous sheet of steaming hot veneer shoots out of the peeler at the Simpson plywood mill in Shelton, Washington. One log 8 feet long and 1 foot in diameter produces about 100 feet of veneer.



Stacks of raw plywood emerge from the press, ready for trimming. The heated press sets the glue in minutes, welding the veneers together.

EXTERIOR PLYWOOD

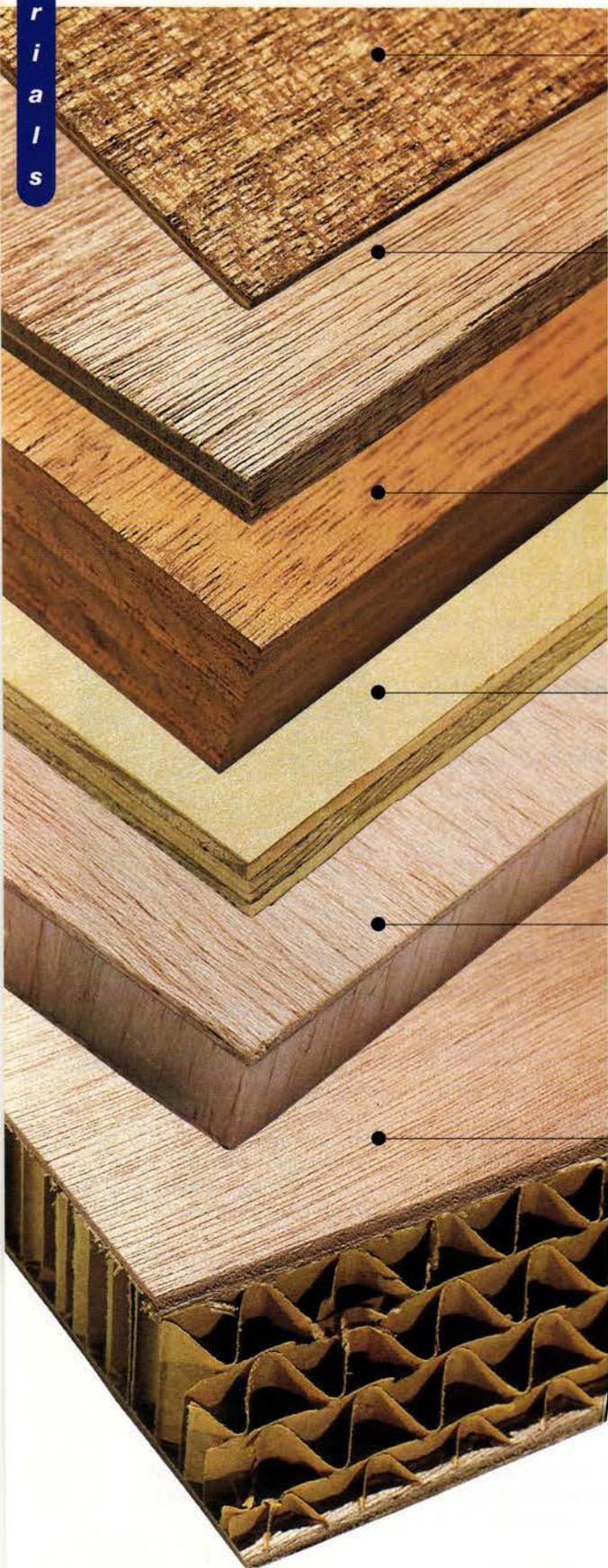
The workhorse of laminated panels is made with softwoods and water-resistant glue. The wood decays if kept in contact with soil or water. In such situations, pressure-treated panels last longer.



SPECIALTY PLYWOODS

STILL LIVES BY DARRIN HADDAD

Almost anything can be put between two sheets of wood. Innovative plywood cores improve stiffness, reduce weight and create products for specific uses, all for a premium price.



AIRCRAFT

Favored by hobbyists who need lightweight skins for their model aircraft. This sample is 1.5 mm thick and has three laminations of okoume (an African mahogany), each just 0.5 mm thick.

FLEXIBLE

For cabinetmakers who want a curve instead of a corner, these plies can be bent like a sheet of rubber. Thickness and number of laminations determine the flexibility of the finished product.

MARINE

The ultimate water-resistant panel, often made with special boil-proof glues and defect-free tropical hardwoods. The best are registered with Lloyds of London and start at about \$150 for a 3/4-inch-thick 4x8 sheet.

MEDIUM DENSITY OVERLAY

Paper impregnated with phenolic resin is bonded to a plywood core. Used on cabinets, soffits, exterior trim and where a smooth, paintable surface is required.

BALSA CORE

A lightweight panel filled with blocks of balsa. Used for bus and aircraft floors and the interiors of boats.

PAPER CORE

This honeycomb paper core weighs next to nothing and when laminated to veneer makes an incredibly stiff panel. Used in exhibit-booth floors, boat and aircraft interiors or anywhere lightness is critical.

John K. Mayo won a patent for what he called scale boards in 1865. Woodworkers were quick to adopt his product for drawers and for covering the backs of cabinets. No one used it to build homes because the glues—derived from blood, animal hides, milk, cassava flour and soybeans—all dissolved in water.

Only when water-resistant resins were introduced in 1931 was plywood considered appropriate for home construction. Before such glues, houses were sheathed in planks laid edge to edge across studs, joists and rafters. The rough-sawn, warped, knotty planks typically used were a carpenter's headache. Plywood, on the other hand, required fewer nails and fewer cuts. Uniform sizing, straight edges and 90-degree corners meant tighter walls. Perhaps most important, because less of the tree ended up as sawdust on the mill floor, plywood offered the least wasteful way to turn a log into a board.

Tom Silva Says:

- Leave a 1/8-inch space between wall, roof and subfloor panels to allow for expansion and contraction. Special H-clips or 6d nails will give the right spacing.
- Lay plywood so its long dimension (its strongest) is perpendicular to joists, rafters or studs.
- Stagger joints. Where four corners meet, overall strength suffers.
- The more plies a panel has for a given thickness, the greater its resistance to warping.
- For roof sheathing, use 3/4-inch tongue-and-groove ply over rafters 24 inches on center.
- For subfloors, use 3/4-inch ply on joists 16 inches on center.
- For walls, use 1/2-inch ply over studs 16 inches on center.

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Somewhere Near Seattle

Bustling with forklifts and thick with the aroma of freshly cut lumber, the Simpson plywood mill covers an area the size of the Astrodome and reverberates with the sound of heavy machinery.

At one end of the complex, an 8-foot-long Douglas fir log, heavy from a 16-hour shower in 180-degree water, slides into position on the peeling machine. The trunk begins spinning at 1,200 rpm as a razor-sharp blade as wide as the log itself moves in. When steel touches tree, a continuous sheet of wood just a sixth of an inch thick flies down the assembly line in a billow of steam. With the 1-foot diameter stock now common, the tree is used up in less than 10 seconds.

Pressurized jet dryers suck the wood's moisture content from between 60 and 70 percent down to 4 percent in 10 minutes. The dried sheets are graded and sorted into face and core veneers, and football-shaped plugs are inserted in place of knotholes and checks.

Then the panels are assembled by teams of four workers. First the face veneer is laid down, then the glue spreader spits out two 4x4 cross plys, shiny-wet on both sides with brown resin. They land on the first veneer. Another 4x8 veneer is laid on the cross plys, and so on until the panel reaches the desired thickness. The boards are popped into a press and heated to 285 degrees under 175 pounds of pressure per square inch for 9 minutes to set the glue. Once out of the press, they are trimmed to size. Panels intended for subflooring or graded higher than C (see page 40) are sanded.

INTERIOR PLYWOOD

Woodworkers favor these smooth, hardwood-faced panels for making cabinets and bookcases. The glues won't tolerate water and may release significant amounts of formaldehyde gas.

VENEER CORE

A favorite of cabinetmakers. Made with solid hardwood veneers throughout. European-made versions are known as Baltic birch.

HYBRID CORE

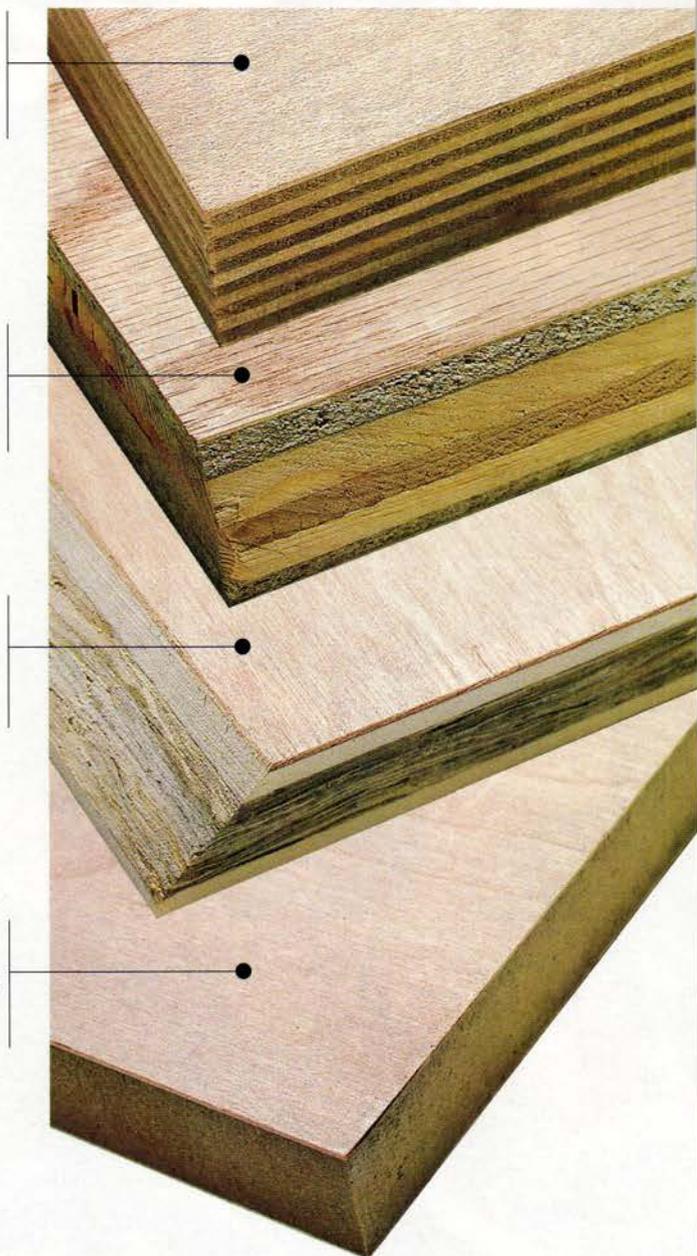
Particleboard cores provide a smooth, stable substrate for the face veneers; veneer cores at the center improve screw holding power and reduce panel weight.

WAFERBOARD CORE

Sandwiching slivers of wood between hardwood face veneers eliminates voids and produces lightweight panels with reduced formaldehyde emissions.

MEDIUM DENSITY FIBERBOARD

Grind wood to dust and glue it back together with a hardwood veneer face, and you get a panel that's perfectly flat and dimensionally stable but heavy and weak.



Is Plywood Dangerous?

Nobody should inhale formaldehyde, a stinky chemical for preserving biology-class frogs and embalming bodies. Yet in today's tighter, energy-efficient houses and offices, people regularly breathe formaldehyde gas given off by carpeting, drapes, paneling and plywood. Minute quantities, on the order of 0.005 parts per million, can trigger "sensory irritation"; higher concentrations can cause watery eyes, nausea and asthma.

The urea-formaldehyde glues commonly used in interior plywood (as well as particleboard and fiberboard) release formaldehyde in amounts that reach the limits set by the U.S. Department of Housing and Urban Development: 0.2 parts per million for plywood and 0.3 for particleboard. By contrast, exterior-grade plywood and strand board panels, made with phenol-formaldehyde resins, emit such insignificant amounts of gas (about 0.1 parts per million) that HUD exempts them from testing. Formaldehyde emissions decrease with time, but in poorly ventilated houses or among highly sensitive individuals, even short-term exposure is undesirable. To avoid breathing the gas, use solid lumber, exterior-grade panels or an interior plywood with a waferboard core.

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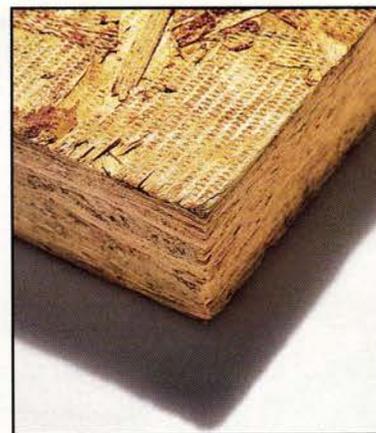
The label tells a story



All plywood is graded A through D based on defects in its face and back veneers. When contractors spec ply, they match grade to purpose. For hidden wood such as sheathing or subflooring, Tom Silva uses cheaper CDX ply, which has a C-grade face, D-grade back and glue rated for Exposure 1 (see decoding below). When looks count, as in cabinetwork, he'll pay more for A-grade ply, which has fewer knots and fewer of those football-shaped patches called plugs or boats. But for structural panels, performance, not appearance, is what counts. The U.S. Department of Commerce developed a voluntary performance standard in the late 1960s. Today, most sheathing-grade plywood and strand board bears the stamps of testing agencies like the American Plywood Association, Teco or Pittsburgh Testing Laboratories, which rate the panel's suitability for a particular application, such as roofing or subflooring, regardless of grade.

The plywood association's labs, which stamp 80 percent of American ply, receive samples from each shift at every member's mill. The largest lab, in Tacoma, Washington, destroys panels with precision instruments while technicians record the results. The gleaming steel flex-tester (top, with its computer monitor) produces a riflelike crack every minute or so as panels are tested to destruction. Nearby, a hydraulic ram shatters floor panels (bottom), while another apparatus rips apart walls by simulating the stresses of an earthquake or a hurricane. While the association is not independent (it is supported by members' dues), it withholds its stamp from mills that consistently fail to meet standards. It does not recall defective lots.

This Old House contractor Tom Silva has watched plywood improve over the years. "My dad and I used to go through stacks of it to weed out the pieces that were delaminating," he says. "You hardly ever see that today."



Substitute Plywood

Oriented strand board, referred to as OSB by contractors, is increasingly replacing plywood in construction because it is as strong as plywood, costs less and has fewer voids. Introduced 15 years ago by Potlatch Inc., strand board has now captured more than a third of the sheathing market.

Strand board is made from layers of wafers that are shaved off logs, roughly aligned at 90 degrees to each other and hot-pressed with phenolic resin glue. The manufacturing process incorporates 90 percent of a tree and uses young, fast-growing trees such as aspen, poplar and pine. By contrast, plywood manufacturers use about 60 percent of a tree and rely on logs 60 to 70 years old.

Not everyone likes strand board. "I don't use it unless I have to," says Tom Silva. "It's heavy and slippery, a real danger on pitched roofs. And it does a job on my saw blades." (The high glue content is not friendly to tools.) "If it gets wet, it'll swell so much you'll trip over it, or the joints show through the shingles." Although manufacturers seal edges, they recommend keeping panels dry at all times.

So Tom sticks with plywood—as do contractors in Dade County, Florida, which banned strand board after Hurricane Andrew relocated many roofs. Strand board manufacturers blame sloppy roofers, and the U.S. Forest Products Lab agrees. Says Paul Fiset, program director of building materials technology at the University of Massachusetts: "Plywood had its problems too at the outset. Strand board technology will improve."

DECODING

Testing agency, in this example the American Plywood Association.

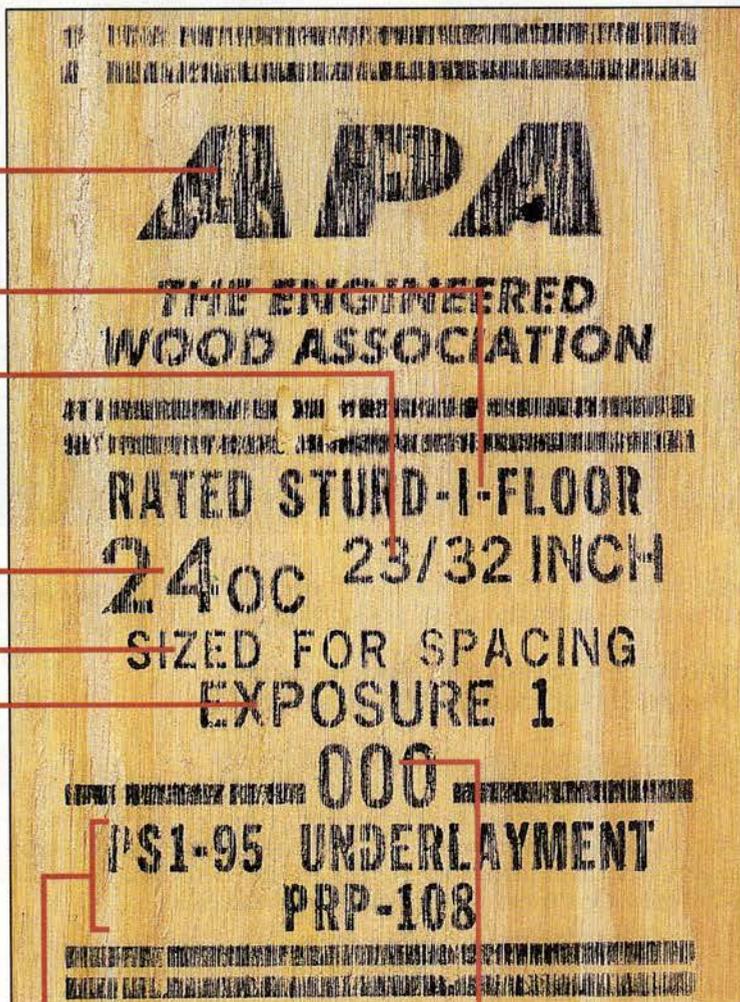
Describes the panel's intended use, in this case as subflooring.

Actual panel thickness in 32nds of an inch.

Maximum span rating, in this case joists spaced 24 inches on center, assuming panel face is perpendicular to joists.

Indicates the panel is 1/8 inch smaller than the standard 4x8 sheet size to allow for expansion and contraction.

Exposure ratings refer to durability. Exposure 2 requires protection from humidity and water. Exposure 1 tolerates some wetting during construction. Exterior means the glues used are the most resistant to water.



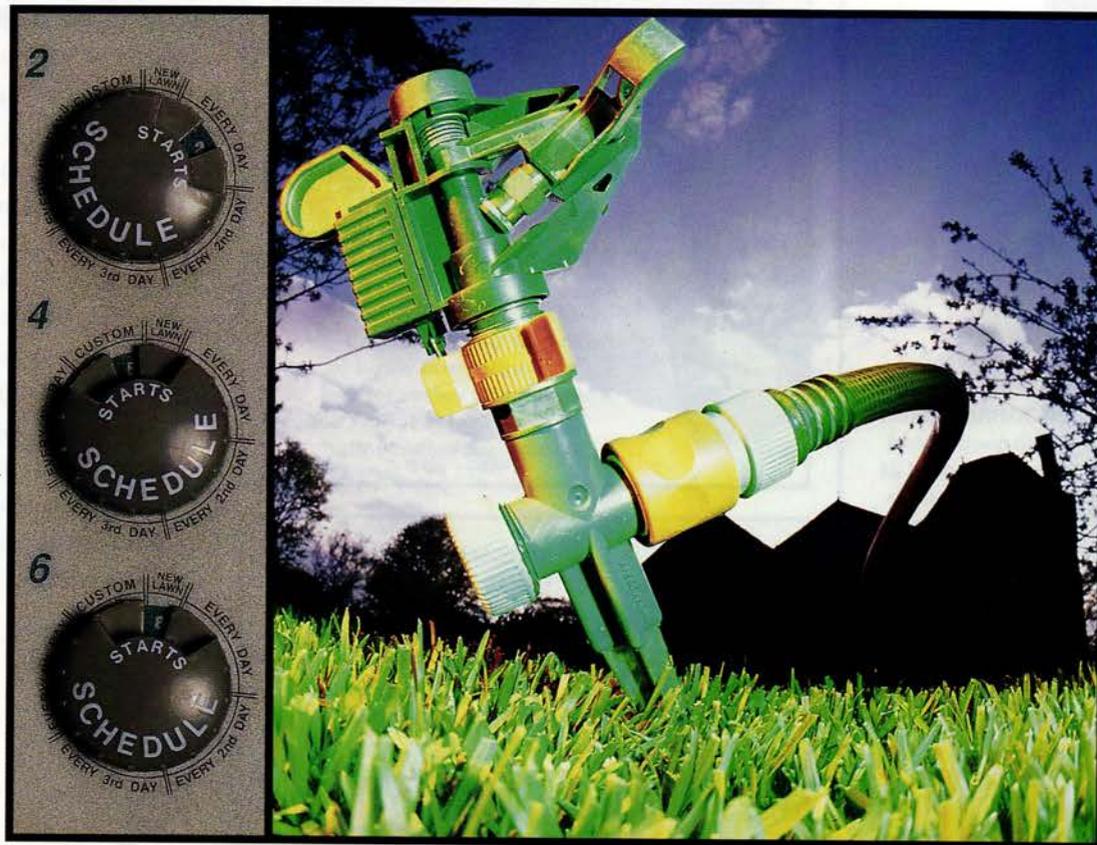
The APA technical standard this panel meets.

Identifies the mill that produced this sheet of plywood.

Hands-off Watering

From windup to digital, timers keep the garden green

BY WILLIAM G. SCHELLER



A control panel like the one shown here can fully automate an underground sprinkler system. Simpler set-and-forget controllers can time watering from hoses as well.

a

s with certain other roads, the path to a perfect garden is paved with good intentions. A lot of them have to do with watering. But the gardener's vow to keep a sharp eye on how much water is called for can often run into conflict with other schedules. To complicate matters, a home landscape usually has more than one planting zone, each with its own requirements. And water is precious:

Plants should get what they need and not a drop more.

For many gardeners, automatic controllers are the answer. The simplest devices shut off a hose after a set time. The most complex turn water on and off for several built-in sprinkler or drip irrigation systems, each with its own schedule. It's even possible to add soil or rain sensors that will override automatic controllers when plants don't need water.

How to decide on a controller? "If you're a concerned gardener, you're out there looking at your garden every day.

You know how much water it needs and where," says *This Old House* host Steve Thomas, who chose basic manual controllers for his own garden.

Those in drier climates might appreciate an automatic system. "It's good to have your sprinklers kick on at the best time to water, early in the morning before you get up," says Dave Young of the National Gardening Association. "In the drought-prone south central part of Oregon where I live, they're becoming pretty common."

LEFT PHOTOGRAPH BY KEVIN WILKES; RIGHT BY CHIP SIMONS/FPG INTERNATIONAL

Timer Options



PROGRAM TIMER
Battery-operated timer, mounted at tap, waters up to four times a day. This can prevent runoff and erosion.



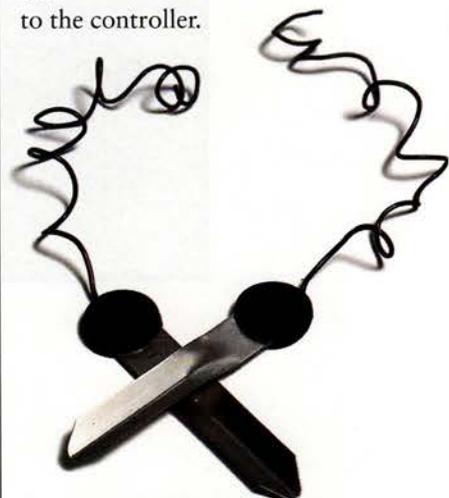
SIX-STATION TIMER
Indoor unit is plugged into outlet and wired to automatic valves (see below). Cycles for six zones can be set individually.



MANUAL TIMER
Unit is set by turning knob to desired watering duration, up to three hours. Operator turns on tap; timer shuts off flow.



AUTOMATIC VALVE
Electronically operated valves work in conjunction with multistation timer. Each valve controls one sprinkler or drip zone, in sequential order.

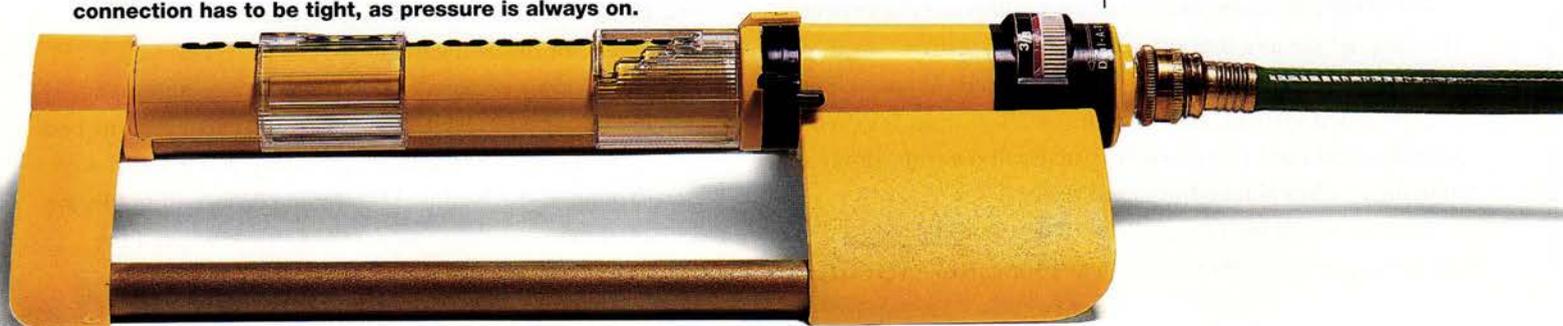


SOIL MOISTURE SENSOR



RAIN-DEPTH SENSOR

TIMED SPRINKLER
Features of a manual timer and a conventional oscillating sprinkler are combined in this unit. Sprinkler-to-hose connection has to be tight, as pressure is always on.



PHOTOGRAPHS BY KEVIN WILKES

FEEDBACK

Automatic watering controllers aren't smart enough to come in out of the rain. To keep from watering when it's not necessary, a soil moisture sensor (below) shuts off valves when moisture allows a current to flow between the metal spikes. A rain-depth sensor (bottom) closes the shutoff circuit when rainwater rising in the tray reaches adjustable electrodes. Both types of sensors are wired to the controller.



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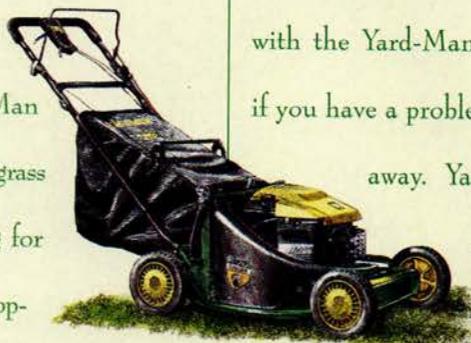
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They wound up building

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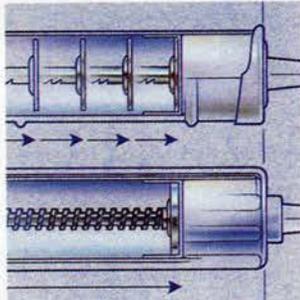
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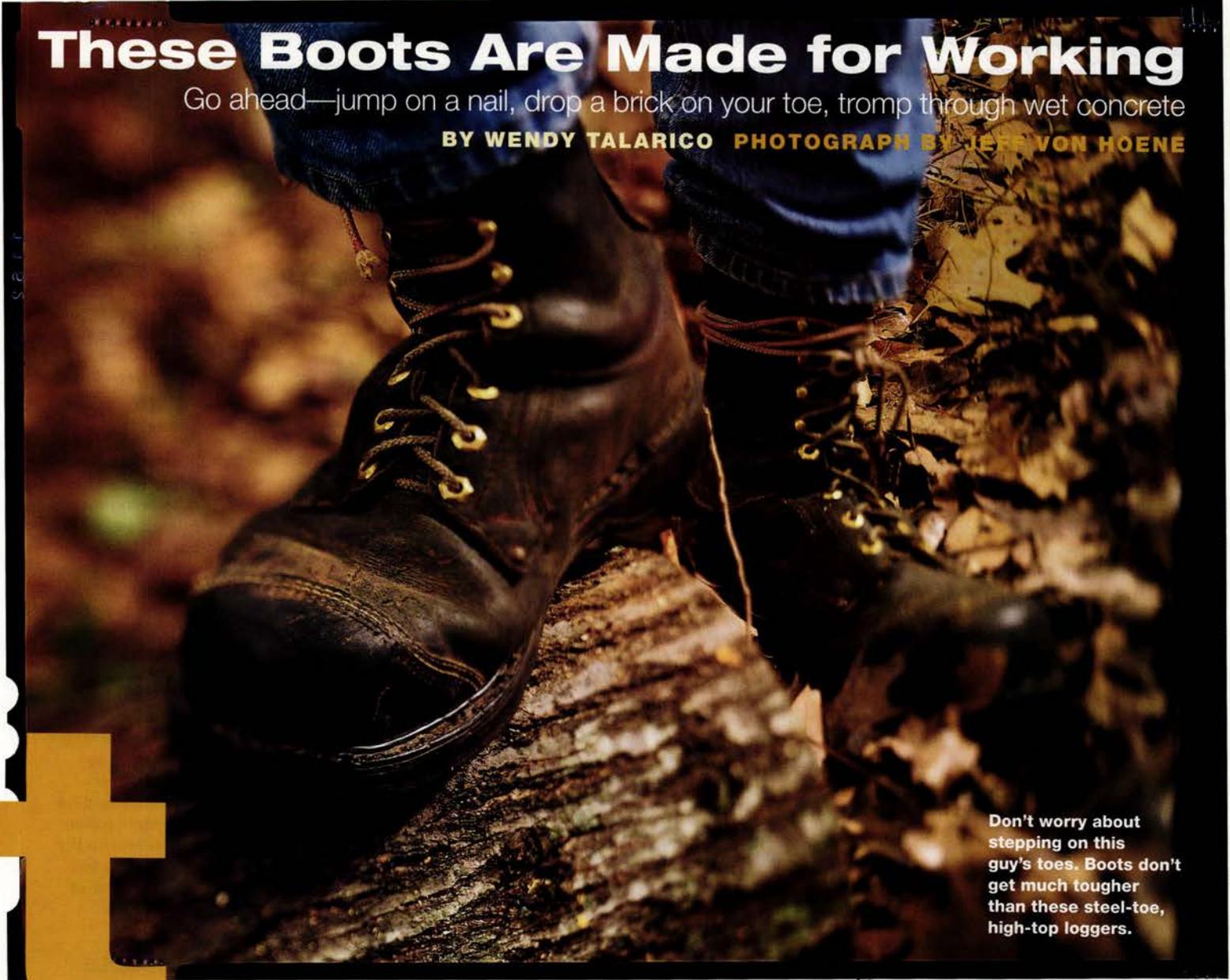
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These Boots Are Made for Working

Go ahead—jump on a nail, drop a brick on your toe, tromp through wet concrete

BY WENDY TALARICO PHOTOGRAPH BY JEFF VON HOENE



Don't worry about stepping on this guy's toes. Boots don't get much tougher than these steel-toe, high-top loggers.

That split second after dropping a hammer on your toes, you look down and think: Maybe this time it won't hurt. Maybe the pain rippling toward the brain will detour. Then it hits. And for a while, you're certain nothing in the world could be so excruciating.

Except getting thrown across the room after stepping on a hot wire. Or stabbing your foot with a nail.

It doesn't have to happen this way. Get help. Get a serious pair of boots. Big, clunky boots with steel in them.

"Think of boots as tools," says *This Old House* contractor Tom Silva. The right pair, like the right tool, makes any job easier—waterproof overboots for wading through concrete; lug-soled high-tops for outdoor work; light, flexible boots for finish work; felt-lined pac boots for winter.

There are so many choices, people can be particular. Some insist on yellow leather with no seam around the toe, cushioning around the collar and a huge heel. Others demand steel-toe cowboy boots with cobras on the vamps. Or maybe only Red Wings will do. And people customize their boots. A Massachu-

setts contractor hated his lug soles so much he shaved off the nubs with a planer. A Minnesota carpenter drilled extra holes in the gussets so he could pull his laces tighter.

The one thing you should be fussy about is the safety standard set by the American National Standards Institute (ANSI). To conform, steel toes must withstand impact from a 75-pound weight, puncture-resistant midsoles must deflect objects inserted at a force of 270 pounds per square inch and boots for electrical work must be made without metal parts in the sole and protect against 600-volt jolts. The Occupational Safety and Health Administration requires boots that meet these standards on many job sites.

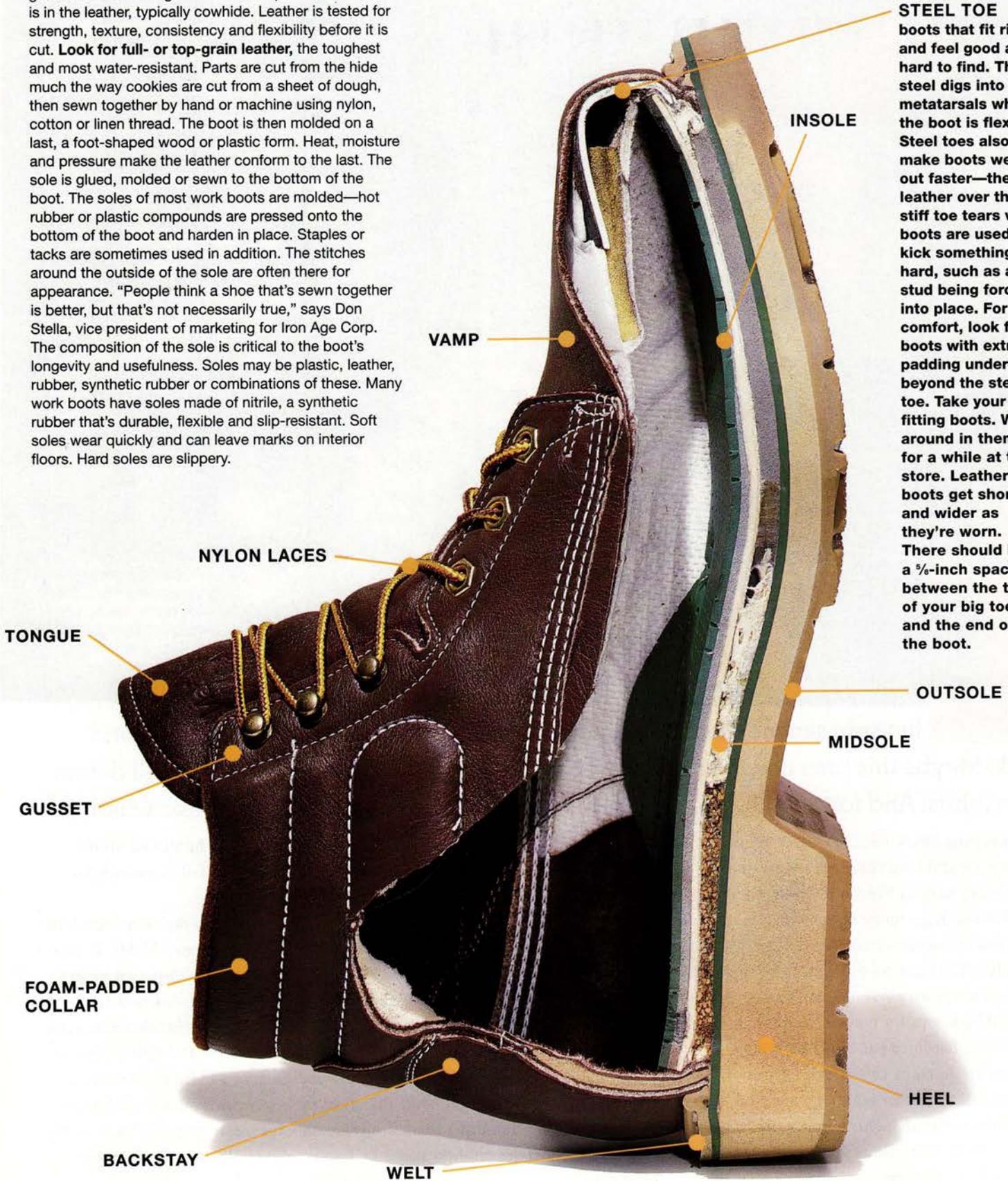
But don't think boots are only for messy projects. Some of the styles on these pages look so good, you'll want to wear them even when you're not working.

Anatomy of a Boot

PHOTOGRAPHS BY SPENCER JONES

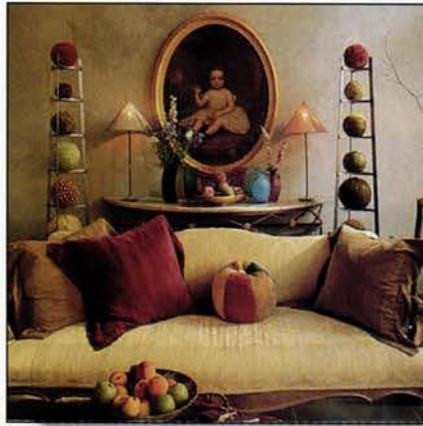
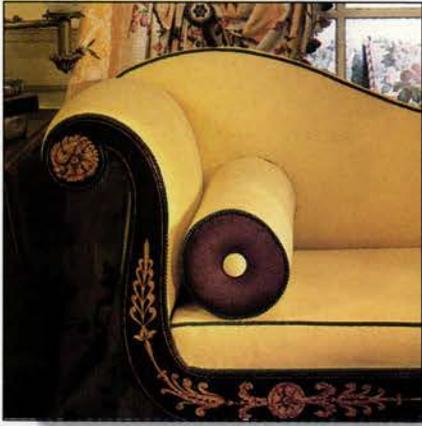
A good boot is the sum of 40 to 50 parts stitched, glued and welded together. About a quarter of the cost is in the leather, typically cowhide. Leather is tested for strength, texture, consistency and flexibility before it is cut. **Look for full- or top-grain leather**, the toughest and most water-resistant. Parts are cut from the hide much the way cookies are cut from a sheet of dough, then sewn together by hand or machine using nylon, cotton or linen thread. The boot is then molded on a last, a foot-shaped wood or plastic form. Heat, moisture and pressure make the leather conform to the last. The sole is glued, molded or sewn to the bottom of the boot. The soles of most work boots are molded—hot rubber or plastic compounds are pressed onto the bottom of the boot and harden in place. Staples or tacks are sometimes used in addition. The stitches around the outside of the sole are often there for appearance. “People think a shoe that’s sewn together is better, but that’s not necessarily true,” says Don Stella, vice president of marketing for Iron Age Corp. The composition of the sole is critical to the boot’s longevity and usefulness. Soles may be plastic, leather, rubber, synthetic rubber or combinations of these. Many work boots have soles made of nitrile, a synthetic rubber that’s durable, flexible and slip-resistant. Soft soles wear quickly and can leave marks on interior floors. Hard soles are slippery.

STEEL TOE boots that fit right and feel good are hard to find. The steel digs into your metatarsals when the boot is flexed. Steel toes also make boots wear out faster—the taut leather over the stiff toe tears when boots are used to kick something hard, such as a stud being forced into place. For comfort, look for boots with extra padding under and beyond the steel toe. Take your time fitting boots. Walk around in them for a while at the store. Leather boots get shorter and wider as they’re worn. There should be a $\frac{1}{8}$ -inch space between the tip of your big toe and the end of the boot.



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Wear a Classic

Everyone near a construction site needs a pair of boots like these from Iron Age. They're full-grain leather treated with silicone to make them water-repellent and have a **puncture-resistant midsole** or shank and a woven nylon, moisture-absorbent Cambrelle lining.





Get Fit

These sturdy, all-leather lace-ups by White's Boots can be **custom-made** on lasts built for the buyer's foot—ideal for those with fit problems. When they wear out, they can be returned to the manufacturer for rebuilding.

Keep Warm

It gets cold in Anchorage, Alaska. Just ask contractor Clai Porter. He and his crew rely on pac boots with **changeable liners** (these, from Tingley, use polypropylene) to wick moisture away from feet. Waterproof PVC uppers and soles stay flexible at 40 degrees below zero.



Know No Fear

Not all **steel-toe boots** are created equal. Before buying, make sure that boots, like these Red Wings, meet ANSI Z41, the standard for protective footwear performance on construction sites. Check the packaging or ask the salesman.





Walk a Roof

When standing sideways on a roof, you want a boot with a sole that grips, like these of nitrile rubber crepe from Iron Age. A conventional **square heel**, rather than a wedge, keeps feet from slipping off ladder rungs.



Slip These On

Kick a Tree

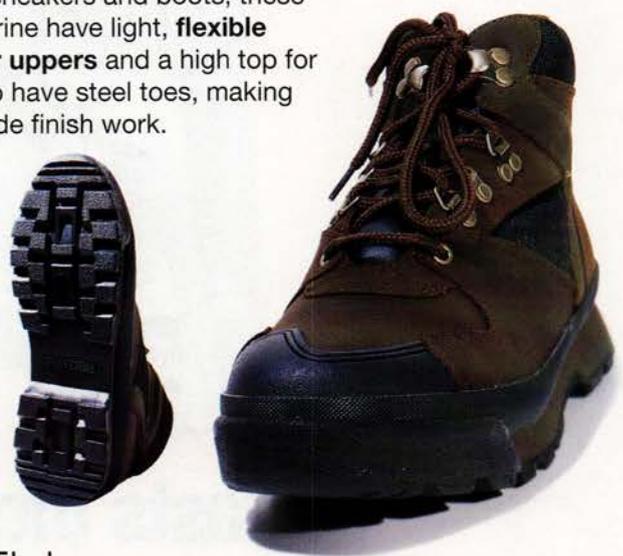
For tramping through woods, felling trees and leaping across streams, these Iron Age boots have soles that offer plenty of traction, steel toes, waterproof uppers and, to baby the wearer's feet, a **cushioned lining**.



Some contractors won't wear anything but Wellingtons. Easy to get on and off, these wedge-heeled boots from Wolverine feature Goodyear welt construction—two rows of **stitching** anchor the sole to the upper.

Go Light

A cross between sneakers and boots, these hikers from Wolverine have light, **flexible nylon and leather uppers** and a high top for support. They also have steel toes, making them ideal for inside finish work.



Insist on Flair



Step in Concrete

Wet concrete is not only messy, it's caustic. Made from a blend of PVC and urethane, these **seamless boots** by Bata keep the concrete out. They also have steel toes and puncture-resistant midsoles.



Add some style to the job site. These steel-toe Western pull-ons by Hy-Test feature a **flexible rubber sole** with gripping power.



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Tests were performed by an independent testing lab. Protocols and results are available from ARROW FASTENER CO., INC.

No Tell, No Sell

More and more states force property owners to be brutally honest

BY WILLIAM MARSANO ILLUSTRATION BY GARY BASEMAN

In 1985, when California's Property Disclosure law took effect, it seemed like a crazy idea: Make homeowners bad-mouth the houses they were trying to sell. Skeptics smiled, saying the law would fade away like blush wine or fruit pizza.

But three years later, in 1988, Maine adopted a similar law. What looked like a fad became a movement, traveling faster than killer bees and inspiring similar hysteria. Now 28 states have disclosure laws on their books, and nine others are considering them.

Typically, disclosure laws require the seller (and his agent) to reveal flaws in the property to the buyer (and his agent)—any flaws, all flaws, hazardous flaws and niggling flaws, physical flaws, even “psychological” flaws.

To some, it seems like lunacy: How can you sell a house with negative advertising? In the 22 states that rely on the ancient Buyer Beware concept, purchasers are responsible for discovering any problems that may exist. Critics see disclosure as yet another governmental intrusion.

But Buyer Beware favors sellers because they needn't reveal anything about their houses. They may simply sell as is, burdening purchasers with expensive and time-consuming inspections. Gov Hutchinson, assistant general counsel for the California Association of Realtors, says, “For most people, buying a house is the biggest financial decision in their lives, and the one that

is hardest to prepare for. Yet they have less protection than when buying a used car.”

Buyers' problems vary in degree. The least of them is “buyer's remorse.” A common affliction, it usually occurs when the dream of owning a home becomes the reality of maintaining and paying for it. But other problems are more serious: asbestos, lead paint, a leaking roof, a furnace on its last legs, alterations made sans permits and sub code.

Problems also arise when first-time buyers are naive or shy about asking questions. Told of “a little water in the yard after heavy rains,” they may not press for details, only to learn after closing that the gentlest spring shower turns the lawn, and the basement, into a swamp. Buyers also tend to confuse details when, in a frenzied and intense search, they become overloaded with information. They think the Cape Cod has new copper plumbing when it's actually the shingled Victorian.

Disclosure addresses such problems, though it can seem onerously bureaucratic, even a little ridiculous. California's mandatory disclosure form runs two legal pages, dense with



59 questions, including some about hot tubs, gazebos and remote controls. The four-page supplementary form is optional, but most real-estate agents in California require it. Its 157 questions ask about, among other things, nuisance neighbors, nearby munitions, tree diseases, local ham-radio operators whose transmissions make static of "Seinfeld" and deaths on the property (deemed psychological flaws if they occurred within three years). Consider this supplemental question: "Have you experienced any unpleasant, annoying or unhealthy conditions in your neighborhood due to any of the following: noises, odors, insects, pets or other animals, traffic sounds, debris from trees, shrubs or any other natural or man-made sources?" How many owners could honestly answer no?

Sellers say disclosure raises unrealistic fears that scare buyers away. Advocates say legitimate questions deserve written answers for which sellers can be held accountable by law.

An expert inspector should uncover most physical flaws in a house, but properly qualified sleuths are difficult to identify in what is still an unregulated business. Disclosure forms include critical questions that, answered satisfactorily, can help focus inspections. If serious flaws are exposed, buyers can look elsewhere or try negotiating better prices to cover repairs.

The real-estate agents' mantra—location, location and location—gives special credence to disclosure laws. A wooded lot may be in a brushfire zone. Winter's skating pond could be spring's mosquito-breeder and stink of marsh gas in August. The next-door neighbor might be a character who festoons his property with Christmas lights, producing an annual public

The Law of Your Land

Twenty-eight states have property disclosure statutes. Of the 22 that rely on the principle of Buyer Beware, 9 are considering disclosure laws.

Disclosure states:

Alaska, California, Connecticut, Delaware, Hawaii, Idaho, Illinois, Indiana, Iowa, Kentucky, Maine, Maryland, Michigan, Mississippi, Nebraska, Nevada, New Hampshire, North Carolina, Ohio, Oklahoma, Oregon, Rhode Island, South Dakota, Tennessee, Texas, Virginia, Washington, Wisconsin

Buyer Beware:

Alabama, Colorado, Georgia, Kansas, Minnesota, Montana, New Jersey, New Mexico, North Dakota, Utah, Vermont, West Virginia, Wyoming

Considering disclosure:

Arizona, Arkansas, Florida, Louisiana, Massachusetts, Missouri, New York, Pennsylvania, South Carolina

festival that jams the streets with thousands of cars nightly. And house inspectors, by definition, inspect houses, not neighborhoods. (San Diego lawyer Bruce Wallace used disclosure law creatively on behalf of clients who weren't selling but simply wanted relief from a nuisance neighbor. Wallace's argument: Since such a problem was included on disclosure forms, it was clearly detrimental to property values. Therefore, the law must provide relief. The court agreed, granting an injunction and damages to the clients.)

Once examined closely, many seemingly far-fetched questions turn out to be well worth asking. "I instituted disclosure even before Ohio had a statute," says Harley Rouda Sr., former president of the National Association of Realtors. "Without it, we didn't take the listing. We didn't lose many listings, and one we did lose produced a messy suit for someone else. We've reduced time spent on lawsuits by about a third."

Suits, justified or not, often name the agent as well as the seller. In California, seller and agent both sign the disclosure form. San Francisco lawyer Mark Perelman says, "Agents sign their own section of the document, and they don't have to validate the seller's disclosure. They have to protect themselves."

Notes Wallace: "Disclosure doesn't cause lawsuits, it helps prevent them. Putting things on paper eliminates many misunderstandings from the outset. And later, if a buyer wants to sue, the paper shows what both parties accepted as an accurate description of the property. If it shows the buyer has no grounds, that's the point at which the seller who complained of disclosure's burdens is suddenly grateful for its protection."

Getting the Most From Disclosure

First, check local ordinances carefully: Laws vary in the 28 disclosure states. Buyers should read forms closely and ask about anything that isn't clear. Too many vague or "don't know" answers should be taken as warnings. Ask the seller to document claims that EPA-listed problems such as radon gas have been addressed.

In Buyer Beware states, get California disclosure forms from legal stationers and ask the seller to complete them so you can "make an informed offer." If the seller declines, use the form yourself: It makes a fine checklist.

Sellers in disclosure states should be thorough and honest in filling out forms. Make it a selling point—no surprises. Search your memory and files for details. Remember that disclosure doesn't necessitate fixing or replacing anything. Don't, for example, junk

your garage-door opener because it doesn't have a safety reverse. Nor does it mean looking for trouble: Don't start tearing down walls to see what's inside. And don't panic. If asked for a price cut for lead abatement, you can say your price already accounts for that.

Sellers need not answer questions that aren't asked and probably shouldn't volunteer information. Buyers, on the other hand, must learn to use the information they're given and assess the possible ramifications. In one recent California case, the court decided the seller's disclosure that his house was in a flood plain was sufficient without speculation about the location's effect on the property's value. It was the buyer's responsibility to discover that the flood plain subjected his property to restrictions on alterations and improvements.

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Spring in Savannah, and the rain is warm. The big drops make a soothing metallic splash on the tin roof of our now completed project on Monterey Square.

A memory from more than 20 years ago comes to mind: camping on the beach in yet undeveloped Baja California. It was Christmas and raining. The water drummed on the roof of my Volkswagen camper. A local rancher and his son shared newly baked tamales, and in return I offered pancakes and syrup. I was completely content, anchored in time and place, isolated from the workaday world by distance and the sound of rain.

The Savannah house still has its original standing-seam roof. Made of terne metal, or steel coated with lead and tin, it has been slathered with asphalt, painted and patched here and there, but it remains sound after more than a century—so sound that we resisted the temptation to replace it and merely spliced in a new roof over the addition. We then covered the whole roof in a new acrylic material that should keep it watertight for a good long time.

I admire the old roof as I admire the house it shields. The house was well constructed in 1884; in fact, it was one of the most expensive houses built in Savannah to that time. The brick exterior walls were laid up in the famous Savannah Greys, and the interior framing and floors are of old-growth southern heart pine. The builder intended the house to last for centuries, and it has made it through one—and then some—without problem.

I also admire the new homeowners, Mills and Marianne Fleming, who had such respect for the house that they were willing to spend the time and money to replace the heating, plumbing and electrical systems, not to mention renovate the kitchen and bathrooms—all without compromising the home's historic and architectural integrity. The marvelous old parlors and bedchambers, with their floor-to-ceiling windows overlooking the square, were treated with a light hand to let their grandeur shine through.

When the project started, there were only two members of the Fleming family. Now, as they move in, they bring baby Alexander—7 pounds, 11 ounces—to a new home too. May they prosper in their castle in Savannah, and may Alexander grow up with rich memories of the sound of rain on a metal roof.

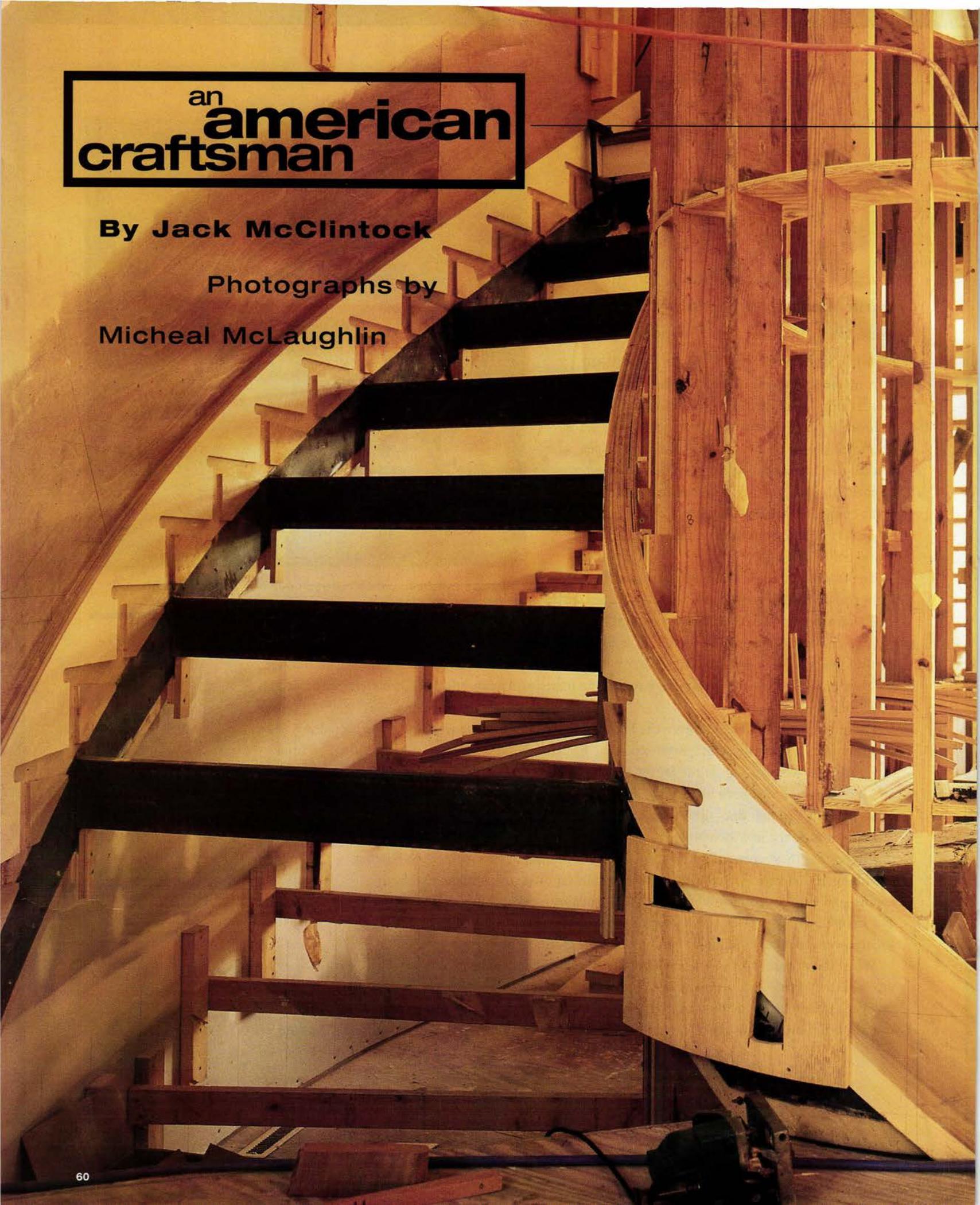
Steve Thomas



As Steve watches, roofing contractor Jeffrey Lancaster seals the seam between the new roof and the old.

A
L E T T E R
F R O M
T H E

Savannah Project

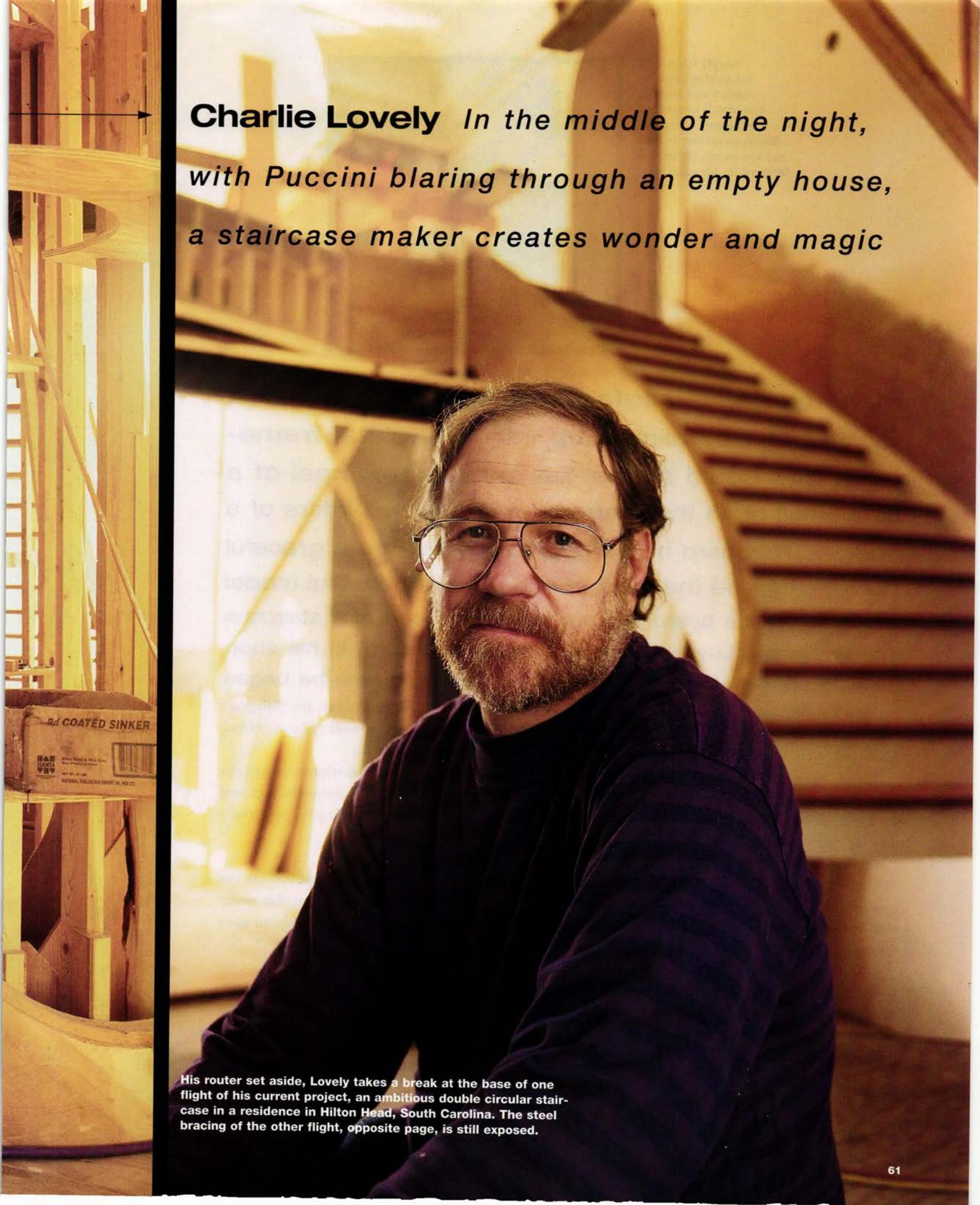


an
american
craftsman

By Jack McClintock

Photographs by

Micheal McLaughlin



Charlie Lovely *In the middle of the night, with Puccini blaring through an empty house, a staircase maker creates wonder and magic*

His router set aside, Lovely takes a break at the base of one flight of his current project, an ambitious double circular staircase in a residence in Hilton Head, South Carolina. The steel bracing of the other flight, opposite page, is still exposed.

Lovely uses a jig for guidance as he routs tread slots in the stair's laminated plywood stringers. Because no two treads are the same, he uses a different jig for each slot.



Maneuvering a six-foot board on his shoulder, Charlie Lovely climbs up into a skeletal framework that could almost be the ribs and keel of a boat's hull or, in the image he prefers, the girders of a bridge. The board he carries, fashioned into a graceful curve, might be the wing of a large and beautiful model airplane. But the board is a stair tread, the part of a staircase one walks on. Lovely fashioned it weeks before, in his shop halfway across Hilton Head Island, at the same time he began building the staircase itself here in the house. The two elements—treads and stringers, the staircase's supporting members—have never been in the same place before, unless you count the inside of Lovely's head, where he conceived them out of trigonometry and imagination.

And so, as he settles into position on the scaffold, Lovely has no way, beyond his mathematical calculations, of knowing whether the tread will fit the slots he has carefully routed for it. He half-kneels, balancing the board on his head like Atlas supporting the globe, and neatly slides it into place. He gives the tread a little tap with a mallet. And smiles.

Perfect fit.

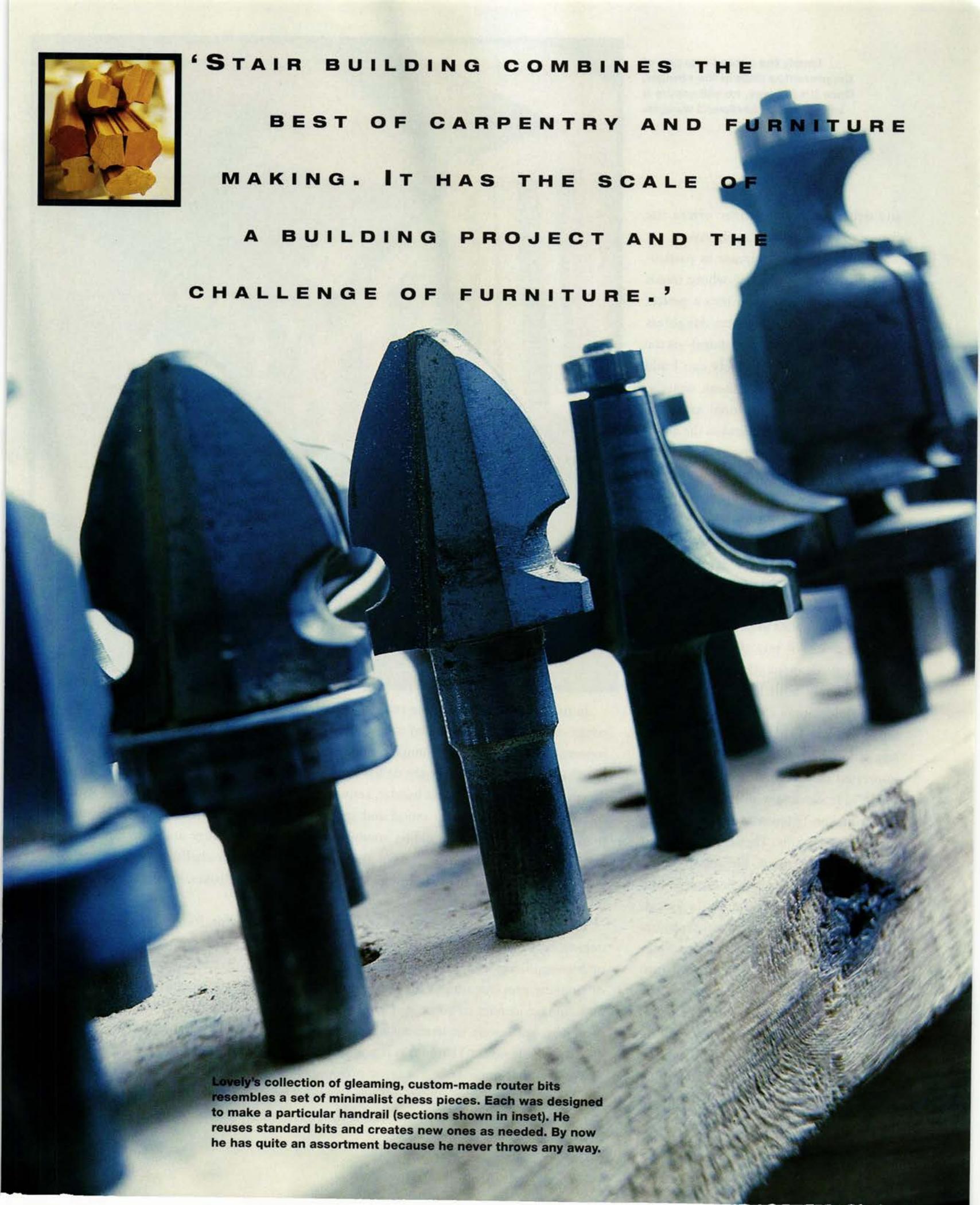
Lovely squirts yellow carpenter's glue onto a hardwood wedge, inserts the wedge point-first into the slot beneath the tread and hammers it home. Wiping glue from his fingers with a rag, he picks up another wedge and repeats the process at the other end of the tread. Then he jumps down from the scaffold and grins through his reddish beard.

"Welcome," he says, putting on a deep, emcee's voice, "to the fine art of stair building."

Charlie Lovely, a gifted mimic, enjoys parodying the admiration he receives for creating beautiful stairs, which he calls the most challenging job in construction. He knows the emotional freight heaped on staircases by the rest of us, most of whom couldn't build one if it were our only path to heaven. Even if we live in a ranch house, we would probably rank a foyer and its staircase as second only to a hearth in romance and emotional resonance. The foyer is the presentation zone of the house. It's where we make an entrance—or an exit. It's where we welcome guests, and where guests first observe us as hosts. It's a gateway to the mysterious and private upstairs, a place of deep and symbolic communion. The staircase is its centerpiece. "More than



**'STAIR BUILDING COMBINES THE
BEST OF CARPENTRY AND FURNITURE
MAKING. IT HAS THE SCALE OF
A BUILDING PROJECT AND THE
CHALLENGE OF FURNITURE.'**

A large, detailed photograph of several custom-made router bits standing upright on a wooden surface. The bits are dark, possibly black or dark blue, and have various shapes, including pointed, rounded, and fluted designs. They are arranged in a row, with the one in the center being the most prominent. The background is a light-colored wall.

Lovely's collection of gleaming, custom-made router bits resembles a set of minimalist chess pieces. Each was designed to make a particular handrail (sections shown in inset). He reuses standard bits and creates new ones as needed. By now he has quite an assortment because he never throws any away.

Lovely fits a tread into one of the prerouted slots in the stringer. Once it's in place, he will secure it with glue and hardwood wedges.

any other room, the foyer offers the chance to be creative," Lovely says.

And the circular staircase in particular—the “dancing winder” whose treads Shirley Temple taps down into a perfect future (or our own beloved daughters descend to meet their prom dates)—is the most dramatic of all. Lovely can build stairs any way you want them: straight, spiral, serpentine, traditional and contemporary. But he specializes in the circular, or geometric, staircase. Four or five times a year, he creates new ones at prices up to \$75,000. This job, in the largest house on Hilton Head, will top out at \$60,000. Calculating quickly in his head—something he’s good at—he concludes that, at the age of 44, he has designed and built nearly two miles of handrails and 6,400 treads and risers.

A prep-school boy (Phillips Exeter) and college dropout (University of Vermont), Lovely built his first steps as a 19-year-old hippie carpenter living in a tepee in New England. It was a three-step stoop, he recalls, and “my boss was impressed that I could keep it all in my mind.” He worked with the custom furniture maker Thomas Moser, improving his hand-tool skills. Then he returned to carpentry in Vermont. He was working on a house when his artist’s eye told him that it needed a spiral stair (a spiral, unlike a circular stair, has a support pole). So he designed one, built an elaborate model with treads mortised into the center pole and showed it to the owner. He got the go-ahead. The spiral was a success. Lovely moved to Hilton Head and became a student of stairs. “I watch people going up and down. I notice how they hold the handrail, I watch for vertigo. I’m always learning.”



In its conventional form, the stair is a simple device, an inclined plane with notches, rungs or treads. But a circular staircase is complex and mysterious, verging on the supernatural. How, inside a human mind, can one create the graceful lines, imagine the dot that moves, curving to right or left as it simultaneously ascends and recedes? How do you draw it? How do you *build* it, transforming the idea into a beautiful, solid structure that elevates people in mood and space? This is more than woodworking, more than architecture. “Stair building combines the best of carpentry and furniture making,” Lovely says. “It has the scale of a building project and the challenge of furniture.”

“I don’t tell Charlie how to design stairs,” says Tim Hazelbaker, the architect of this house. “Charlie tells me.”

Like any designer, Lovely starts with tracing paper at a drafting table. But a stair doesn’t begin to take shape until he drops to his knees and lays it out in pencil, full size, on his shop floor, which is crisscrossed and crosshatched with the superimposed layouts of so many previous stair designs that it resembles the latitude, longitude, topography and climate isobars of some lost continent. To a novice explorer, the floor is terra incognita, but Lovely understands it all. “You can describe any geometric shape mathematically,” he says. “That makes it possible to duplicate any shape.”

Possible, but not easy, as his latest project proves. It’s a double stair, up one side of the foyer and down the other, with a balcony-bridge connecting the two flights across the top. And the room isn’t quite deep enough for the height the stairs have to climb.

So Lovely must, as he puts it, “squeeze a rhythmic progression of treads into a space it doesn’t really want to go into.”

The problem, as always, is proportion—the ratio of rise to run.

Rise is the vertical dimension of a stair step and run the horizontal. If you had unlimited space, you could build the ideal stair, with treads perfect in height and depth. It seldom works out that way because the designer must deal with the room’s given dimensions. The stair must start *here* and land *there*.

“Here,” Lovely says, “the rise is about 6½ inches, and I wanted to get a run of 10½. But I couldn’t because the space was too short. I had to shorten the run to 9¼.”

Because the stair is circular, the problems are multiplied. One curved stringer hugs the wall, another is farther out in the room, and the treads go in between. But because the staircase is squashed into the given depth, the two curves aren’t concentric, so each tread must be different. As Lovely puts it with cheery impenetrability, he has to “make separate calculations and then unite the two stringers using a series of treads with different radiuses.”

Ordinarily Lovely builds his stairs in the shop, but this one is too big and com-



Neatly stacked stair treads wait for their introduction to the stringers. On this job, Lovely fabricated the treads in his shop and trucked them to the site, where they fit perfectly.

plex. A circular stair has no central pole to hold it up, so Lovely constructs a temporary supporting form of 2x6s and life-size plywood curves, like enormous versions of the French curves architects use. He assembles the form on site and builds the stair’s graceful stringers—laminated, glued and stapled of quarter-inch plywood—between the form and the wall. Steelworkers arrive and weld together the bracing that stiffens the structure.

“You could drive an elephant up that thing,” he says.

Lovely marks tread-height increments on the first stringers, taking these off a portable story pole he has made from a tall 1x2. Wearing a respirator and earplugs, he routs tread slots, guiding the whining router with handmade jigs clamped to the stringer, one for each tread. Then, if the treads fit—and they usually do—he installs them. Laminating the handrails is almost the final step, but a major one. “Laminating rails is so stressful that my personality changes,” Lovely says. “I get what I call laminoia. So I do it alone, late at night, listening to opera. That calms me down.”

The sweeping curves of a handrail cannot be made from heavy lumber, so the pieces must be laminated from thinner stock. In the middle of the night, with Puccini or Wagner blaring in an empty, half-built house, Lovely cold-laminates straight sections of rail from 20 to 40 layers of ¾-inch-thick mahogany, taking pains to match the grain. Curved segments are made of even thinner strips, and a few parts, such as the tightly bent “wreaths” above the newel posts, are glued-up blocks band-sawed to rough shape and then finished by hand.

When the rail components are done, Lovely joins them end to end with epoxy and bolts. He raises the rail to the required 34-inch height, anchors it and installs the balusters. Then come the final moldings and trim.

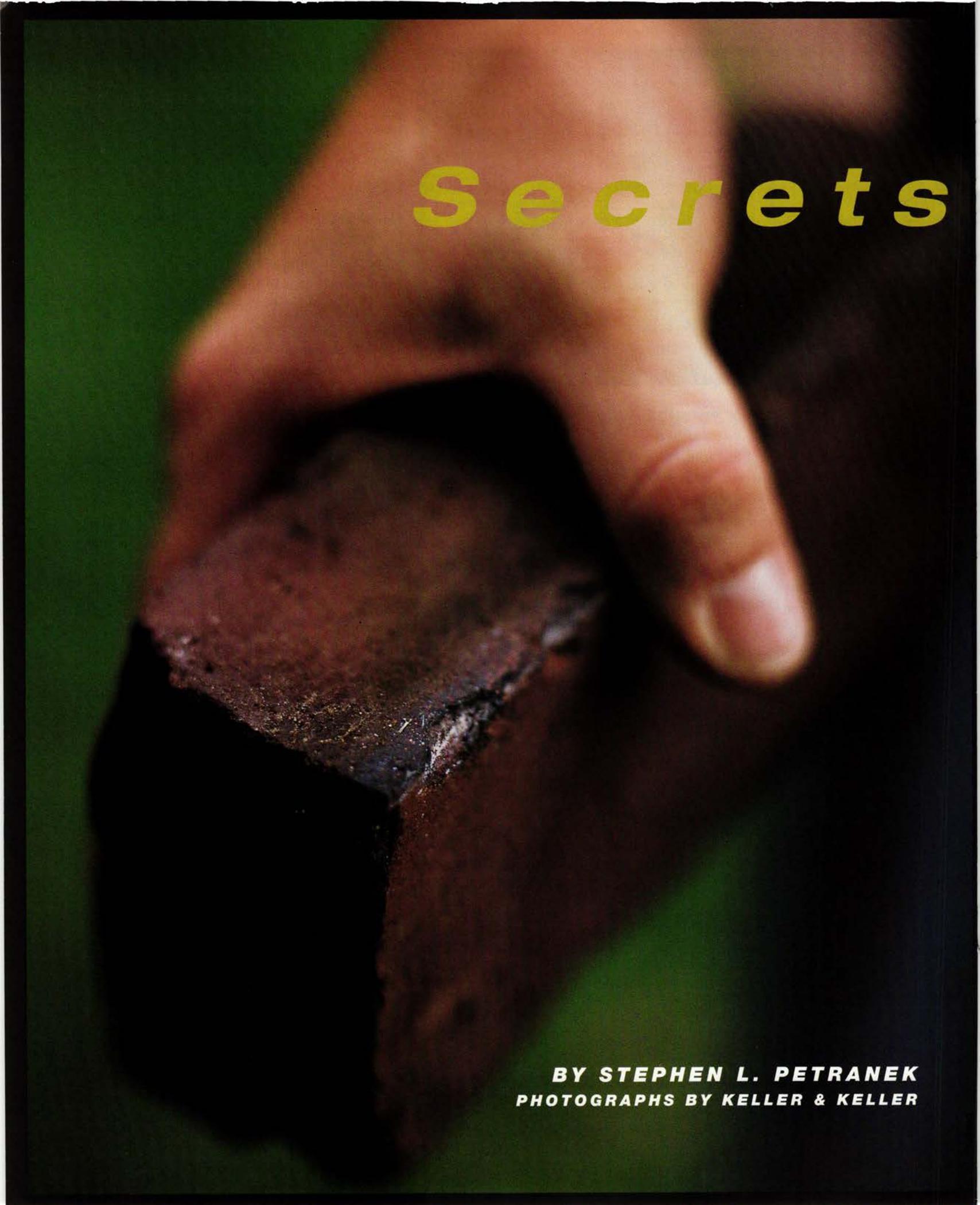
In stair building, perfectionism is a virtue. There must be a rhythmic consistency within the “walk zone,” the area 15 to 18 inches from the handrail, so that a person ascending or descending will “learn” in the first few steps what the stair requires. Just a quarter-inch difference, Lovely says, “and people will trip.”

He says a safe, sturdy and aesthetically pleasing stair is one with steps no higher than 7½ inches, no lower than 6¼ inches, no narrower than 11 inches.

This staircase works perfectly. With an inch and a half of tread projecting beyond each riser, its dimensions will just match that ideal stair in Lovely’s mind. When it is finally finished this summer, it will have consumed 50 sheets of plywood, 400 board feet of Santos mahogany, 600 to 700 board feet of plain mahogany, 200 board feet of poplar, 1,800 pounds of welded steel cross-bracing, 30,000 steel staples, 12 gallons of glue and 1,300 man-hours, two-thirds of them expended by Lovely.

And then he will test it, taking the steps the way he always does: two at a time.

**‘LAMINATING
RAILS IS SO
STRESSFUL
THAT MY
PERSONALITY
CHANGES.’**



Secrets

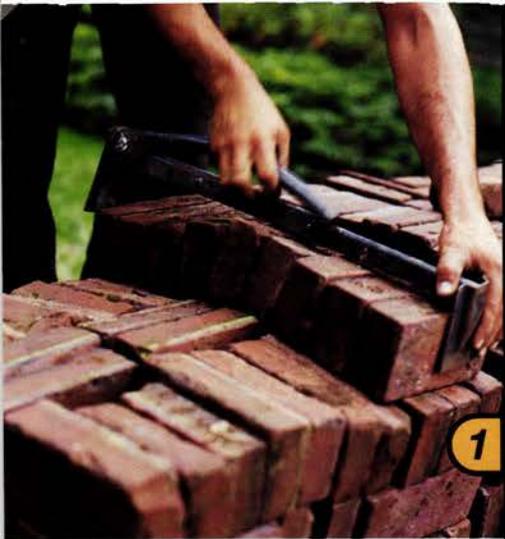
BY STEPHEN L. PETRANEK
PHOTOGRAPHS BY KELLER & KELLER

of a perfect

path
way

It's not what's on top that counts

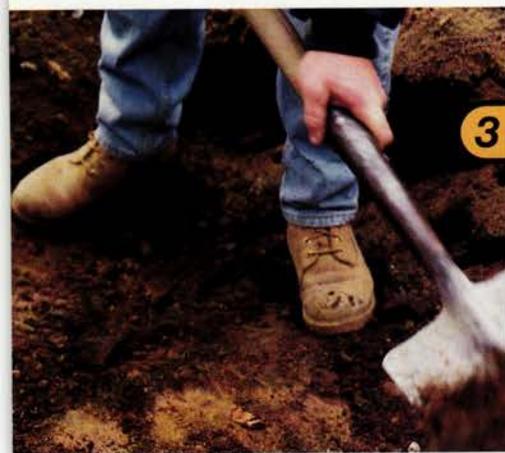
Building it like



1. Water and ice are the enemies, so *This Old House* landscaper Roger Cook only uses brick rated SW (for severe weathering). For this project, water-struck bricks that look handmade are mixed with antique bricks.

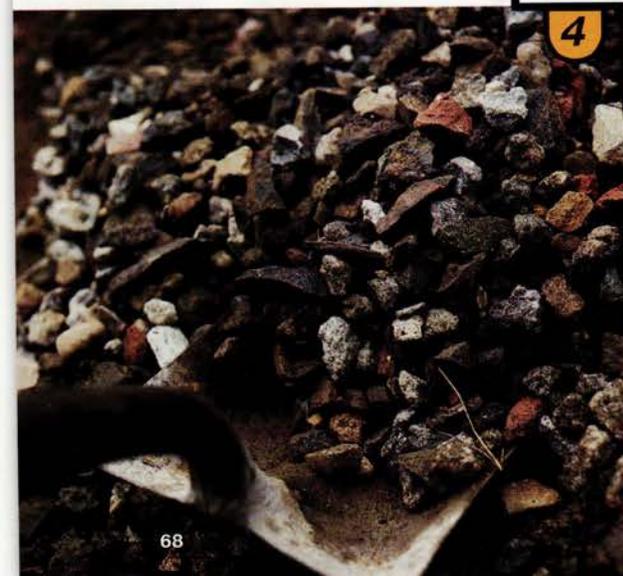


2. Before the path is dug, 1x2 stakes are driven into the ground to mark the borders. Spruce 1x3 strapping will be fastened to the stakes with drywall screws to define the exact edges of the 48-inch-wide walkway.



3. One secret of a stable walkway is to remove all soil containing organic material. Roger advises digging down 2 feet when in doubt.

4. "To keep the walk from walking on you," Roger says, the bed under the brick gravel—5 tons of it for this 42-foot path.



5. The spruce boards that control the sides and width of the walkway are bent into curves by kerfing them—sawing partway through across the grain every half inch or so. Boards should be securely placed so the width of the walk varies by less than 1/4 inch.



Norm Abram inspects 200-year-old bricks used in the path. They were salvaged from a building in Boston's Scully Square.

6. As he defines the edges with a soldier course (bricks bedded vertically with wide faces touching), Roger is careful to frequently check the cross-pitch. This 4-foot walk is sloped 1/8 inch per foot to the left so that water will drain off the top rather than pool on the surface.



Custom-fitting brick

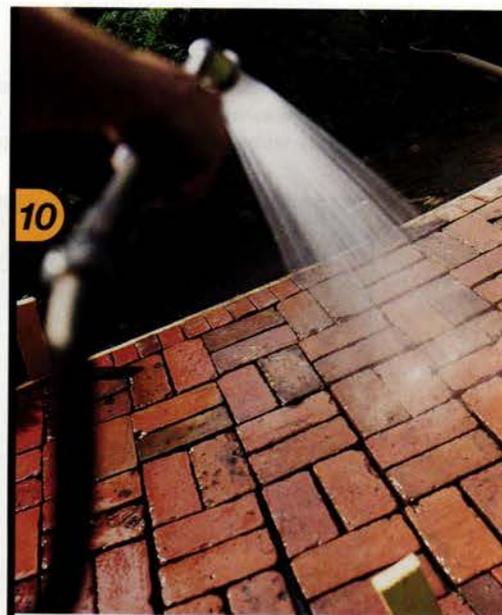
A pathway with sharp curves or one that meets a driveway at an angle will require some bricks that are cut to fit odd spaces. Complex paving patterns may call for a lot of custom cutting. Bricks can be chipped to shape with a mason's hammer (top) for many applications, or they can be cut with a very wide cold steel chisel and a hammer (Roger suggests placing the brick on a bed of stone dust before whacking the chisel). Still, a lot of expensive bricks—often \$1 each or more in SW grade—can be ruined before the right shape is obtained. And nothing will create as fine and finished a look as a masonry wet saw (bottom), often used for tile work. The saw is fitted with a 7¼-inch diamond-studded blade, cooled by water pumped up from a pool below the work deck. Using such a saw can be surprising the first time (a steel blade spinning against brick is reminiscent of a fingernail scraping on a blackboard) yet the results are remarkably satisfying. Whether it's worth renting one, Roger says, "depends how neat you want to be."



7. Another secret: Stone dust, available from quarries, is the essential ingredient of great brick walkways because it compacts much better than sand. Roger uses 2 inches of it above the gravel underlayment, tamps it with a machine and keeps it moist while laying brick. To control the level of the final surface, he makes a screed, cut from a 2x4, that he uses to scrape the surface just before he places the bricks. The screed is cut to fit precisely between the soldier courses.



10. Finally, the completed pathway gets a long wash-down with a hose. The water will help settle the underlayment and set the bricks in the stone dust. The spruce side boards should be left in place for a week while the bricks adjust to the weight of people walking on them.



9. Once paved, the walkway is covered with a ½-inch layer of stone dust, which is painstakingly and vigorously worked into the cracks between bricks with a broom.



8. Each and every brick is firmly tamped to set it into the stone dust below. Brick scars easily, so a dead-blow rubber mallet is a better choice than a metal hammer.



A *Portfolio* of Classic Paving

Deep vertical soldiers on the sides help stabilize this ageless basket-weave design. The pattern works only for bricks that are half as wide as they are long. (Most bricks are 4 by 8 inches.)



A Colonial Williamsburg pattern is narrow (about 36 to 40 inches using standard pavers), but it accommodates varying sizes of bricks because the rows are not linked to each other.



A traditional pattern twisted to the diagonal is edged with bricks laid flat, called a stretcher course in masonry work. The design requires a significant amount of custom cutting.



A basket-weave turned 45 degrees and edged with two rows of bricks laid on their side, called a rowlock stretcher course, lines streets in the antiquing town of New Market, Maryland.

Motifs for Brick Pathways

ILLUSTRATIONS BY DOUGLAS TOCCO

A simple basket-weave can be given a sense of complexity and depth by using bricks of sharply contrasting colors. The design is difficult to work with in a pathway that curves.

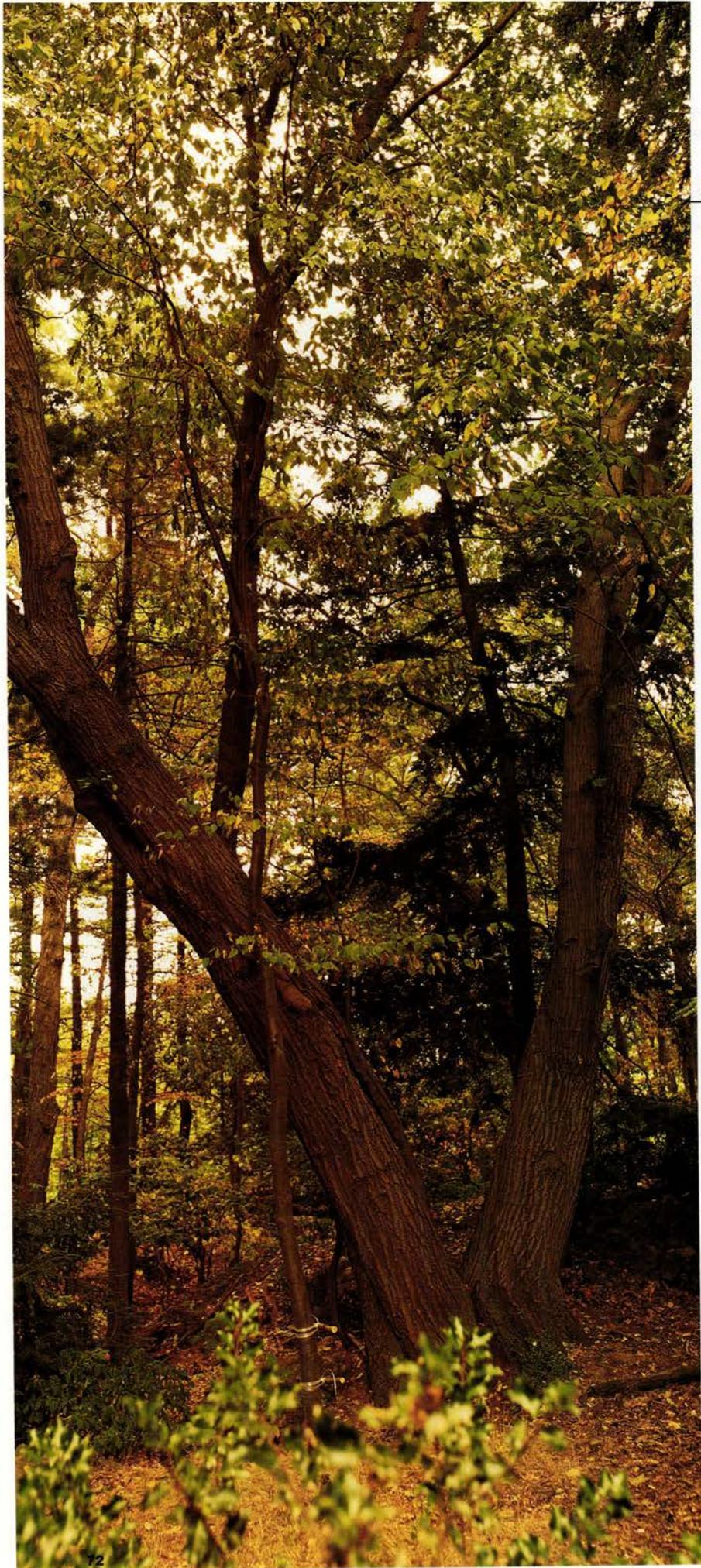


Called Spanish bond, this motif uses four bricks, each twice as long as it is wide, to trap a half brick in the center. The design is simpler to put down than it looks but does not curve easily.



Herringbone themes are popular in brickwork all over America but require a lot of brick cutting for the edges. The edges of this path, for example, need a half brick every foot.

In running bond style, the space between two bricks falls in the middle of adjacent bricks. Shifting the joint to fall in the first third or fourth of neighboring bricks changes the look entirely.



SMALL SPIRITS SOAR IN A

Photographs
by Erik Rank

Treehouses are for kids. Winnie the Pooh has a treehouse, and Tarzan does too. The Swiss Family Robinson's is the most memorable. Built of sails and timbers salvaged from their shipwreck, it's 40 feet up a colossal fig tree on a tropical island and sleeps two adult Robinsons and their four boys.

Perched between the earth and the clouds, treehouses light the imagination and foster their own kind of suspended animation. They are places of refuge, launch-

ing pads for daydreams and stages for fantasy. Children take to them immediately. So do parents, to whom they represent safe adventure and the early stages of independence—that milestone

known as “first time away from home.” Treehouses should be family projects, heavy on kid involvement. Parents who take over (as some parents do Little League baseball games) court failure. Theirs may be a “designer treehouse,” a twee totem of style and good taste—but the kids probably won't play in it.

Parents should help finance the project, provide enough engineering savvy to keep the thing up there and consider esthetics (looks can be important,



Jiggering windows and 2x4s, the crew works out the design of one side wall.

BEFORE

The V-shaped trunk, with each arm nearly 9 feet around, almost beckoned to embrace a treehouse.

tree house

especially to the neighbors). They can be put to heavy lifting, buying forgotten fittings and teaching the next generation of amateur carpenters.

The kids' job is to provide the free-form, free-wheeling vision that inspires piratical dreams. Offered a ladder, kids will demand a *rope* ladder or precarious rungs fastened to a tree trunk. They appreciate such necessities as trapdoors, pulleys (for hoisting up provisions when under siege) and annex treehouses for pets. Kids should help erect the structure and to that end should be given hammers and encouraged to hit nails with them.

The project shown here is in the Brookline, Massachusetts, backyard of Amy Peck and Ralph Sinsheimer, who built it with the help of architect friends Lisa Cunningham and George Warner. The children of both couples pitched in.

The materials cost about \$1,000, and it took five days to turn the scene at left into the one at right. It also took a leap of faith: The treehouse is about a dozen feet off the ground, high enough for a fall to be serious. But, Peck says, "Anything lower would have seemed babyish to my kids. There are so many dangers I can't do anything about; I decided this was one I could live with." Still, when friends visit, she always consults their parents. "I say, 'It's pretty high up. It's really a little dangerous.'" (That's probably an added thrill for the kids.)

Peter Nelson, author of *Treehouses: The Art and Craft of Living Out on a Limb*, says imagination counts, not great altitude. "Six feet or 60 makes no difference. It's getting off the ground and into the air that opens your mind, that brings you ideas right out of the blue."

AFTER

With a translucent roof and wide-open back, the treehouse shelters without blocking the treetops.

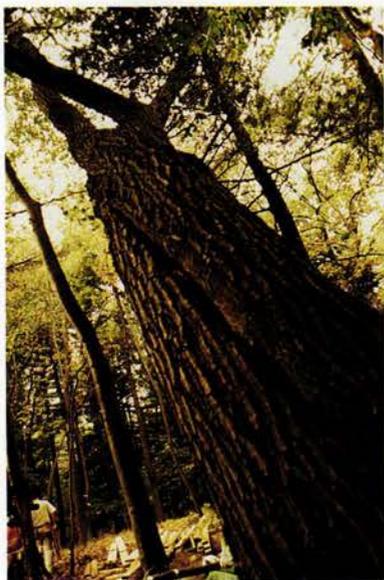


RESPECT THE TREE

Treehouses and ordinary dwellings differ from the ground up. Aloft, the simplest platform can inspire play while a fussy doll's house may stifle it.

Walls and even roofs can be dispensed with, but basic engineering can't. You'll need strong fastenings to one mature or two or more younger trees. When using two trees—or a V-trunked specimen, as in this project—be sure to provide flexibility. Beams anchored at one end must be free to slide in sleeves or slip-fittings as the tree grows or the wind blows. (A treehouse strong enough to prevent sway is against nature and requires very heavy construction.)

Certified arborists can tell whether your tree has internal (and invisible) rot or whether it should, like the Brookline tree, which has a crack running down



Crack could indicate weak trunk.

one side, be made less top-heavy by pruning.

Nailing or screwing lag bolts into a tree creates small wounds that can lead to decay, so damage to the bark should be kept to a minimum. Be careful not to cut the bark horizontally. Don't, for example, use an unpadded wire snugged against the trunk. This might damage the tree's cambium layer, its factory for new cells.

Attach main support beams with hefty screws, not nails, which could wobble loose. And don't paint the wounds with tree sealer. It does more harm than good by locking in moisture, which can encourage rot.

Protect kids by giving them a place to hold on as they climb up and down, especially while they are moving between the top step and the treehouse or deck. For added safety, shovel a thick cushion of shredded wood or mulch underneath. The U.S. Consumer Product Safety Commission's guidelines for public playgrounds recommend a layer of at least one foot for an 11-foot-high platform.

A sleeve allows the beam to move.

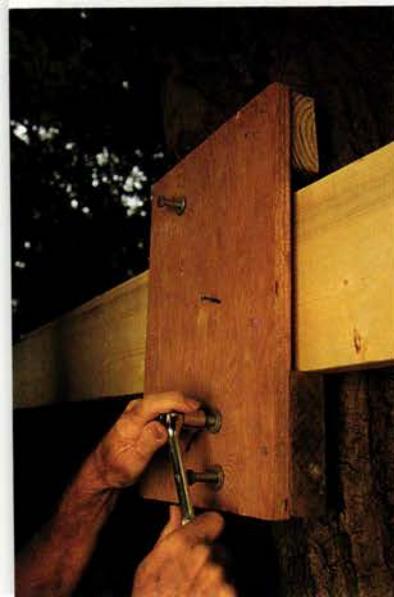
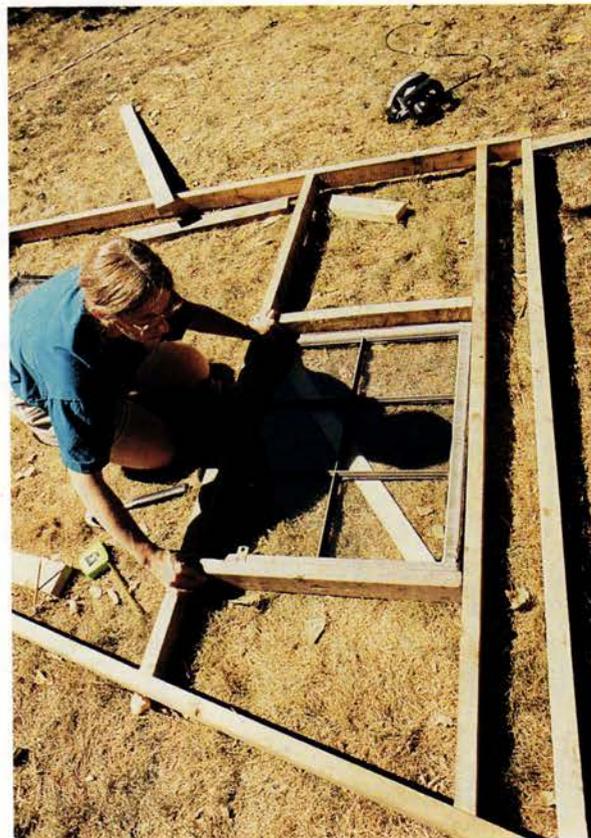
GETTING STARTED

With the two support beams hoisted and set level, Lisa Cunningham begins work on the ladder. She measures to ensure even spacing of the rungs, which the kids had cut from 2-inch-diameter branches and helped nail and lash to a nearby tree. Adults drilled holes near each end and later threaded them with $\frac{1}{8}$ -inch stranded wire. With stops crimped above and below each rung, the wire keeps steps from pivoting. Adults find the ladder awkward, but kids love it. "It's one of my favorite parts," says 9-year-old Max Sinsheimer.



STREAMLINING

It's easier to build up in the air if you do most of the work on the ground. With a crew of amateurs, the simplest way to avoid framing errors is to build wall sections around elements with fixed sizes. Here, one side wall takes shape around a window, which eventually will pivot open and closed on dowels set into holes drilled at midspan. The other side wall was copied from this one, but when the window was set in, it didn't fit. A good lesson: If you use salvaged windows, be aware that the top and bottom sash often vary in size.





BUILDING A PLATFORM

From a pile of wood on the forest floor, the treehouse deck takes shape. Joists, consisting of 14-foot-long 2x6s, rest on the support beams and extend far enough out to allow narrow porches in front and back. Temporary braces keep the joists from shifting until sturdier, permanent diagonal bracing made from 4x4s is in place. The posts extending up from the deck will eventually support a guardrail equipped with horizontal boards on the back porch and with lengths of $\frac{1}{8}$ -inch stranded stainless steel wire on the front. (Marinas and boat stores sell this material, the same as that used on the treehouse ladder, as lifeline cable. They also sell the copper sleeves that can be installed wherever stops are needed and the swaging tool required to crimp them in place.) The crew secured all important connections with galvanized nails or screws to keep joints from coming loose. To avoid any concern about exposing children to poisons, no pressure-treated wood was used. "Except for the decking, there won't be any water sitting on it," George Warner says. "And the treehouse doesn't have to be here for 30 years—just for the life of childhood."



WORKING TOGETHER

Sofia Warner, 9, watches her friends' grandfather, Robert B. Peck, install a hinge on one of the front double doors. Each door was hung on four hinges, then taken down and cut in half horizontally to make a Dutch door, with top and bottom that can be opened and shut independently. Involving three generations lent a barn-raising atmosphere to the project. "When I look out my kitchen window at the treehouse, I think of all the hands—the little hands, the big people's hands—that put it there," Amy Peck says.

FINDING KID JOBS

ABOVE: When the whole family tackles a construction project, it's sometimes difficult to find meaningful jobs for youngsters. While the grownups were busy muscling floor joists into place, the kids got busy cleaning up a pile of old windows. With a blast from the hose, Teddy Sinsheimer, 7, executes the chore with gusto.

RIGHT: The architects' first thought was to clothe the treehouse in classy shingles. But they ended up using 1x3 boards placed horizontally with half-inch spaces in between. Besides being far cheaper and faster, this siding "really accentuates the fact that this is an outdoors space that doesn't have to be completely closed off," George Warner says. Teddy and the other kids had a great time nailing on the boards. The gaps allow peering out while making it difficult for those on the ground to spy in.





KEEPING OUT THE RAIN

With ropes and pulleys still in place from raising wall sections, the treehouse nears completion. All that remains to be added at this point is a roof, made with panels of clear corrugated vinyl. Like the walls, the roof was to be shingled, but at this stage the crew started wishing for something less solid. With the translucent roof, "looking through is like an Impressionist painting," Amy Peck says. "Even when you're in, you're out. Very pretty." Son Max is a fan of the Dutch doors on the front—"really neat"—but in retrospect doesn't particularly like the open back. Perhaps he'll remodel.

HAVING FUN

The rewards for a construction project well done? An afternoon spent building with blocks in a treehouse all their own. Counterclockwise from right, Georgy Warner, 7, Max Sinsheimer, Alex Lutch, 9, and Teddy Sinsheimer try out their new space. "It needs a little bit of furniture," Max says. To enhance the treehouse atmosphere, the builders chose not to remove a sapling struggling to grow near the support tree; instead they built the floor around it. When the tree grows too large for its hole, the plywood ring can be removed and a new one inserted. In the meantime, the trunk makes a perfect place to hang jackets. Or maybe to fly a pirate's flag.



f e n

Our futile but fascinating bid to **replace nature's boundaries with our own.**

B Y S T E P H E N H A R R I G A N

► In 1876, an energetic young barbed-wire salesman named John Gates—later known in Texas lore as Bet-A-Million Gates—traveled to San Antonio to win customers for the revolutionary product he represented. But the Texas cattlemen were skeptical of barbed wire, which they assumed would be as flimsy as cobwebs against the shoving and trampling power of a longhorn steer. To convince them otherwise, Gates organized a public demonstration. He built a barbed-wire corral in downtown San Antonio and filled it with rambunctious livestock. As a crowd watched in wonder, the cattle charged the wire repeatedly, but the barbs repulsed them every time.

Bet-A-Million Gates's live-action infomercial is often cited as a defining moment in American history. When the San Antonio cattlemen put in their orders that day, they were effectively sealing the demise of the open range, of a landscape and a lifestyle that had been predicated on unbounded freedom of movement across the plains. With the triumph of barbed wire, the fencing of America was pretty much complete.

Conditioned by the stern environmental ethos of our own times, we are less likely to celebrate this milestone than to find it disquieting, even tragic. A fence is by definition a divisive thing, separating not just animals and crops and houses but human beings as well, sectioning us off from one another behind ramparts of stone or wood or chain link.

Fences, in this sour but not entirely incorrect view, are a prime example of our compulsion to replace nature's boundaries with our own; they are the symbol of our petty and finally futile bid for human authority over the earth.

This is not strictly a modern bias. Fences have always aroused suspicion. "That kind of fence is best which is least seen, and best seen through," preached a 19th-century landscape architect. "It is unchristian to hedge from the sight of others the beauties of nature which it has been our good fortune to create or secure."

But the evidence—in the form of endless miles of fences sprouting up wherever human beings congregate or cultivate the land—suggests that the urge to enclose or be enclosed is at least as authentic as the longing to roam free. As far back as Neolithic times, people were building corrals for their livestock and

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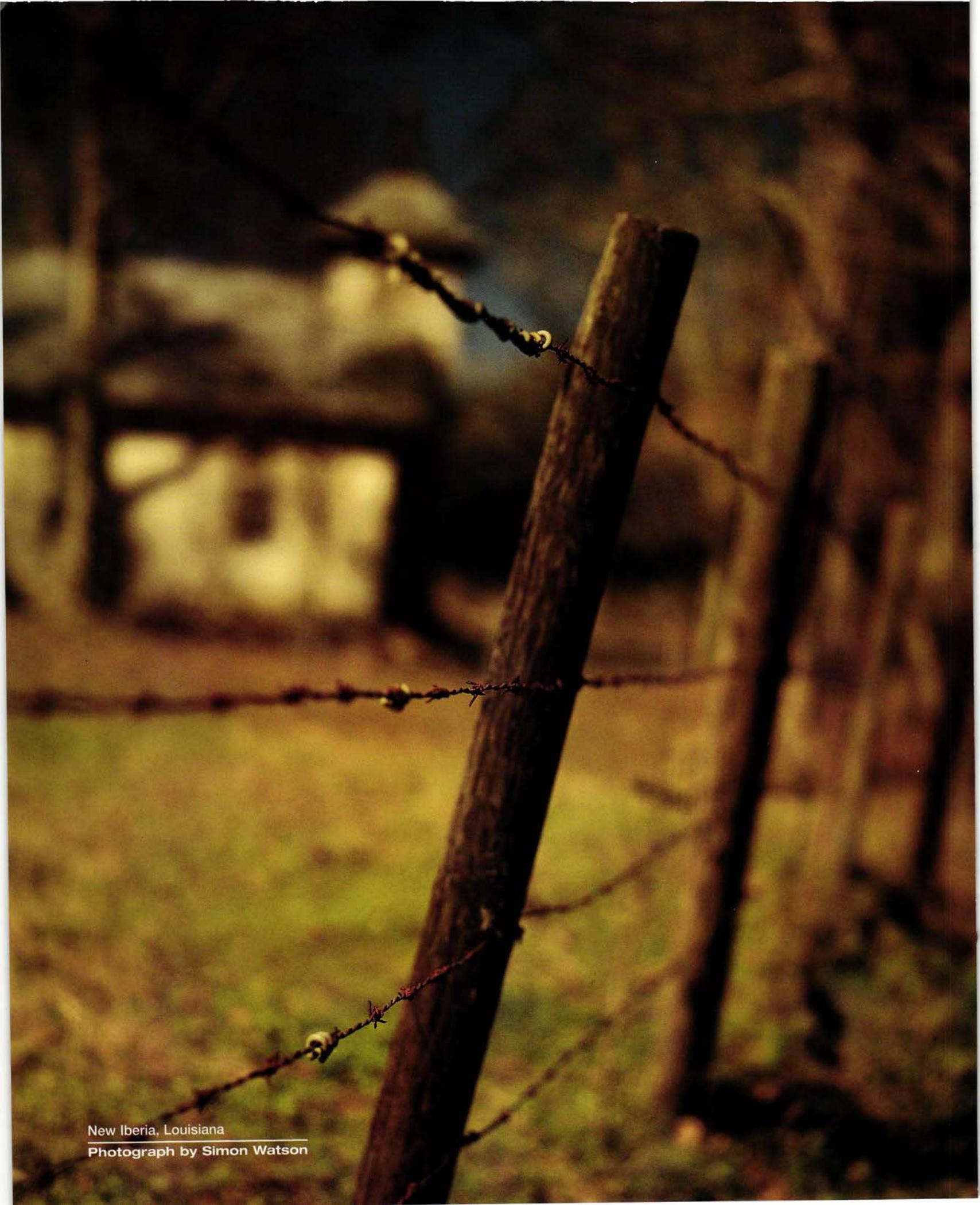
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Garrison, New York

Photograph by Andrea Gentl



New Iberia, Louisiana

Photograph by Simon Watson

protecting their villages with wooden palisades. The word “fence,” in fact, is derived from “defense,” reminding us that our decorative suburban enclosures had their origins in walled cities and frontier forts. Even the white picket fence, the very emblem of domestic placidity, carries in its sharpened stakes a haunting vestige of a time when a fence was designed to repel and even impale invading hordes.

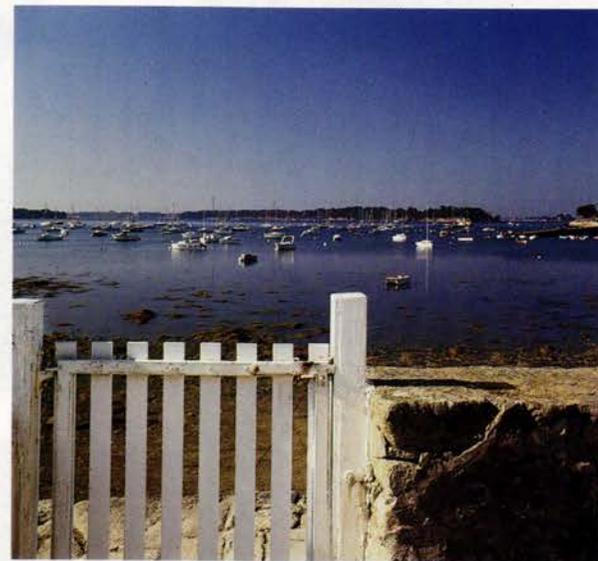
Early settlers in the New World found that Indian villages were often protected by wooden stockades, but it took a European mind to embrace the fence as a means of taming and partitioning the land. Among the colonists of New England it was the fence itself that certified ownership and justified seizing the land from its original inhabitants. “As for the Natives in New England,” reasoned John Winthrop, the governor of Massachusetts Bay Colony, “they inclose no land...and soe have no other but a Natural right to those Countries.”

The fence satisfied something in the American psyche, providing protection and title, imposing order on an undifferentiated wilderness. The continent was too howlingly vast: People needed their own spaces, their little parcels of manageable earth.

In our time, of course, those parcels are rarely even as large as an acre, but the rationale for fences—and our national infatuation with them—has not dimmed. (In fact, an exhibit on the subject, titled “Between Fences,” will open on May 31 at the National Building Museum in Washington, D.C.) We still build them to repel invaders, usually in the form of nosy neighbors, to corral our dogs and to mark our boundaries.

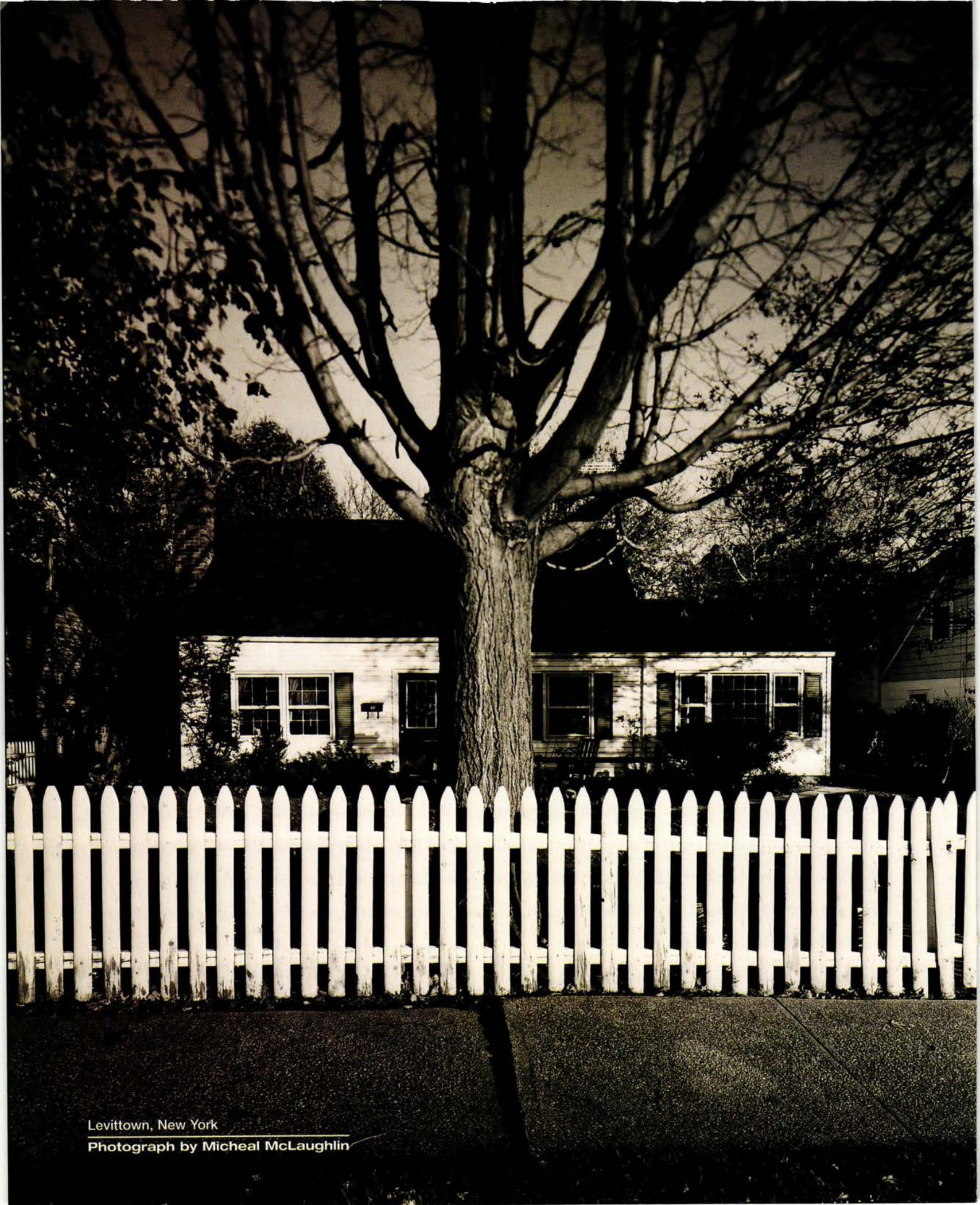
Though various restrictive covenants dictate what sort of fences homeowners can build, or even rule them out entirely, the fence industry, according to Terry Dempsey of the American Fence Association, remains “robust.” American homeowners, he says, construct more than 72,000 miles of fences annually. Just over half of those miles are built of chain link, which is intriguingly referred to in the industry as a “fabric” because it is created by great loomlike machines that combine metallic threads into a distinctive diamond weave. Wood is the next most favored material, though there is an increasing market for vinyl-coated chain link and other sorts of plastic products that can mimic expensive wooden fences. An average fence for an average backyard costs between \$1,000 and \$5,000, and it is an expense that Americans do not seem to find it in their hearts to question.

When I was a boy, growing up in a West Texas city in the open range that had been shut down by barbed wire, a world without fences would have seemed an eerily stark place. Fences brought relief and scale and a much-needed sense of mystery to a landscape that was unnervingly flat. People put up fences



Brittany, France

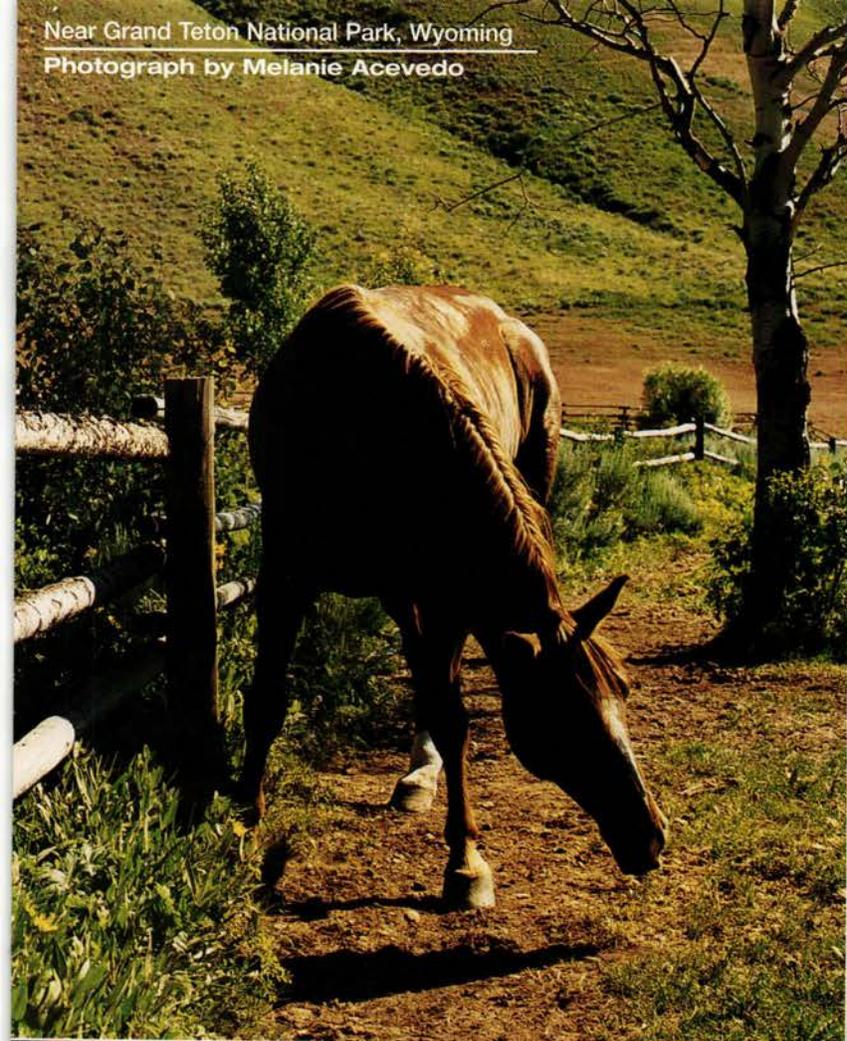
Photograph by William Abranowicz



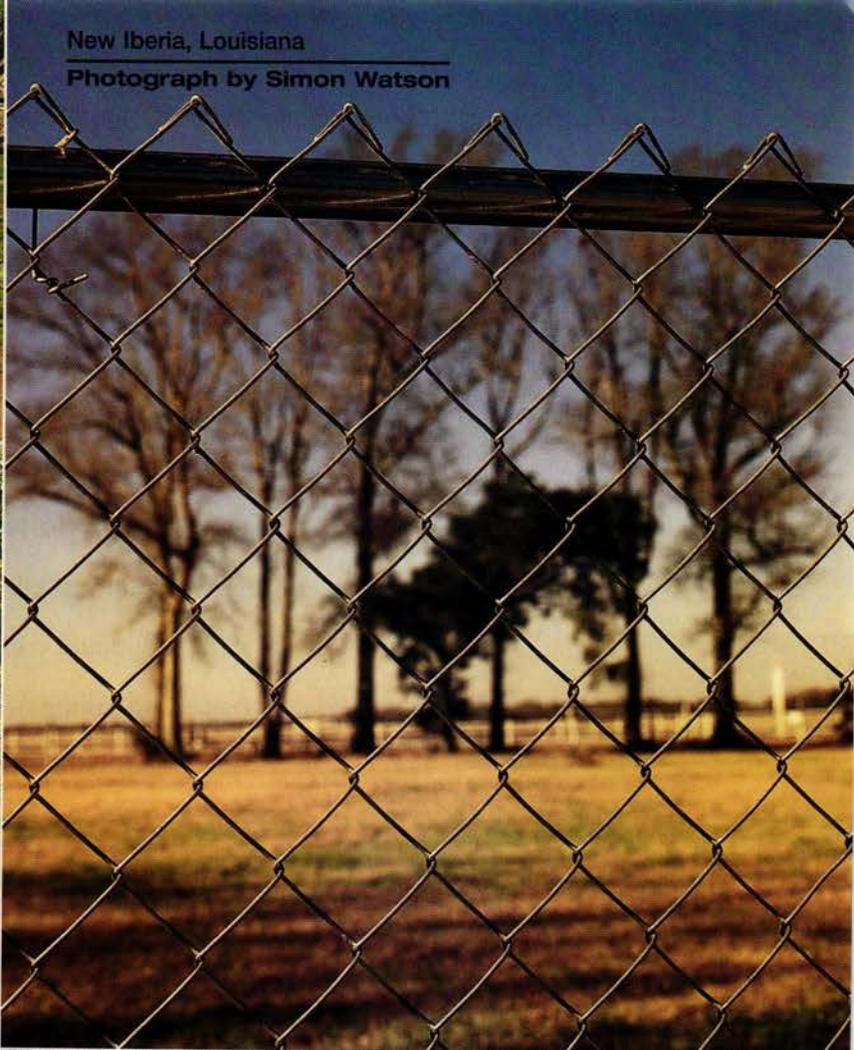
Levittown, New York

Photograph by Micheal McLaughlin

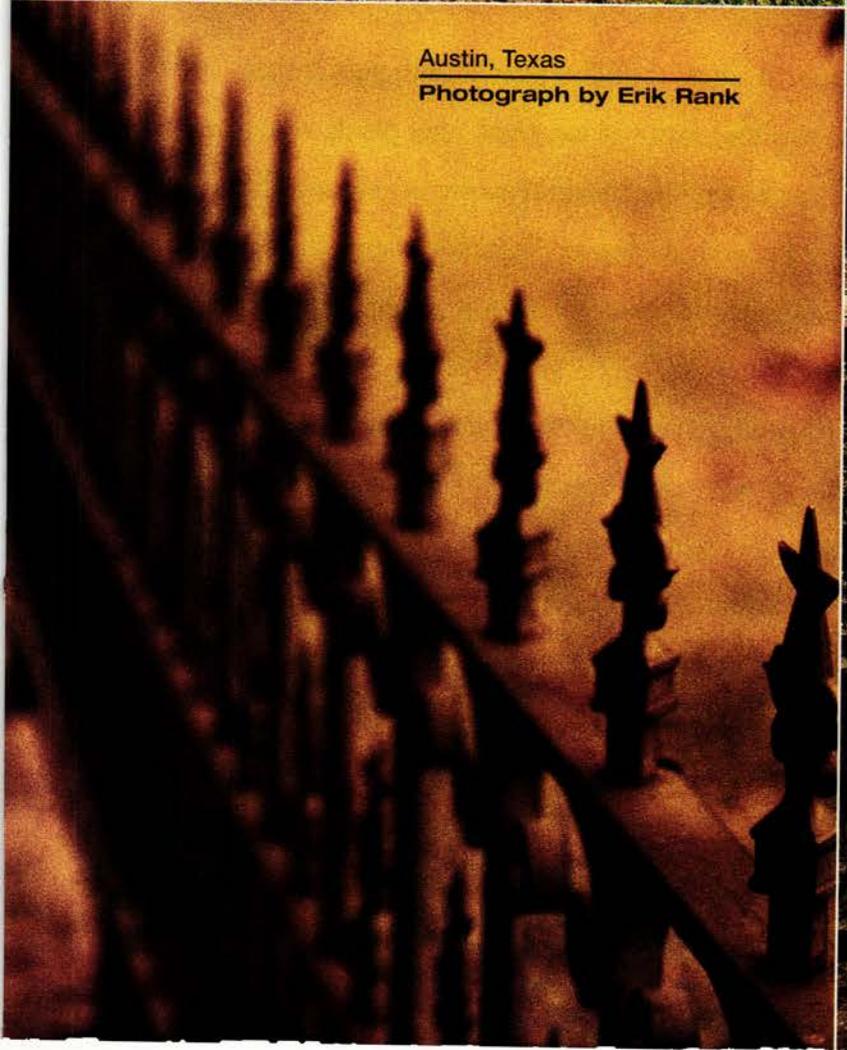
Near Grand Teton National Park, Wyoming
Photograph by Melanie Acevedo



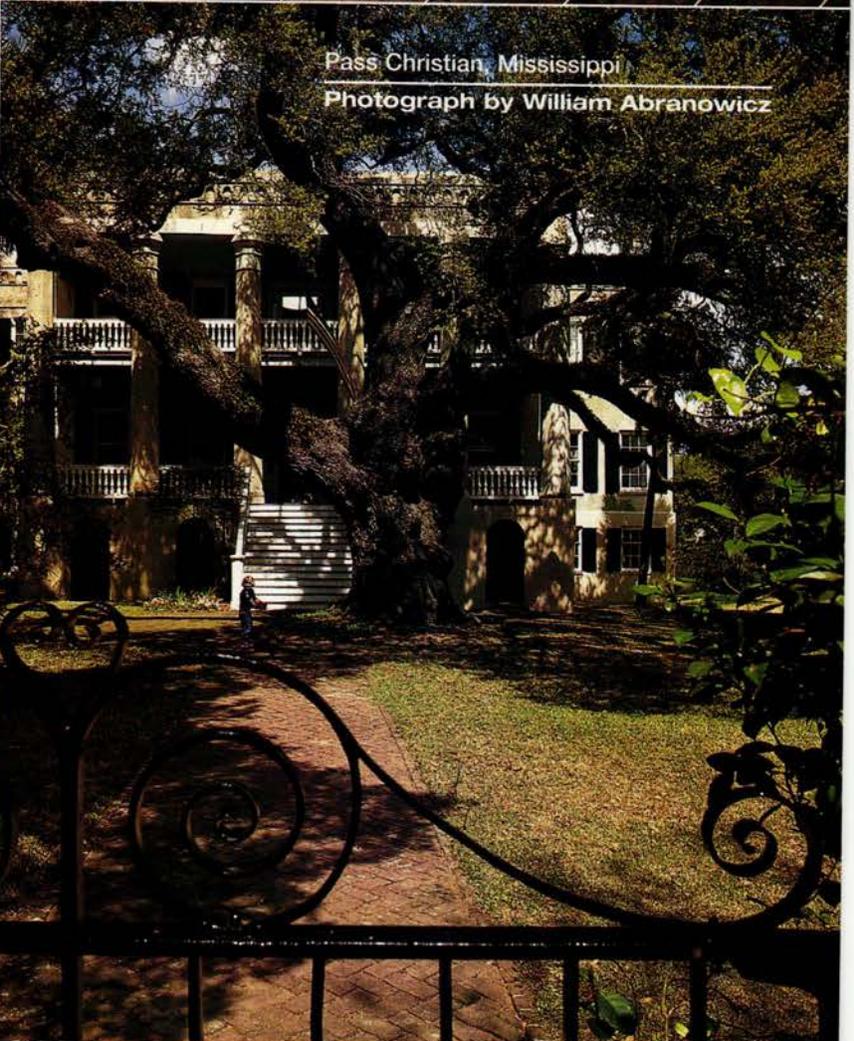
New Iberia, Louisiana
Photograph by Simon Watson



Austin, Texas
Photograph by Erik Rank

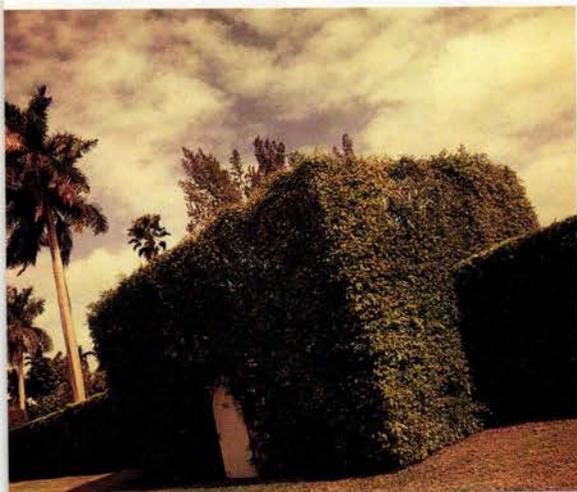


Pass Christian, Mississippi
Photograph by William Abranowicz



simply to protect themselves against nothingness. Our own fence was built of gray cinder block, wide enough at the top to provide footing for children and dogs as we paced back and forth, bracing ourselves against the wind from those empty plains, which was often powerful enough to sweep us off. The alleyways behind the houses were lined with wooden fences, some with recessed, built-in compartments for garbage cans. For some reason these little hutches always intrigued me, and I used to imagine taking up residence within them, simply melting into the fence with nobody able to guess where I had gone.

“The close proximity of fences to the house,” scowled a critic in 1841, “gives the whole place a confined and mean character.” Maybe, but on the whole I think I disagree. Even today, when I pass a house without a fence, it seems bare and unfinished. And there is an undeniable beauty to fences, some-



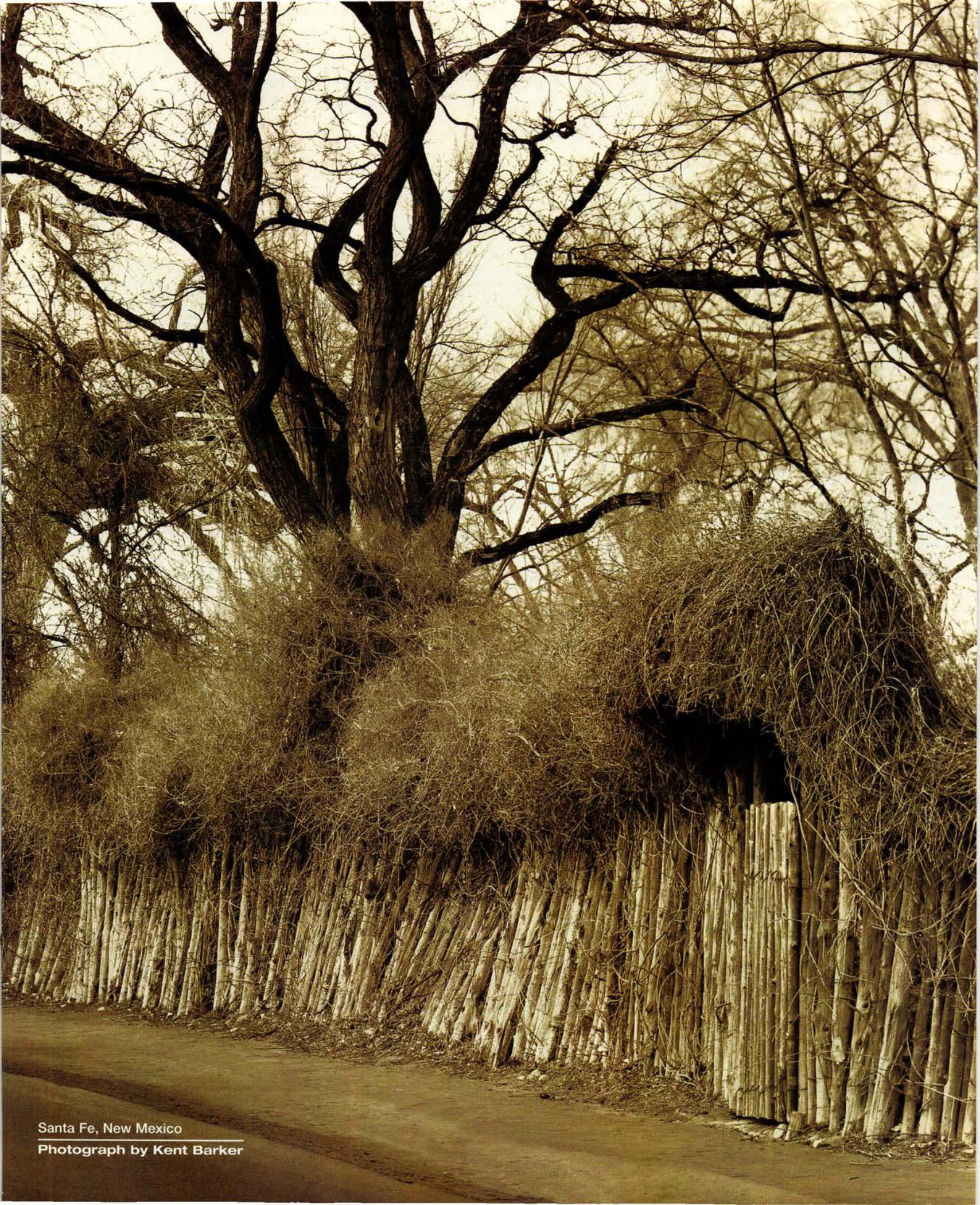
Miami Beach, Florida

Photograph by Brian Smith

thing stolid and confirming in the way they march across the landscape, rising and falling in accordance with the contours of the terrain but never surrendering their momentum. An ageless stone fence in a New England potato field, a corral in Wyoming, a knotholed redwood privacy fence in a suburban backyard, an endless strand of barbed wire held up by gnarly mesquite posts and strung with dead coyotes somewhere in the arid Southwest: All such structures have their own harmony and authority, if viewed with an accepting eye.

The practical function of fences is to shut you out. But part of their aesthetic appeal is the way they lead you on, plank after plank, zigzag after zigzag, with their recurring ornamental doodads, their carved wooden finials of acorns or pineapples, their rows of wrought-iron spear points. Fences can be almost hypnotically linear. The world’s largest fence, the Great Wall of China, has this quality, at least in aerial photographs, in which it roves across the Mongolian Plain like something alive and searching.

It is highly doubtful that our little balustrades of redwood or chain link will ever stir the souls of future generations. But the humble fences of years past do make up a surprisingly rich legacy. Consider a sagging fence of stacked stone running bravely across the landscape. It may be three or four hundred years old, built by pilgrims or slaves or some lonely hardscrabble rancher. Buckled in places by tree roots, undermined here and there by shifting terrain, it remains standing only because gravity has not yet decreed otherwise. But in the light of a fading afternoon, such a fence can seem more venerable and enduring than a cathedral. The fields it once divided, the grounds and houses it once protected, have all moldered away into a wild tangle of vegetation, but the fence stands there as if still needed, a reminder of a human compulsion as old as time.

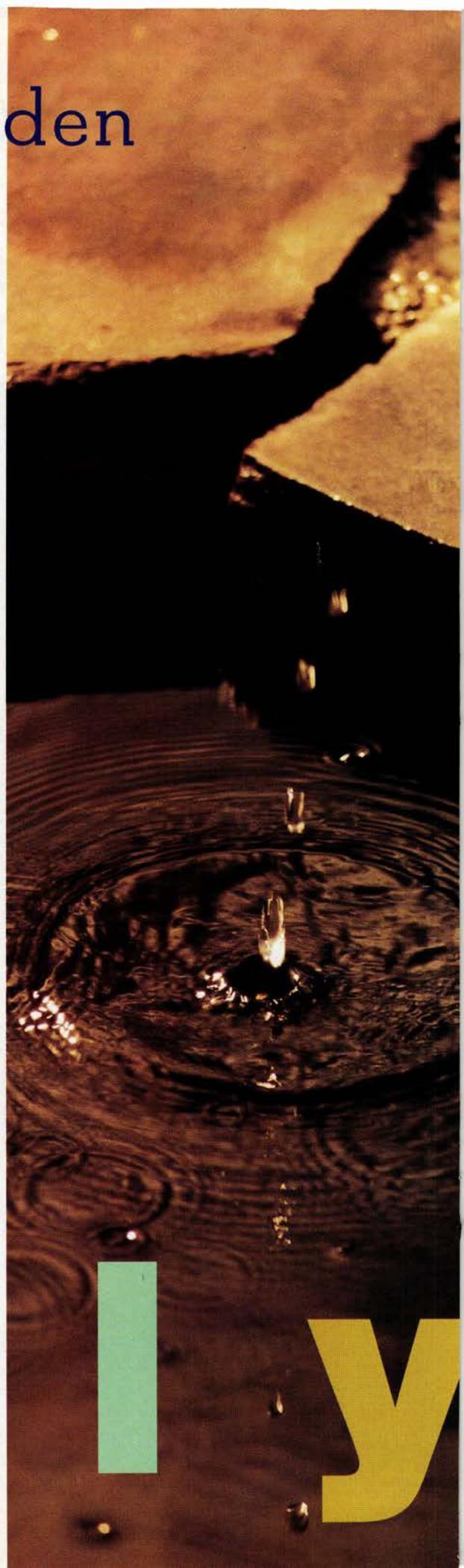


Santa Fe, New Mexico
Photograph by Kent Barker

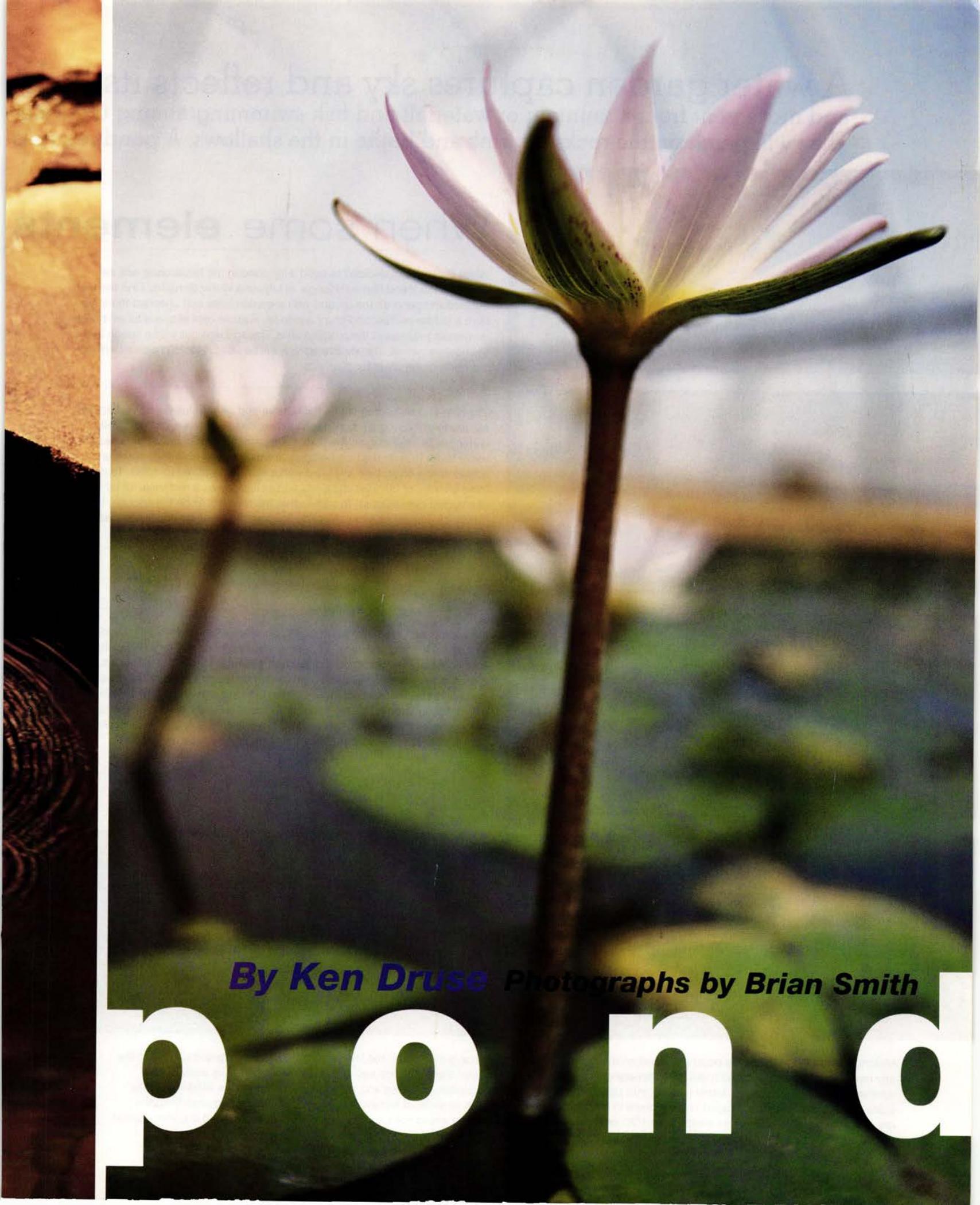
Adding life to a garden



ii



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By Ken Druse Photographs by Brian Smith

p o n d

A water garden captures sky and reflects its light and movement from a fountain or waterfall and fish swimming among the water. They will perch on the rocks to drink and bathe in the shallows. A pond requires



When some elements

When Rolf Nelson decided to build a lily pond in his Texas backyard, he called on his friend Richard Koogle of Lilypons Water Gardens. First the men outlined the pond on the ground with a garden hose and checked the shape from a ladder and second-story windows. A loose oval allows a future bridge or stepping-stones at the pinched area. The sod was cut with a spade and the hose removed. The excavated soil will be used later to create a berm to the north of the pond for plantings.



The hole should be dug with a flat bottom and gently sloping sides. Experts recommend making 12-inch-deep shelves on which to set potted, shallow-water plants, and digging the rest of the area down to at least 18 inches for water lilies. To level the pond edge, soil was scraped from high areas and added to low ones, then checked with a spirit level taped to a 2x4. To determine the size of the liner, the pond was estimated as a rectangle 16 by 6 feet (the widest dimensions). To assure that the liner would be big enough, the depth (18 inches) was multiplied by $2\frac{1}{2}$, and the resulting 45 inches was added to both length and width.



In keeping with the pond's naturalistic shape, Nelson and Koogle decided not to make a formal "necklace" of coping stones around the rim. They will use them only on the north side, closest to the house, to blend in with a future rock garden. Using local stone and making the edge as natural as possible will avoid the planted-pool look. On the north side, the men dug a shallow trench for flat stones; on the south, they installed steel lawn edging. The liner will go under the rocks on one side and over the edging on the other, where it will be trimmed off 4 inches beyond the rim and buried beneath sod.



Matting around the sides of the pond and sand on the bottom keep any remaining sharp stones and roots from damaging the liner. A synthetic feltlike underlayment fabric was cut into panels to fit the sides. (Old carpet can also be used.) Liners come in many sizes and are made from materials such as inexpensive PVC or more costly, longer-lasting rubber. Thicker liners last longer—up to 50 years.

To avoid damage, the liner was folded into a strip and carried to the hole, then unfolded and allowed to settle. Creases were, where possible, gathered and smoothed. The pond was filled with water only to within 4 inches of the top, so that finishing work from the inside would not cause overflow. The water pressed the liner against the sides of the pond, making the creases barely visible.

back to the landscape. There is sound
lilies. Nothing attracts birds like water—particularly moving water.
attention, but no other garden feature will be as rewarding.

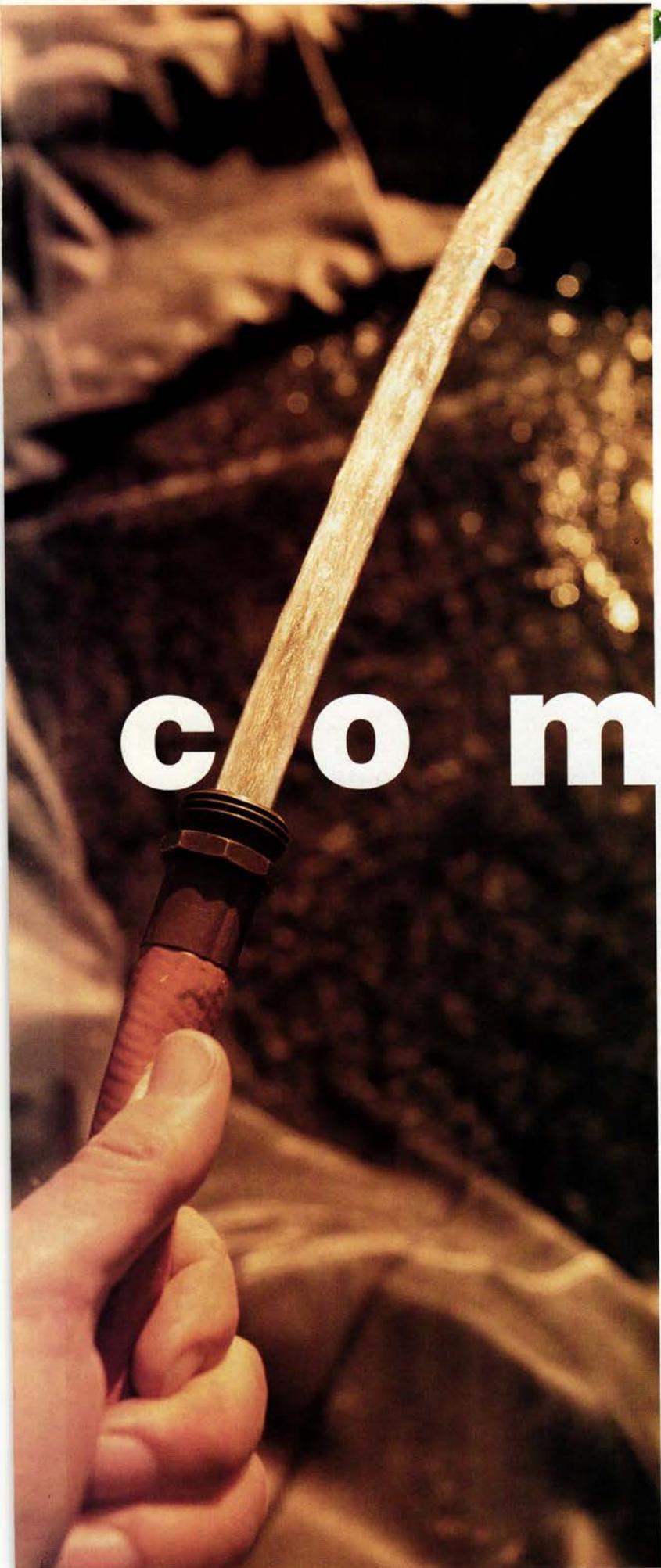


of nature are missing, **add them**

The pond should not be sited in a low place where runoff from the property can foul the water or dislodge the liner. Nelson wanted water lilies in his pond, so it had to be located in full sun—away from the shadow of the house and overhanging tree limbs. This also eliminated the need to dig around tree roots and reduced leaf cleanup. The pond is the focal point of a new garden area, which will eventually be reached by a stepping-stone path from the house. It's not a good idea to install a lined pond where the water table is high or the soil drains very poorly—hydrostatic pressure might shift the liner. You will have to deal with drainage. One way is to make a 1-foot-wide, gravel-filled channel under the pond, running along its length. Start it 6 inches deep at one end and increase the depth $\frac{1}{2}$ inch per foot until it extends at least 3 feet beyond the opposite end. The channel should lead to a gravel-filled dry well.



On the north edge, rocks were set in mortar and arranged with a 3-inch overhang that casts a shadow on the water for a deep, natural look. Soil was backfilled to sandwich the liner against the rocks, and the excess liner was trimmed flush. The original fill water, made dirty and alkaline by the mortar, was siphoned out and the pond was refilled. Water lilies were placed on the lowest part of the pond floor and shallow-water plants set on the shelves.

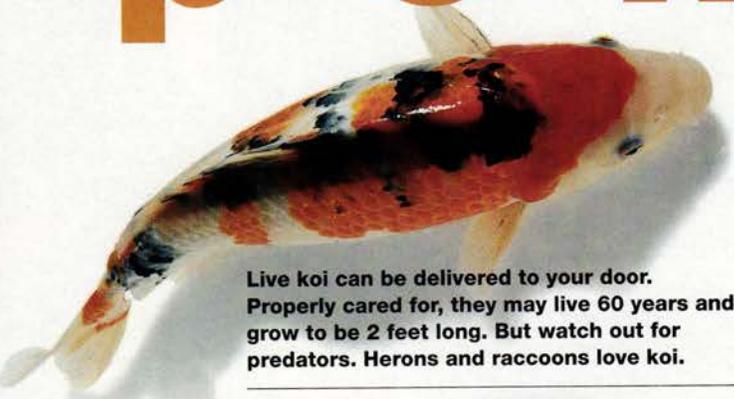


c o m p o n

Water gardening requires
The challenge is maintaining a balanced



A pump to power a filter and fountain will be needed. This one moves 475 gallons of water an hour.



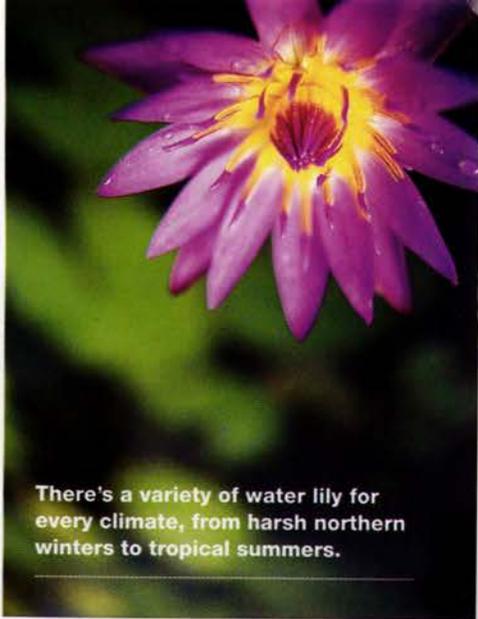
Live koi can be delivered to your door. Properly cared for, they may live 60 years and grow to be 2 feet long. But watch out for predators. Herons and raccoons love koi.



Illuminate the pond with an underwater fixture. This one comes with a transformer and built-in timer.

attention to details.

ecosystem in miniature. PHOTOGRAPHS BY DAVID SACHS



There's a variety of water lily for every climate, from harsh northern winters to tropical summers.

elements of a lily pond

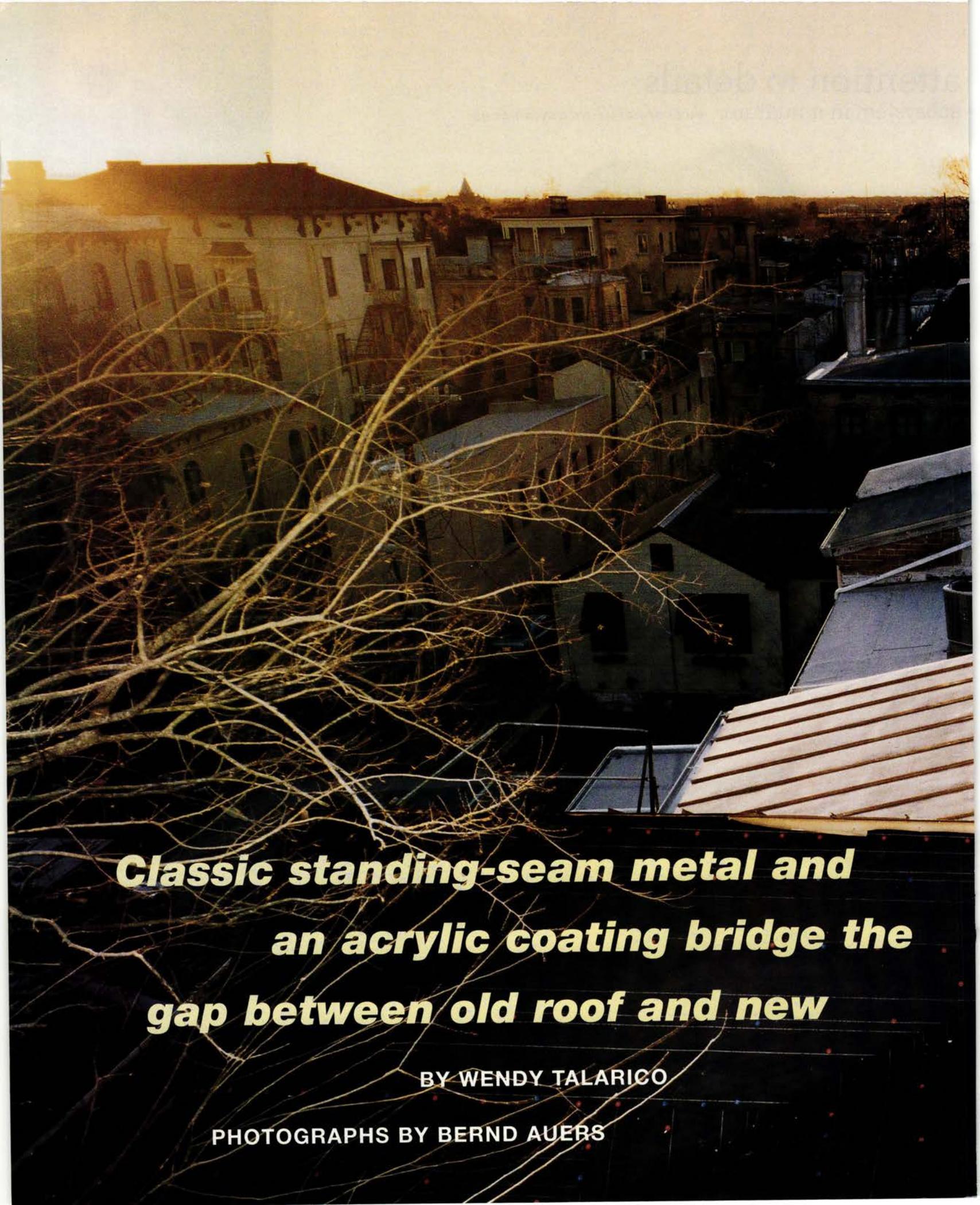
HAND HOLDING HOSE, LIVE FISH AND WATER LILY PHOTOGRAPHS BY BRIAN SMITH

A sacrificial anode attaches to the water pump and protects it from corrosion.

A verdigris metal spouting fish fountain adds sight and sound while aerating water.

A mechanical filter with a washable foam cover traps debris.

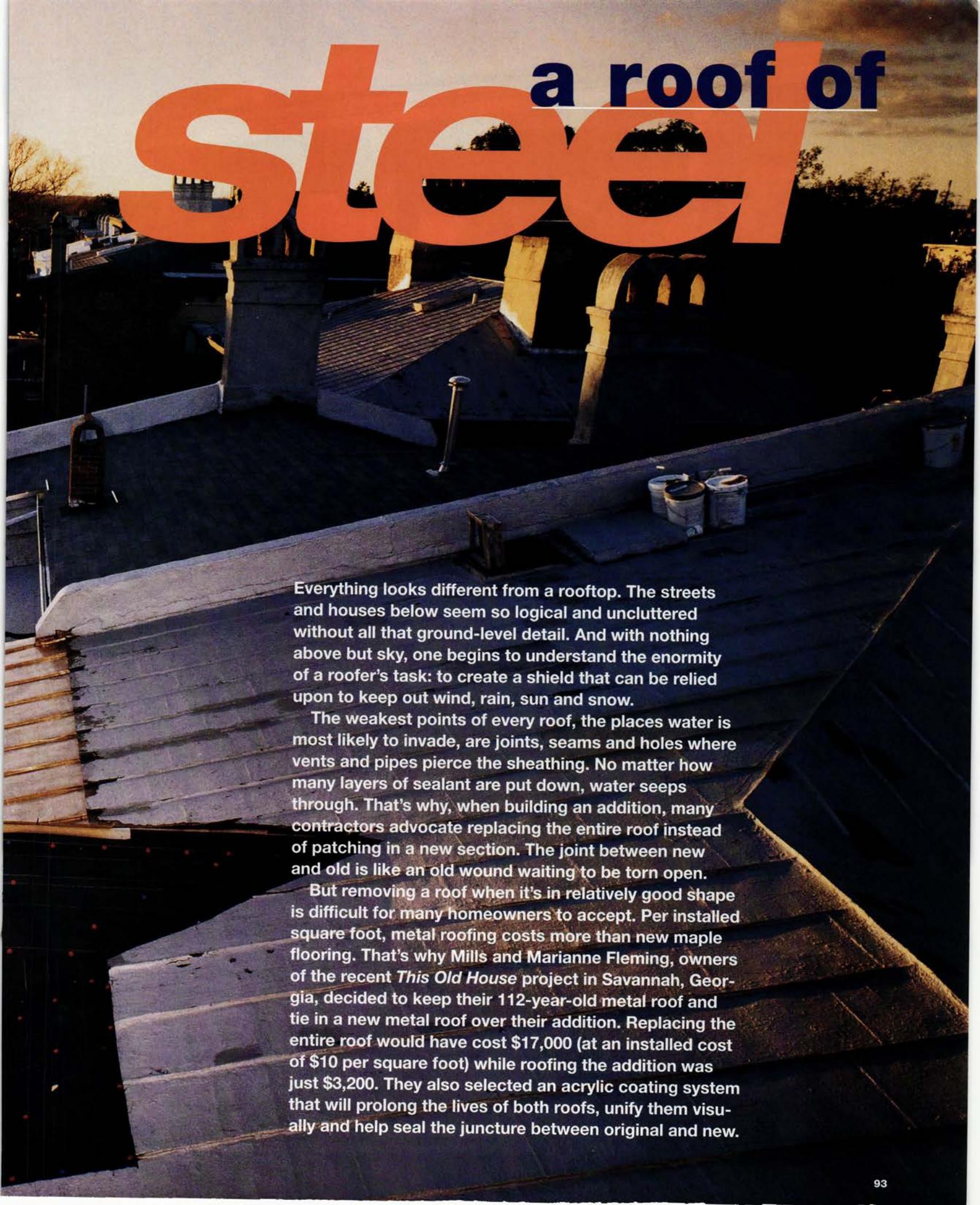
◆ See Directory, on page 107, for details and sources



***Classic standing-seam metal and
an acrylic coating bridge the
gap between old roof and new***

BY WENDY TALARICO

PHOTOGRAPHS BY BERND AUERS

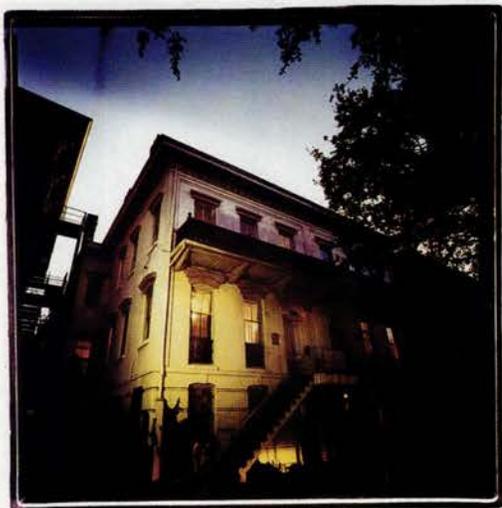


steel a roof of

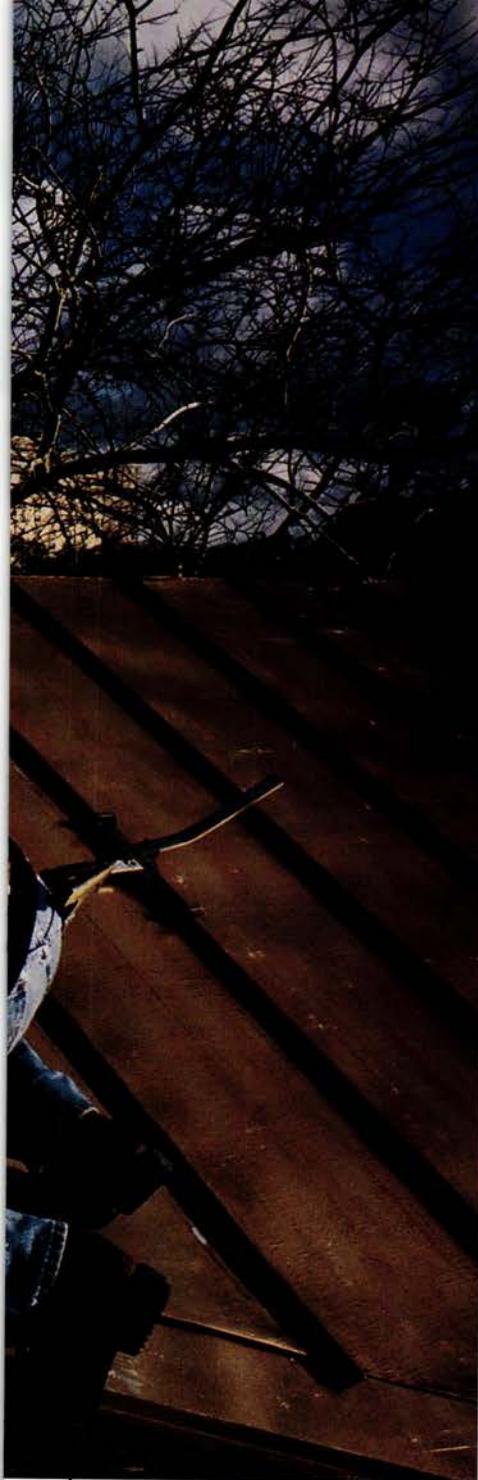
Everything looks different from a rooftop. The streets and houses below seem so logical and uncluttered without all that ground-level detail. And with nothing above but sky, one begins to understand the enormity of a roofer's task: to create a shield that can be relied upon to keep out wind, rain, sun and snow.

The weakest points of every roof, the places water is most likely to invade, are joints, seams and holes where vents and pipes pierce the sheathing. No matter how many layers of sealant are put down, water seeps through. That's why, when building an addition, many contractors advocate replacing the entire roof instead of patching in a new section. The joint between new and old is like an old wound waiting to be torn open.

But removing a roof when it's in relatively good shape is difficult for many homeowners to accept. Per installed square foot, metal roofing costs more than new maple flooring. That's why Mills and Marianne Fleming, owners of the recent *This Old House* project in Savannah, Georgia, decided to keep their 112-year-old metal roof and tie in a new metal roof over their addition. Replacing the entire roof would have cost \$17,000 (at an installed cost of \$10 per square foot) while roofing the addition was just \$3,200. They also selected an acrylic coating system that will prolong the lives of both roofs, unify them visually and help seal the juncture between original and new.



Judged on looks alone, the neat, symmetrical lines of standing-seam metal make it one of the most attractive roof coverings available. While there are several types of metal roofing, including copper, aluminum, zinc and steel, the roof of the Flemings' house (pictured at left) is terne—steel coated front and back with a lead/tin alloy to retard rust. The unusual name is French for dull, referring to the lead in the coating, though the material was developed in Wales during the 18th century. Manufacturers recommend painting terne every five to seven years for additional protection against rust. That accounts for the brilliant blues, reds and other colors these roofs often wear. Sometimes referred to as tin roofing, terne doesn't expand and contract as much as other metals during temperature swings. A summer rainstorm can drop the heat on a Savannah roof from 160 to 70 degrees within minutes, causing most metal panels of equal size to shift by a third of an inch or more. Terne moves at about half that rate. It's also strong, fire-resistant and slippery enough for snow to slide off, making it a good choice for cold climates. Where air-conditioning costs are steep, research shows, metal roofs painted a light or reflective color can save 20 percent or more per year. That's good news for the Flemings, who chose a silvery gray for their roof.



ABOVE: The addition's $\frac{3}{4}$ -inch plywood roof sheathing was first covered in roofing felt, an asphalt-saturated fabric. The felt keeps the new construction underneath dry until the roof is finished. Afterward, it acts as a layer of protection against leaks. Because the asphalt in the felt corrodes steel, rosin-coated craft paper was sandwiched between the two materials to keep them isolated.



Roofing isn't a job for those who strive to avoid math. Figuring out how to form the metal for these converging valley pieces, where the addition's dormer meets the old roof, took the crew more than an hour and involved some serious trigonometry, sketched on a spare piece of rosin paper. Because all the roof panels radiate from the valley, it was essential the pieces be straight. The valley pieces were laid in butyl rubber to keep water from backing up under the metal. The joint at the apex was riveted and soldered to create a watertight seal. One advantage of metal roofing is that it can be soldered, forming a long-lasting bond.



Each terne metal panel measured 17 inches wide, with $1\frac{1}{2}$ -inch wings on either side. The wings on adjacent panels were folded together with a metal-bending tool called a hand brake to form the standing seams. This traditional installation method, used on terne since its inception, gives water and ice no place to invade; screws don't pierce the metal membrane. To anchor the roof to the sheathing and to prevent the occasional hurricane from lifting the panels, S-shaped stainless steel cleats, spaced 12 inches apart along the seams, were nailed into the sheathing, then folded into the metal seams.

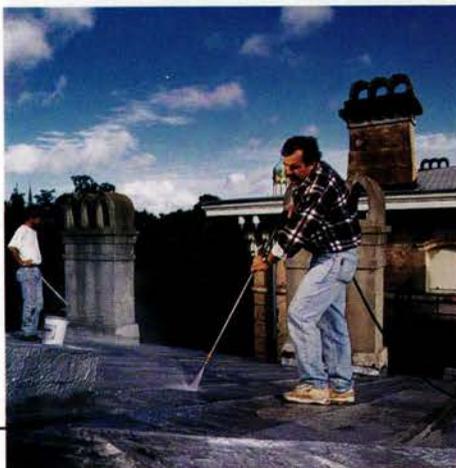


Two chalk lines snapped along the peak of the dormer provided a guide for trimming the excess metal and folding the tops of the panels to form the ridge cap, the standing seam that runs along the peak of the dormer. The terne metal used here is 28-gauge, about $\frac{1}{8}$ of an inch thick. It is thin enough to cut easily with tin snips and to bend into place with hand tools. But despite its light weight—about 12 ounces per square foot—it's surprisingly strong and durable. The new roof has a 20-year warranty, but with proper upkeep, chances are it will last as long as its 112-year-old neighbor.

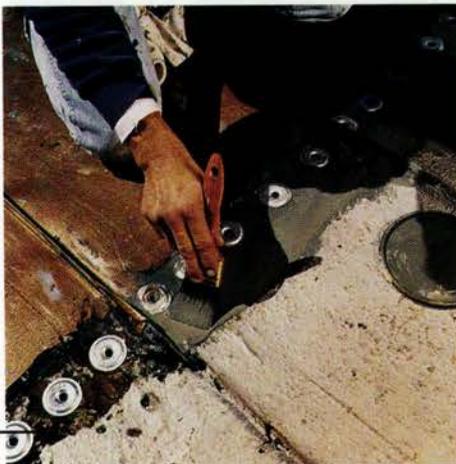


The ridge cap was created by hand. Eighteen-inch tongs were used to push the metal from each side of the dormer into a standing position. The pieces were folded over twice, much like the seams between panels. To form a crisp edge, the seam was flattened with a 16-ounce sheet-metal hammer. The ridge assembly is airtight as well as watertight, so vents must be installed every 12 inches along the soffit for attic ventilation.

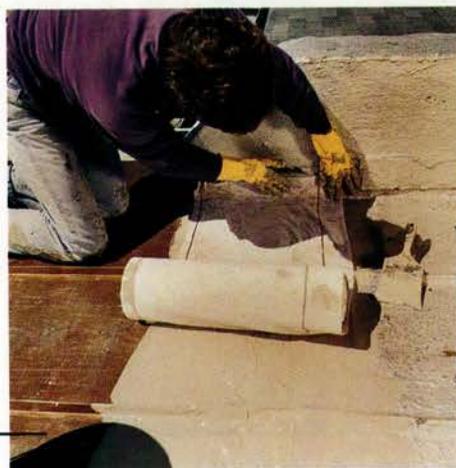
To give the acrylic coating a solid, clean surface to adhere to, the old roof was power-washed with a pump rated at 2,500 to 3,000 pounds per square inch of pressure. Salt, dirt and chips of loose paint were washed away. It wasn't necessary to remove the entire ¼-inch-thick crust of old paint that covered the roof. Roofing contractor Jeffrey Lancaster estimated that more than 15 coats of paint had been applied during the past 112 years. Rust spots where the terne plating had worn away, exposing the steel to the elements, were scraped clean with a wire brush and treated with a rust inhibitor.



The joint between the old roof and the new required special treatment to prevent it from loosening over time and allowing water to infiltrate. First, the existing roof was peeled back so the new sheathing could be patched in. After layers of roofing felt and rosin paper were inserted, the old roof was trimmed to provide a neat edge. The new roof was tucked beneath the edge, creating an 8-inch overlap that was sealed with butyl rubber. Then the layers were secured to the wood sheathing below using screws and 2-inch galvanized washers. A coating of AcryMax, a polyester mesh and acrylic system (see story, opposite page) was applied over the joint.



The polyester reinforcing mesh comes in 4- and 16-inch-wide rolls. The latter is normally used to cover the panels while the 4-inch polyester bolsters the seams. In this case, the wider fabric was applied along the joint to provide extra strength. The mesh was laid down while the base coat was wet, and bubbles and wrinkles were smoothed out. No mesh was necessary on the new roof. Instead, the contractor applied a single coat of the acrylic component. Before acrylic-based products, linseed oil was the main ingredient in roof paints.



Once the base coat was dry, two additional coats of acrylic were rolled over the mesh. Each coat takes about 15 hours to dry thoroughly, depending on humidity, temperature and color (dark colors dry more quickly). Like any exterior paint, AcryMax should be used when temperatures are moderate and there's no rain in the forecast. Freezing temperatures damage the coating if it isn't dry, and rain washes it away. AcryMax was used over metal here, but it is suitable for use on other materials as well, including shingles.



ABOVE: AcryMax can be used with or without the polyester reinforcing mesh. The mesh gives the acrylic coating additional strength and, in effect, holds the roof together. The coating can be ordered in just about any color. On the Fleming house, AcryMax was installed by contractors, but homeowners can do the work themselves—as long as they aren't afraid of heights.



A Modern Roof-Coating System

Flipping through a trade magazine for builders, Savannah project supervisor Mark Fitzpatrick saw a small ad for an elastomeric roof-coating system. He thought it might

be a way to restore—or at least slow the aging process of—the original terne metal on the Fleming house. The old roof was dotted with pinhole leaks and minor cracks. AcryMax is much like other coatings used on metal roofs, except it combines acrylic with sheets of polyester reinforcing mesh to form a thicker membrane. The acrylic coating is elastomeric, which allows it to flex without cracking as the roof expands and contracts. As thick as potato soup, it goes on heavier than most oil-based paints or acrylic house paints. According to the manufacturer, the system will last seven to 12 years before recoating is necessary. It can also be used repeatedly, extending the life of the roof almost indefinitely.

Fitzpatrick reasoned that the acrylic-polyester system might also help seal the joint between old and new metal. And applied as a top coat over the entire roof, it would visually blend the two sections. Contractor Jeffrey Lancaster wasn't so sanguine, even after watching the AcryMax go down. "It's a way of buying time, that's all. They'll have to replace the old roof eventually." That may be true, but, as Fitzpatrick points out, at an installed cost of \$3 per square foot, the acrylic-polyester treatment can go on three times before it approaches the price of a new metal roof. "If the system lasts the projected 10 years," Fitzpatrick says, "that buys the homeowners 30 years." That's longer than the warranty period on a new roof.

low-tech buggy

Now that we've **banned** killer chemicals, the **eat-your-house wars**. New high-tech luck if your house is in a **hot climate** and

After a quarter century, Jeb Eddy thought he knew everything about his house, even down to quirky details like the shredded redwood bark used for insulation in the attic. So when a painter noticed pinholes in two eaves and said they meant termites, Eddy didn't panic. Suspecting just a touch of damage, he did nothing.

A few months later, he spotted winged insects flying from a hole in the baseboard near the front door. He spent two hours behind a vacuum cleaner, sucking up a stream of them. "It was a wake-up call," he says. "I had to do something."

Eddy called in two termite inspectors. Each glanced around and recommended fumigation. Loathing the prospect of filling his house with toxic gas, Eddy contacted a third inspector, who went over the entire structure, even probing the roof overhang with a ski pole. Behind the paint, much of the wood was hollow. "Poke, poke, poke—it was like poking through a thin layer of plastic," Eddy remembers.

No one wants a firsthand education in the habits of bugs that eat houses. But knowing the enemy is crucial, both to guard against expensive repairs and to judge exterminators' proposals, which these days range from strong insecticides poured on anything that

BY JEANNE HUBER PHOTOGRAPHS BY ERIK RANK



insects are winning
tricks help, but good
termites attack

Blind and nearly translucent from lack of pigment, worker termites scurry for cover when exposed. They lack defenses against dry air or predators. Although they look like their chief enemy, ants, termites are more closely related to those other disgusting household pests, cockroaches.

detection

moves for those who demand a fast kill, to an amazing array of alternatives for those who cannot abide the idea of poisons.

The truth is that most insects pose no structural threat. Of those that do destroy wood, many die out after one generation even if no action is taken. Others are best deterred by keeping wood dry. That leaves termites and a few beetles that lay eggs in seasoned wood. Even with termites, though, the degree of concern ought to match the type of termite. Formosan termites can cause significant damage in as little as three months, but other kinds need years.

Two types of termites were attacking Eddy's house. The eave holes were evidence of drywood termites, which are common in California and in the South. They live inside wood but chew tiny holes in the surface to push out their fecal pellets. (Under a magnifying glass, these pellets look like desiccated corn because the termites recycle almost all their waste water.) The termites flying out from the baseboard were subterraneans, the most common kind in the United States. They feed on wood but must have a sheltered route to soil, where they nest and get moisture. In Eddy's house, they were sneaking into wall studs through cracks in the concrete slab foundation. They invade houses with elevated foundations by building protective mud tubes for trips between dining hall and home.

Because Eddy lives in California, which has one of the worst termite problems in the country as well as perhaps the stiffest public opposition to toxic chemicals, he could choose from an unusually rich array of treatment methods. The third inspector offered to kill the termites in the roof by "popping" them with microwaves. That sounded great to Eddy, far better than draping the house with tarps and filling it with sulfuryl fluoride. (The other common fumigation gas, methyl bromide, damages the earth's ozone layer.) The inspector added that his company would use "a balanced assortment of treatment methods," Eddy recalls. The price tag for the various treatments, plus

a three-year warranty, came to \$2,200.

As soon as the work began, Eddy realized he'd been naive. "Yes, they used microwaves—for one beam. The attic and the garage were sprayed," albeit with borate, a mineral-based insecticide that is no more toxic to humans than table salt. Along one wall of his living room, the wood parquet floor was drilled every foot or so with half-inch holes (now plugged with gray plastic) so the soil underneath could be drenched with permethrin, a synthetic version of pyrethrin, the insecticide found in chrysanthemums.

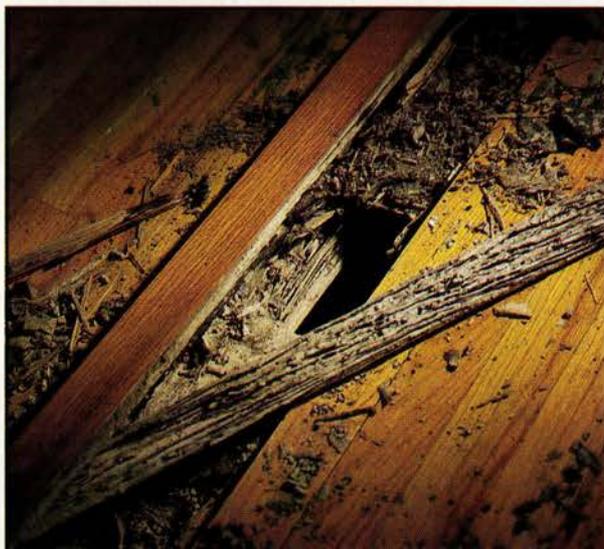
After the work was done, pellets the size of poppy seeds continued to drift down onto a tile floor at the rear of the house. Suspecting some termites were still alive, Eddy paid \$225 for a fourth inspection, this time using a dog, which sniffed out bugs the human inspectors had missed.

Eddy was not upset that some termites were still alive. "We sort of expected that. Anything short of bagging the house and putting in all those obnoxious chemicals may leave some." He plans to deal with termites as he finds them, calling in the dogs every few years for a checkup.

prevention

Most homeowners, however, want the bugs gone once and for all. Given Eddy's experience with alternative treatments, old-fashioned chemicals might seem preferable. But whether they realize it or not, homeowners—especially those in hot, humid places—are in for an expensive battle that will need to be fought year after year.

For a time, one method of treating subterranean termites seemed to guarantee a long-lasting cure. Starting about the end of World War II, pest-control companies routinely drenched soil with chlordane, an insecticide chemically related to DDT, to create a barrier that lasted for 30 years or more. Farmers also spread chlordane on fields to control insects, and homeowners

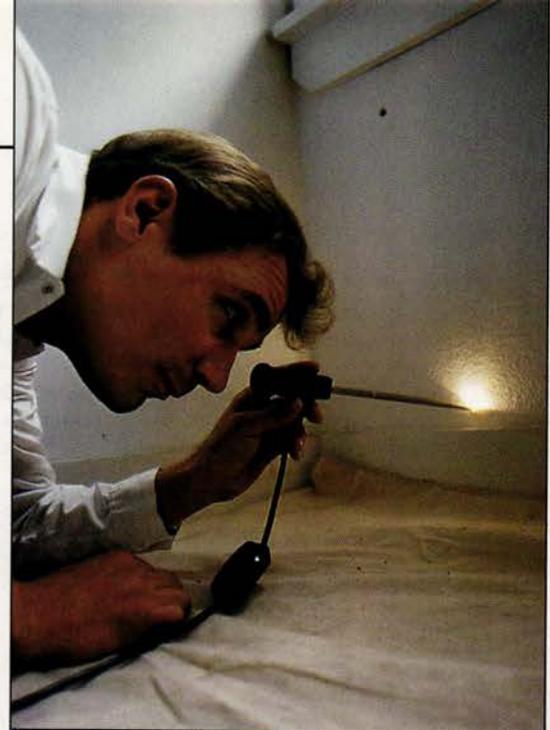


The termites to fear

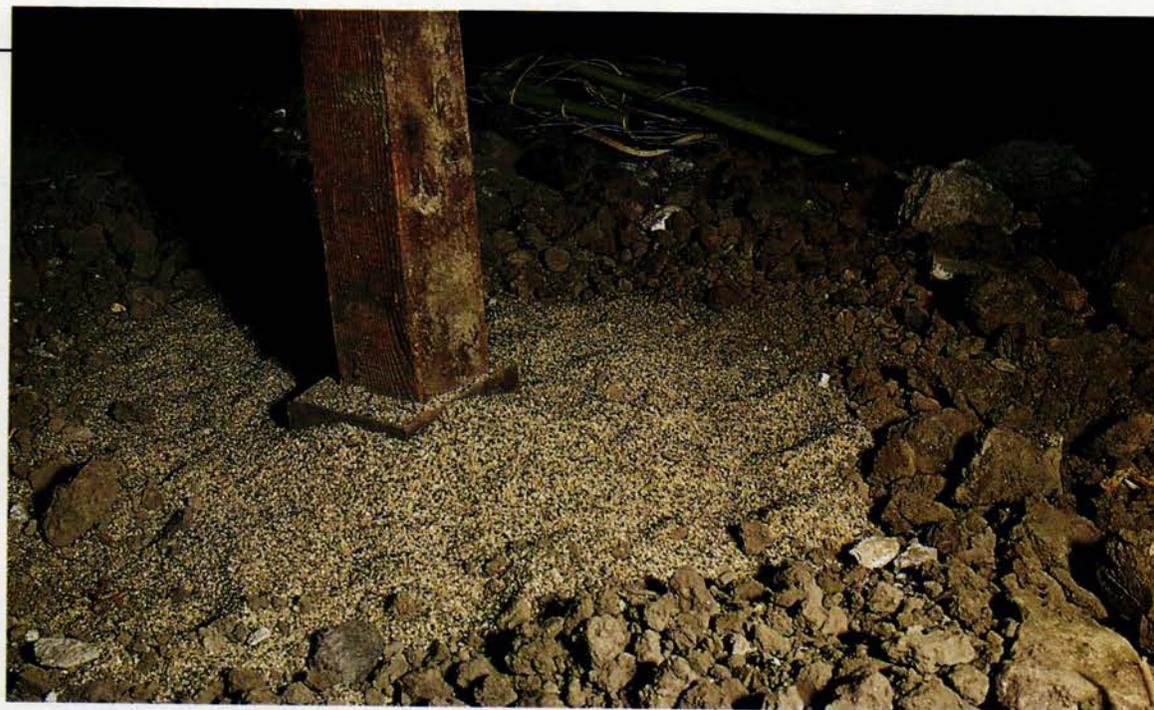
This oak floor in New Orleans was destroyed in just two years by Formosan termites, the killer bees of structural pests. In another room in the same building, the floor was replaced three times in six years. The culprit looks so much like the common termite that scientists did not recognize it as a separate species until 1965, probably about two decades after it was brought here on boats from Asia. Although still found only in southern coastal areas and in Hawaii, it might eventually spread as far north as Tacoma and Boston. That would be very bad news. Formosan termites form huge colonies. A colony with 3 million members could consume 167 linear feet of 2x4 in a year. An ordinary subterranean termite colony with 60,000 members would destroy just 2½ feet, and a drywood colony of 700 members would eat just a few inches.



Finding termites is especially difficult because so much of a house is hard to inspect. But a beagle from TADD Services Corp. of Belmont, California, easily scoots into a corner of Jeb Eddy's attic. "Dig 'em out," handler Ron Moberg commands, and the dog responds by pawing vigorously over a wall from which drywood termite pellets have been falling.



Thomas Polcik of Tallon Termite & Pest Control, based in Redondo Beach, California, uses a fiber-optic scope to peer into wall cavities. The wand is inserted through half-inch holes that are later patched. In this uninsulated wall of a house in Santa Monica, Polcik saw piles of pellets left behind by drywood termites.



Weapons in the fight against subterranean termites take advantage of the fact that the bugs always enter a house from the ground. ABOVE LEFT: When contractor Doug Carver built this new foundation under an old house, he stopped the stucco well above the soil. This way, the mud tunnels subterranean termites build to reach the sill can be easily detected. ABOVE RIGHT: A barrier of sand protects the house underneath. Carver piled the sand 4 inches deep along the inside of the foundation and around support piers; it trailed down to nothing 20 inches out. Sand must be 10 to 16 mesh (1.2 to 2 mm). To find the right size, "ask for sandblasting sand first and then check the specs," he suggests. Sand can be transported through crawl spaces with a wagon and ropes. LEFT: DowElanco makes a plastic bait station, which can be pushed into soil at intervals around a house. The poison is slow-acting in hopes termites will carry it back to their nest before they die. It's an expensive solution, in part because a pest control operator must check it four times a year.



heat

This is the only whole-house alternative to fumigation for eradicating drywood termites. At this house in Arcadia, California, nylon tarps billow out as hot air from a propane burner heats walls from the exterior. At the same time, the walls are heated from inside. Heat can melt vinyl records or soft plastic, so Cal-Western Termite & Pest Control removes these items before work begins and leaves water running in plastic pipes to protect them. Because the roof isn't covered, as it is during fumigation, there's no chance of damage from workers walking on it.



sprayed it in kitchens to kill ants. Then laboratory tests showed it caused tumors in animals. The Environmental Protection Agency stopped most uses in 1983 and banned chlordane as a termiticide, the final allowable use, in 1989. The decision remains controversial, with some researchers saying the dangers were overblown and others worrying that chlordane residues still make some homes unsafe.

Substitutes sold now are safer in part because they don't last as long—as little as three years under a concrete slab foundation and one year in less protected areas, even when applied at the highest allowable levels. This has kindled interest in other ways of dealing with subterranean termites.

Some of the “new” ideas are actually just dusted-off old ones from the decades before chlordane, such as placing metal termite shields under sills in new homes and building and remodeling with borate-treated wood, which resists attack from all termites as well as carpenter ants and many beetles. Some exterminators are using borates on existing homes too, but few see this as a sole weapon against subterraneans.

One promising technique is simply to fortify foundations with a four-inch-thick layer of sand that the termites cannot tunnel through. Doug Carver, a pest-control operator and general contractor in Berkeley, California has used sand barriers in about 100 houses to stop termites. The idea is based on research done in the 1950s by Walter Ebeling, an entomology professor at the University of California at Los Angeles. In the houses Carver has treated, termites have come back only a few times, usually when a dirt clod protruded into the sand. “The fix is simple,” Carver says. “Just pull out the lump and push the sand back.”

Other researchers are focusing on slow-acting baits and



Watching the house heat: Sharon and Karen Moores and their two dogs.

biological controls. Although some researchers suggest using ants—termites' greatest natural enemies—exterminators aren't trying to sell that approach. But one company active in California and Florida, Tallon Termite & Pest Control, does use nematodes, microscopic worms that tunnel into the termites. “We've been very successful in Northern and Southern California,” president Jay Tallon says. “But I won't use them in Florida because the [termite] colonies are too big.”

A nonprofit organization that tracks and publicizes less-toxic pest-control methods, the Bio-Integral Resource Center in Berkeley, considers nematodes an experimental treatment and warns that even under the

best circumstances they will die out within two years. Tallon gives a two-year guarantee with its treatment, which costs between \$900 and \$1,500.

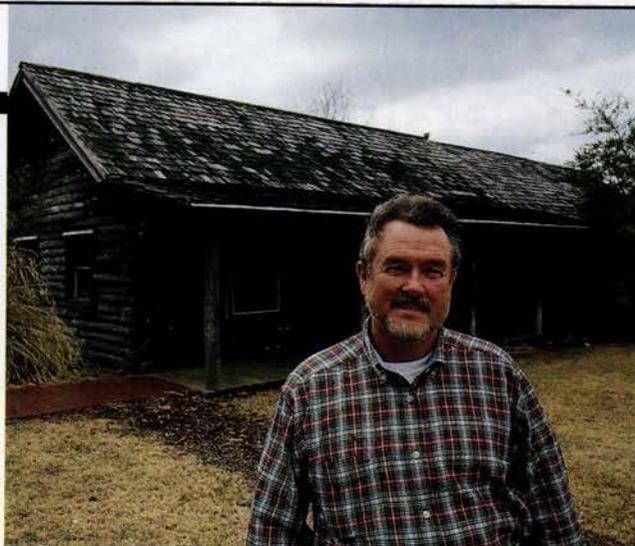
a wider array of options is available to combat drywood termites, and what works against them often works to kill carpenter ants and wood-boring beetles too. But nothing except spraying borates on exposed, unpainted wood in attics and crawl spaces protects for more than a day—not even the traditional solution of filling the house with poisonous gas.

Although drywood termites generally cause less damage than subterranean termites do, they usually cost much more to keep under control. A mating pair needs only a tiny crack to settle in while they dig a hole to begin housekeeping. Because they get their moisture from wood, they need no contact with soil, so physical barriers that keep out subterranean termites don't deter them. But like many insects, they are very temperature-sensitive. Many of the newer approaches take advantage of this, employing either heat or cold.

One method developed by Ebeling works for entire houses, just as fumigation does. Crews clip tarps to eaves, then arrange doors and fans inside so air heated by propane can be blown

Building so the bugs won't dine

It's a lot easier to prevent termites and other pests than to get rid of them. Terry Amburgey, a researcher at Mississippi State University, built this log house to test what works and what doesn't. He'll use the results when he builds his own retirement home, a southern farmhouse. There, he'll crown the site so water runs away and use borate-treated lumber for the framing and pressure-treated lumber for porches all around. The roof will be metal, with continuous ridge and eave vents and ample overhangs. It will have no inside valleys to trap water and no gutters—he's never seen ones that didn't clog. Instead, he'll install drain tiles in the ground at the drip line. “One thing I will not have is insulation below the floor,” he says, because it can cause condensation problems in air-conditioned houses. He'll also skip drenching his soil with chemicals. “I don't think I'll need it.”





freezing

Cold clouds billow up around tarps enclosing a front porch column in Santa Monica, California, as Tallon Termite & Pest Control uses liquid nitrogen to kill termites inside. The liquid, cooled to 20 degrees below zero, causes ice crystals to form on hoses between the tank and the column. The system cannot be used next to glass because the temperature change would shatter it.

microwaves

The heat generated by microwaves kills termites. Mounting three units on a pole, as Northwest Termite Control has done here, speeds the job considerably. To guard against exposure, operators control the machines from switches in a nearby room.

into one or two rooms at a time. Cal-Western Termite & Pest Control in Pasadena, California, has been offering this option for three years. In the first 10 jobs, the company had three callbacks because some termites survived. So president John Lemm turned up the heat, to 130 degrees for one hour instead of the 120 degrees for 35 minutes that worked for Ebeling. Since then Lemm has had only two failures, he says, far fewer than with fumigation. His prices and guarantees are the same for both treatments to encourage people to choose heat.

For Karen and Vance Moores, it was an easy sell. Their daughter is pregnant, and the family has two dogs, two cats, two turtles, two cockatiels and an aquarium full of fish. Fumigation would force everyone to move out. "It would be just too hard to find a place," Vance Moores says. Instead, while the bedrooms baked, Karen Moores could go about her household chores and her husband could rest on the couch after work and marvel at how "something so small can do so much damage." The treatment cost \$4,495, including a soil poison for termites under the house but not including \$1,700 to fix plumbing problems that the inspection revealed. "Until you have an inspection, you just put the termites out of your mind," Vance Moores says. "And the bill just goes up and up."

Compared with Lemm's whole-house approach, other companies use heat, cold, microwaves and electric current almost like scalpels to kill drywood termites or other pests in specific pieces of wood. Though these methods could in theory be used to treat widespread infestations, they wouldn't be practical. Tallon, for example, uses heating strips on accessible pieces like windowsills

and frigid liquid nitrogen in enclosed spaces such as walls. It takes an hour to heat a piece of wood to 135 degrees and 30 to 45 minutes to cool each 16-inch-wide wall cavity to 20 degrees below zero. The Electro-Gun Treatment System, designed to send a high-voltage charge through wood via the path of least resistance, must be run by hand along each inch of framing. And the microwave machine must be repositioned for each foot of framing, although mounting several machines on a pole streamlines the process.

do all these methods work? In a laboratory, yes. In real houses, the answer is more complicated. In late February, researchers Vernard R. Lewis of the University of California and Michael I. Haverty of the U.S. Department of Agriculture released a long-awaited study of how various methods worked in a test house they built. Fumigation, whole-house heat treatment and heavy applications of liquid nitrogen killed all or virtually all termites. Lighter use of liquid nitrogen left about a fourth of the termites alive. Microwaves and electrocution worked some of the time, but 8 percent of the termites survived one microwave test and 18 percent survived one using electrical current.

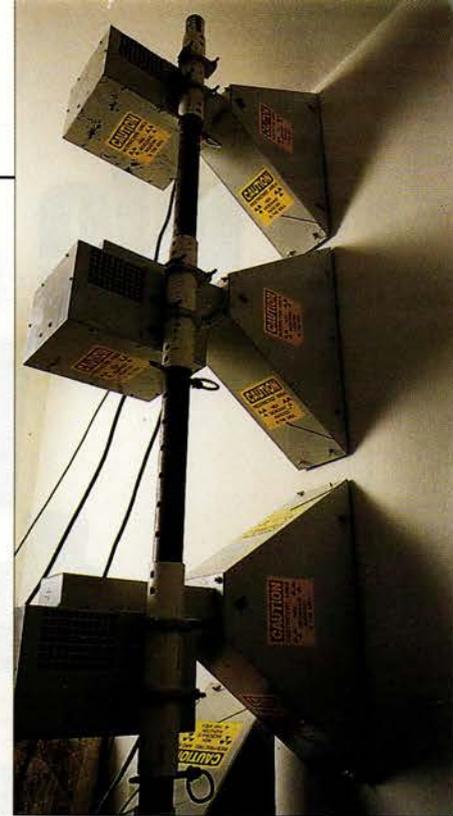
electricity



Fingers of blue light dart across a 2x4 under a house in Castro Valley, California, as Todd Maitlen of Northwest Termite Control uses the Electro-Gun to search out drywood termites. The gun shoots pulses of electricity at a low current (about .5 amp), high voltage (90,000 volts) and high frequency (60,000 cycles). When the current hits a termite tunnel, it jumps from the gun, through the wood, to a screwdriver that acts as a ground. Termites in its path are killed.

In those tests, researchers knew exactly where the termites were. In actual houses, spot treatments are effective only if every termite colony or beetle infestation is located. That's a daunting assignment because most wood is covered up. Researchers are working on sensors to detect the methane or chloroform that termites produce and the sounds they generate. But so far nothing works better than a careful human inspection, perhaps backed up by a visit from dogs.

Maureen Sharp, deputy registrar of California's Structural Pest Control Board, says she's seen evidence recently that a drywood colony can persist if fewer than two dozen termites are left alive. "The survivors will turn into reproductives and continue business as usual," she says.



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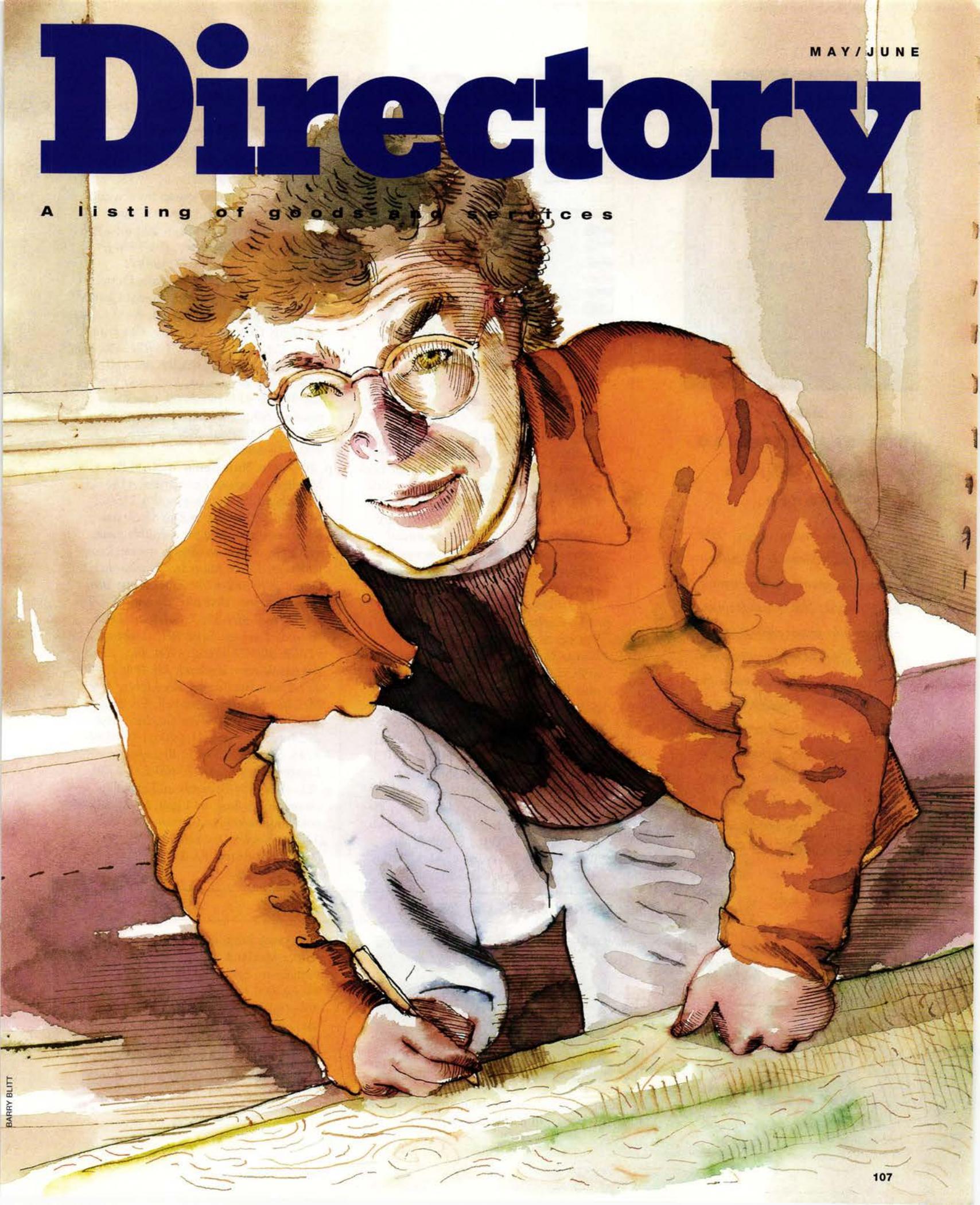
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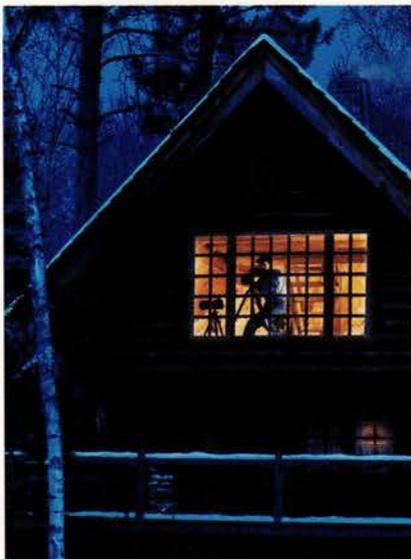
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EXTRAS pp. 14-21



- p. 14—Gloves (priced per pair): PVA, (polyvinyl alcohol) #1834-8, \$26.15; fluoroelastomer, #6647-8, \$43; polyethylene disposable, #1358MDP, \$1.55 per box of 100; nitrile, #17092, \$6.80; butyl, #14998-9, \$19.55; PVC (polyvinyl chloride) knitwrist, #28262, \$2.40; multilayer laminate Silvershield, #7094L, \$4.40 per pair or \$40 per package of 20; Lab Safety Supply Inc., Box 1362, Janesville, WI 53547-1368; 800-356-0783, 800-356-2855 for catalog orders, 800-356-2501 for technical information. Latex, \$1.98; neoprene MAPA Bluettes, \$5.98; Barson Hardware Co., 35 W. 44th St., New York, NY, 10036; 212-944-8181.
- p. 15—Caretaker Gazette: \$24 per year, \$15 per 6-month subscription; 1845 Deane St., Pullman, WA 99163-3509; 509-332-0806. Froebel blocks: available only in the entire series of educational gifts, \$195; Heartland, Box 737, Branford, CT 06405; 800-621-4660.
- p. 16—Real Goods Solar Living Center: 13771 S. Highway 101, Hopland, CA 95449; 707-744-2100. Shop Boss: \$59.95 plus shipping; PMI, 3655 East Roesar Road, Phoenix, AZ 85040; 800-325-6952. Easy Joint tape: 100-ft. roll, \$3.75–\$4.25, 200-ft., \$6.50–\$7.50; Wall Tool & Tape Corp., 81-11 101st Ave, Ozone Park, NY 11416;

- 718-641-6813, fax 718-641-6758.
- p. 17—Greene House: group tours available, open Wed., Fri., Sat. and Sun. 1–4:30 pm and Thurs. 1–6:30 pm; 2307 Piedmont Ave., Berkeley, CA 94704; 800-342-5552 or 213-740-8687. Earthquake stores: Earthquake Outlet Supplies, Services & Educational Center, 900 Northpoint St., Suite E1, Rose Court Building, Ghirardelli Square, San Francisco, CA 94109; 415-674-9091. 981 San Pablo Ave., Albany, CA 94706; 510-526-3587. 2225 Broadway, Redwood City, CA 94063; 415-368-8800. Liar's Suspenders: \$9.99; Duluth Trading Co., Box 7007, St. Paul, MN 55107; 800-505-8888.
- p. 20—Auto Turn-About Wieland R. Mueller, Hopewell Enterprises, 4546 Broadhead Rd., Aliquippa, PA 15001; 412-375-5316. Stik 'n Zip: \$6.50 per 83-in. zipper or \$10 for a double pack, available at local hardware stores; Strom Closures, 535 S. Main St., Wauconda, IL 60084; 800-362-8239. Sun Lights: Sun Industries Inc., Box 887, Bountiful, UT 84011; 800-409-9927. Solatube, 5825 Avenida Encinas, Suite 101, Carlsbad, CA 92008; 800-773-7652. ODL Inc., 215 E. Roosevelt Ave., Zeeland, MI 49464; 800-253-9000. Sun Tunnel Sky Lights, 786 McGlincey Lane, Campbell, CA 95008; 800-369-3664. SunPipe Co. Inc., Box 2223, Northbrook, IL 60065; 800-844-4786. SunLITE, 524 E. Broadway, Logansport, IN 46947; 800-231-1596.
- p. 21—White'N Brite tile and grout cleaner, sizes 8 oz. to 1 gal., \$9.95–\$49.95 postpaid; Safechem Chemical Co. Inc., 315 N. Flagler Dr., Suite 300-P, West Palm Beach, FL 33401; 407-832-8800.

CHAIN SAWS pp. 22-26



Chain saws: Picco #021 (shown at left) reduce-kickback chain, 35.2 cc engine with 16-in. bar, \$244.95; Stihl Inc., 536 Viking Dr., Virginia Beach, VA 23452; 800-467-8445. Husqvarna #51 (shown in use), with 16-in. bar, 51 cc engine and chain brake, weight 11.6 lbs., \$339.95; glove: small or medium #5056422-09, large #5056422-10, leather with protec-

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CHAIN SAWS pp. 22-26 continued

tive fabric, \$15.95; bar oil: #610000075, vegetable-oil based, \$4.99 per gallon; *Husqvarna Forest & Garden Co.*, 9006 Perimeter Woods Dr., Charlotte, NC 28216; 800-438-7297. Peavey: #T-029-060-0124, with forged steel socket and 5-ft. rock maple handle, \$45.29; *Peavey Manufacturing Co.*, Box 129, Eddington, ME 04428; 207-843-7861. Head gear: #G413, with face shield and earmuffs, \$52.91; *Peltor*, 41 Commercial Way, East Providence, RI 02914; 800-327-6833. Chaps: wrap chaps #194036, Engtex chain-saw-resistant fabric, \$69; rubber boot: #340010, chain-saw-protective with lugged soles, \$79; leather boot: #305000, steel-toed with chain-saw-protective fabric, \$159; mitt:

#250010, chain-saw-protective, \$19.95 per pair; "Safe Wood Cutters Guide" booklet: safety tips plus cutting and limbing techniques, 36 pp., \$2; *Gransfors Bruks Inc.*, 821 W. Fifth North St., Summerville, NC 29483; 800-572-9937. Tree care products: including safety chaps, helmets, pruning saws and poles and pruning saw scabbards; *Shelter Tree*, Box 693, Wrentham, MA 02093; 800-720-8733. Chain sharp: hand

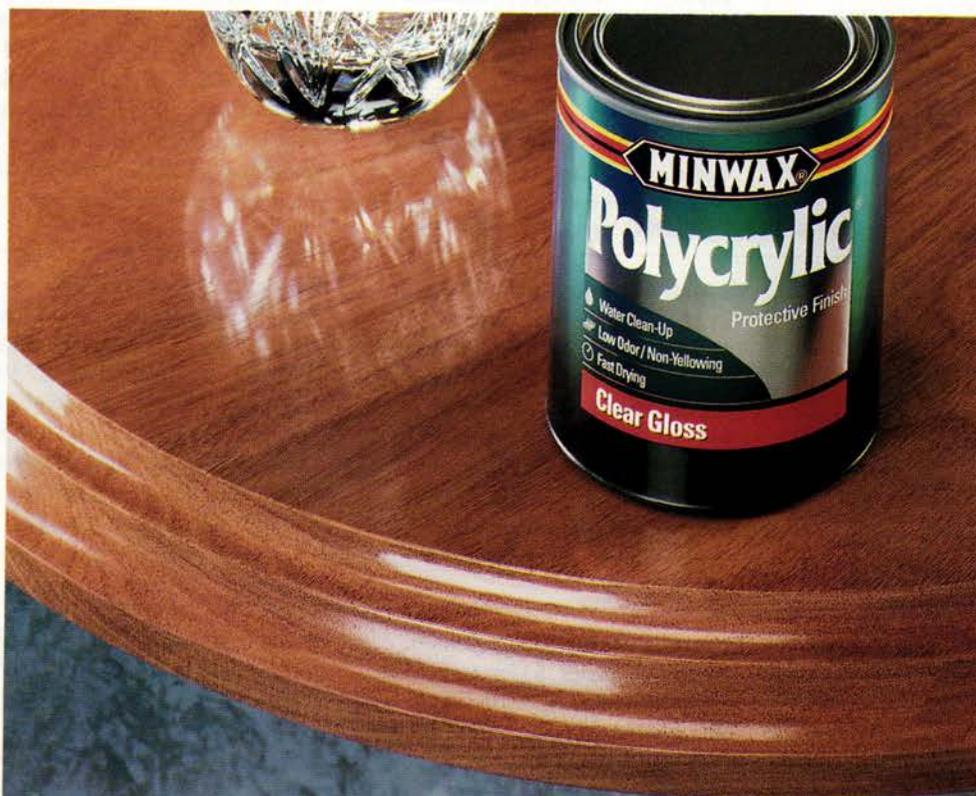
tool for filing teeth and depth gauges, \$14.85-\$19.10; *Pferd, Inc.*, 30 Jytek Dr., Leominster, MA 01453; 800-342-9015. Sure Sharp chain-saw sharpening kit: manual version, \$29.31, electric 12 volt version, \$50.56; *Blount Inc.*, Oregon Cutting Systems Division, Box 22127, Portland, OR 97269; 800-223-5168. Our thanks to: Tim Ard, president, *Forest Applications Training Inc.*, Hiram, GA.

PIPE CLAMPS pp. 28-32



Locking bar: *Vise-Grip* #18DR, \$30-\$35; spring clamp: *Quick-Grip* #58200, \$2.49; one-handed bar clamp: *Quick-Grip* #00512, \$15-18; *American Tool Companies*, 8400 Lake View Pkwy., Kenosha, WI 53142; 800-838-7845. Quick-action bar: #TG7.016, \$40.95; *American Clamping Corp.*, Box 399, Batavia, NY 14021; 800-828-1004. Wood hand-screw: #3-0, 6-in. jaw length, \$17.03; #0, 8-in. jaw length, \$20.36; #1, 10-in. jaw length, 6-in. opening capacity, \$23.31; #2, 12-in. jaw length, 8½-in. opening capacity, \$26.73; ratchet band: #88127, 2-in., \$39.01; *Adjustable Clamp Co.*, 417 N. Ashland Ave., Chicago, IL 60622; 312-666-0640. C-clamp: #120/6, \$9.95; *Record Tools Inc.*, 1920 Clements Rd., Pickering, Ont., Canada, L1W 3V6; 716-842-1180 or 905-428-1077.

Our thanks to: Jim Chestnut, *Chestnut Tool*, Box 320094, Fairfield, CT 06432; 203-384-0888.



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PLYWOOD pp. 35-40



Aircraft plywood: 1.5-mm mahogany, 4x8 sheet, \$82; *Harbor Sales Co.*, 1401 Russel St., Baltimore MD 21230; 800-345-1712. **Flexible plywood:** 9-mm Flexcurve, 4x8 sheet, \$35.50; *Allied Plywood*, Box 1153, Littleton, MA 10460; 508-486-8808. **Marine plywood:** 18-mm Bruynzeel Regina mahogany, 4x8 sheet, \$353; *M.L Condon*, 260 Ferris Ave., White Plains, NY 10603; 914-946-4111. **Medium-density overlay:** 3/4-in., 4x8 sheet, \$35-\$50; *Simpson Timber Co.*, Third and Franklin, Shelton, WA 98584; 800-782-9378. **Balsa-core panel:** #1208, 3/4-in. DecoLite, 4x8 sheet, \$4.26 per sq. ft.;

Baltek Corp. Box 195 Northvale, NJ 07647; 201-767-1400. **Paper-core panel:** 3/4-in., 4x8 sheet, Tripanel Marine, \$110-\$130; *Tricel Corp.*, 2100 Swanson Court, Gurnee, IL 60031; 800-352-3300. **Veneer-core plywood:** 3/4-in. Appleply, 4x8 sheet, \$110; *States Industries*, 29545 Enid Road East, Box 7037, Eugene, OR 97401; 800-626-1981. **Hybrid-core panel:** 3/4-in. Fiberply, 4x8 sheet, \$60 in bulk; *Georgia Pacific*, Box 1763, Norcross, GA 30091; 800-284-5347. **Wafer-board plywood:** 3/4-in. Multicore, 4x8 sheet of oak, \$48, birch, \$38; *Weldwood of Canada Ltd.*, 2000 Argentia Rd.,

Plaza One, Suite 200, Mississauga, Ont., Canada L5N 1P7; 905-542-2700. **Fiberboard core plywood:** 3/4-in., 4x8 sheet, natural maple, \$41.60; *Allied Plywood*, Box 1153, Littleton, MA 10460; 508-486-8808. **Our thanks to:** Gaylen Bryan, *Simpson Timber Co.*, Shelton, WA. Forest Products Laboratory, USDA Forest Service, Madison, WI. APA-The Engineered Wood Association, authoritative source for technical information on plywood and wood panel products, Box 11700, Tacoma, WA 98411; 206-565-6600.

HANDS-OFF WATERING pp. 41-42



Six-station digital timer: #PC-506, \$112.80; **automatic valve:** #APAS-075, \$27.59; **soil moisture sensor:** Aquamiser, \$95.50; **rain-depth sensor:** Raincheck #RF-1, \$41.50; *Rain Bird*, Customer Products Div., 7590 Britannia Ct., San Diego, CA 92173; 800-247-3782. **Program timer:**

Rainmatic #5600, \$49.99; **manual shutoff timer:** Rain Date #5200, \$10.99; **timed sprinkler:** Dial-A-Time #3600TW, \$27.99; *L.R. Nelson Corp.*, One Sprinkler Lane, Peoria, IL 61615; 800-635-7668. **Further reading:** *Watering Systems for Lawn & Garden: A Do-It-Yourself Guide*, by R.

Dodge Woodson, 1996, 144 pp., \$16.95; *Storey Publishing*, Box 445, Pownal, VT 05261; 800-441-5700.

WORK BOOTS pp. 47-53



Logger: (shown at left) #305000, chain-saw-proof, \$159; *Gransfors Bruks Inc.*, 821 W. Fifth North St., Summerville, NC 29483; 800-572-9937. **Electrical hazard** (shown in Table of Contents): #00659, \$105; *Western*: #00759, \$100-\$115; *Hy-Test*, 130 S. Canal, Chicago, IL 60606; 800-635-4536. **Construction:** #639, \$100.95; **roofer:** #698, \$82.95; **cushioned logger:** #628, \$185.95; *Iron Age Corp.*, Robinson Plaza 3,

Pittsburgh, PA 15205; 800-223-8912. **Custom-made:** #375 VIB, \$304-\$315; *White's Boots*, 4002 E. Ferry, Spokane, WA 99202; 800-541-3786. **Pac:** #22234, \$65; *Tingley Rubber Corp.*, Box 100, S. Plainfield, NJ 07080; 800-631-5498. **Steel-toe:** #2233, \$136; *Red Wing Shoe Co.*, 314 Main St., Red Wing, MN 55066; 800-328-9453. **Concrete:** #13836, \$58.80; *Bata Shoe Co.*, 4501 Pulaski Hwy., Belcamp, MD 21017; 800-365-2282.

Wellington: #01947, \$128.95; **hiker:** #03018, \$79.95; *Wolverine Worldwide*, 9341 Courtland Dr. NE, Rockford, MI 49351; 800-253-2184. **For more information:** *Footwear Industries of America*, 1420 K St. NW, Suite 600, Washington, DC 20005; 202-789-1420. **Our thanks to:** Steve Farrell, *Farrell Co.*, Los Altos, CA. Dee Bailey, *Harrell Remodeling*, Menlo Park, CA 94025; 415-326-7093. Clai Porter, *NCP*, Anchorage, AK.

DISCLOSURE pp. 55-56



Property-disclosure form pads: state-specific or general-purpose, \$8 per pad; *Professional Publishing*, 122 Paul Dr., San Rafael, CA 94903; 800-288-2006. **For more information:** *Your Home Inspection Guide*, by William Bentolo, 1995, 261 pp., \$15.95; *The Complete Homebuyer's Guide*, by

Bruce Hahn, 1995, 151 pp., \$12.95; *Homebuying Secrets & Insider Tips* video, \$24.95; *American Homeowners Foundation*, 6776 Little Falls Rd., Arlington, VA 22213; 800-489-7776, or question line 703-536-7776. *Disclosure in Real Property Transactions*, \$1.50; *California*

Department of Real Estate, Box 187006, Sacramento, CA 95818; 916-227-0864.

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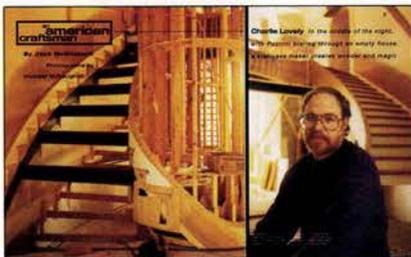
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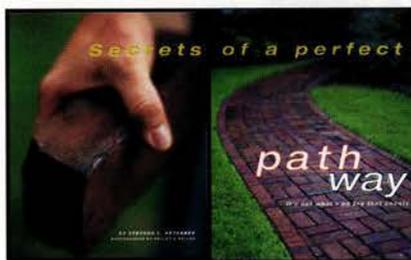
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CRAFTSMAN pp. 60-65



Staircases: Charlie Lovely, *Architectural Woodworks Inc.*, 12 Marshland Rd., Hilton Head, SC 29926; 803-681-9215. **Further reading:** *A Treatise on Stairbuiding & Handrailing*, by W. and A. Mowat, 1985, 390 pp., \$24.95; *Linden Publishing*, 3845 N. Blackstone, Fresno, CA 93726; 800-345-4447. **Our thanks to:** Tim Hazelbaker, architect, 12 Marshland Rd., Hilton Head, SC 29938.

PATHWAY pp. 66-71



Further reading: *Masonry, Home Repair and Improvement*, Time-Life Books, 1995, 128 pp., \$16.99 plus \$3.95 shipping; *Time-Life Books, Customer Service*, Dept. 100, Richmond, VA 23280; 800-621-7026. *Brick Pavement*, by Peter Joel Harrison, 1994, 163 pp., \$30 postpaid; Dietz Press, available from the author; 2021 Faundale Dr., Raleigh, NC 27612; 919-676-0659.

TREEHOUSE pp. 72-77



Architects: George Warner and Lisa Cunningham, 26 Elm St., Brookline, MA 02146. **Cable:** Loos #131862, 1/8-in. stainless steel lifeline cable, 65 cents per ft.; **copper oval sleeves:** #115055, \$1.43 each; **copper stopped sleeves,** #494302, 50 cents each; *West Marine*, Box 50050, Watsonville, CA 95077; 800-538-0775. **"Handbook for Public Playground Safety,"** by John Preston; 1994, 31 pp., free, send postcard requesting publication #325; *Consumer Product Safety Commission*, Washington, DC 20207. **Further reading:** *Treehouses: The Art and Craft of Living Out on a Limb*, by David Larkin and Peter Nelson, 1994, 128 pp.,

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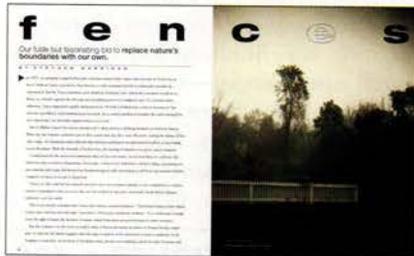
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\$19.95; Houghton Mifflin Co., 181 Ballardvale St., Wilmington, MA 01887; 800-225-3362. Our thanks to: Jim Skiera, International Society of Arboriculture, Savoy, IL (Arboriculture On Line at <http://www.ag.uiuc.edu/~isa/>).

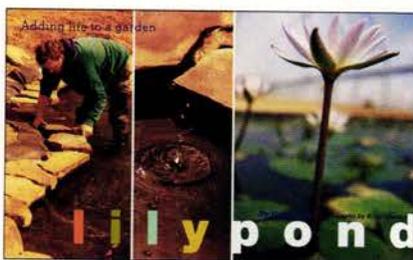
FENCES pp. 78-85



For more information: The exhibition "Between Fences" will be on view at the National Building Museum in Washington, DC, from May 31-January 5, 1997. A catalog, published by the museum with Princeton Architectural Press and edited by Gregory Dreicer, is available for \$17.95 from the museum shop; National Building Museum, 401 F St. NW, Washington, DC 20001; 202-272-7706.

Our thanks to: Terry Dempsey, executive vice president, American Fence Association, 5300 Memorial Dr., Suite 116, Stone Mountain, GA 30083; 800-822-4342 or 404-299-5413.

LILY POND pp. 86-91



Submersible Pump: Little Giant #50237, \$110; koi: 2-3 in., \$5, 5-6 in., \$20, 10-12 in., \$60; **pond light:** with underwater fixture, bulb and transformer with timer, #98126, \$145; **sacrificial anode:** #50599, \$16; **mechanical filter:** with washable foam cover, #70103, \$145; **biological filter,** #70115, \$219; **verdigris fish fountain:** #78166, \$239; **water lilies,** \$20-\$50 per plant; *Lilyponds Water Gardens*, Box 10, Buckeystown, MD 21717-0010; 800-999-5459.

Our thanks to: homeowner Rolf Nelson, and Richard Koogle and Charles B. Thomas of Lilyponds Water Gardens.

STEEL ROOF pp. 92-97



AcryMax acrylic-polyester roof-coating system: 50 cents-\$1.25 per sq. ft., depending on use; *Preservation Products*, 221 Brooke St., Media, PA 19063; 800-553-0523.

Terne roofing: *Follansbee Steel*, Box 610, Follansbee, WV 26037; 800-624-6906.

Our thanks to: Jeffery Lancaster, vice president, *Metalcrafts*, Box 1665, Savannah, GA 31402; 912-236-0615. Mike Kerr, *Mike Kerr Communications*, 14597 Ojai Rd., Santa Paula, CA 93060; 805-525-2266. Dave Poindexter, *Roofing Industry Educational Institute*, 14 Inverness Dr. East, Bldg. H, Suite 110, Englewood, CO 80112; 303-790-7200.

BAD BUGS pp. 98-105



Borates: Tim-Bor powder, "USTim 1," 1 lb., \$4.95; Bora-Care liquid, "NiborQ," 1 qt., \$22.50; NiBan weather-resistant granular bait, 5 lbs., \$31.50; Jecta injectable borates, "Niject," 60-cc syringe tubes, \$10.95; Impel rods, #CS1412, 1/4-in. diameter by 1/2-in. length, \$14.25; *Preservation Resource Group*, Box 1768, Rockville, MD 20849; 301-309-2222. **Termite-sniffing dogs:** *TADD Services Corp.*, 1617 Old County Road, Belmont, CA 94002; 800-345-8233 or 415-595-5171. **Nematodes,** \$1,000-\$1,800 for 2,000 sq. ft. home; **liquid nitrogen,** \$45 per 1,000 cu. ft.; **heating strips,** \$45 per 1,000 cu. ft.; *Tallon Termite & Pest Con-*

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BAD BUGS pp. 98-105 continued

trol, 123 W. Torrance Blvd., Suite 203, Redondo Beach, CA 90277; 310-376-0249. **Sand barriers:** \$6-\$8 per lineal ft.; *Live Oak Structural*, 801 Camilia St., #B, Berkeley, CA 94710; 510-524-7101. **Heat with tarps:** \$65 per 1,000 cu. ft.; *Cal-Western Termite & Pest Control Inc.*, Box 662020, Arcadia, CA 91066-2020; 800-326-2847 or 818-443-4091. Technique licensed from *Isothermics/TPE Associates*, Box 6951, Orange, CA 92613; 714-970-5602. **Microwaves and Electro-Gun:** *Northwest Termite Control Inc.*, 19485 Sonoma Highway, Suite C, Sonoma, CA 95476; 707-528-7776 or 415-453-1264. Electro-Gun licensed from *Etex Ltd.*, 3200 Polaris Ave., Las Vegas, NV 89102; 702-364-5911. **Demonstration log house:** Terry L. Amburgey, *Forest Products Laboratory*, Department of Forest Products, Box 9820, Mississippi State, MS 39762-9820; 601-325-2116. **For more information:** Pest-control hotline: Dr. Richard Kramer, technical adviser, *the National Pest Control Asso-*

ciation; 703-573-8330. **Chlordane information:** *The National Pesticide Telecommunications Network*, Oregon State University in Corvallis, 800-858-7378. **Insect zoo:** structural pest displays at the Insectarium, Steve's Bug-Off, 8046 Frankford Ave., Philadelphia, PA 19136; 215-338-3000. **Further reading:** *Least-Toxic Pest Management for Termites*, by William Olkowski and Tanya Drlik, 1992, 62 pp., \$17.50; *Bio-Integral Resource Center*, Box 7414, Berkeley, CA 94707; 510-524-2567. *A Guide to the Inspection of Existing Homes for Wood-Inhabiting Fungi and Insects*, by Michael P. Levy, 1991, 104 pp., #AG321, \$5; *North Carolina Cooperative Extension Service*, North Carolina State University, Publications Office, Box 7603, Raleigh, NC 27695. **Our thanks to:** Jeff Smith, *Van Waters & Rogers Inc.*, West Sacramento, CA. Steve Kanya, *Steve's Bug-Off*, Philadelphia, PA. Nan-Yao Su, professor of entomology, *Fort Lauderdale Research and Education Center*, University of Florida.

Steven B. Suoja, urban entomologist, and Eddie Dunbar, insect preparator, *Cooperative Extension, University of California, Berkeley*, CA. Edgar S. Bordes, administrator, *New Orleans Mosquito Control Board*, LA. Louis N. Sorkin, Department of Entomology, *American Museum of Natural History*, New York, NY. Bradford Kard, principal research entomologist—termites, *U.S. Forest Service, Southern Forest Experiment Station*, Gulfport, MS. Lonnie H. Williams, *Rich Mountain Wood Protection Services*, Gulfport, MS.

SAVE THIS OLD HOUSE p.132



Our thanks to: Robert H. Miller, chief building official, *Ravenna Building Department*. Lydia Gamble, *Library Services*, Kent State University.

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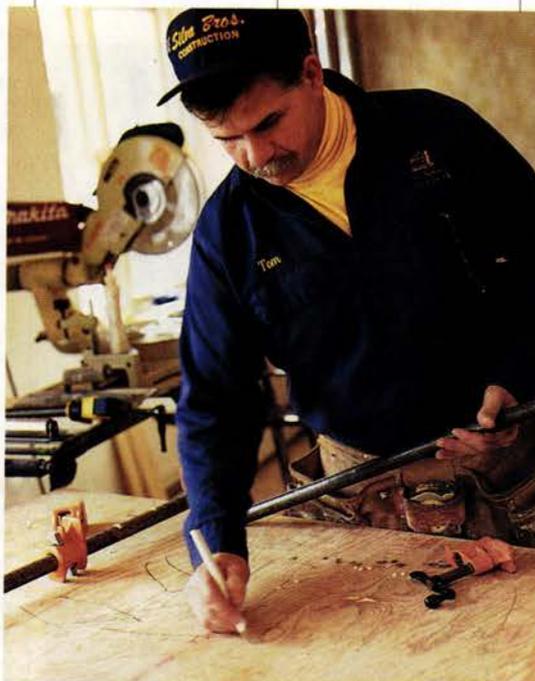
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Waterloo
KRIN-TV
Fri. 6:30 pm
Sat. 1:30 pm
KANSAS
Bunker Hill
KODD-TV
Thu. 7:00 pm
Sat. 12:30 pm
Lakin
KSWK-TV
Thu. 7:00 pm
Sat. 12:30 pm

Louisville
WKMJ-TV
Sun. 5:00 pm
WKPC-TV
Wed. 1:30 pm
Sat. 1:30 pm
Sun. 3:00 pm
Madisonville
WKMA-TV
Sun. 4:00 pm
Morehead
WKMR-TV
Sun. 5:00 pm

Lake Charles
KLTL-TV
Sat. 4:00 pm
Sun. 10:00 am
Monroe
KLTM-TV
Sat. 4:00 pm
Sun. 10:00 am
New Orleans
WYES-TV
Sat. 8:30 am
Shreveport
KLTS-TV
Sat. 4:00 pm
Sun. 10:00 am

MAINE

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

MARYLAND

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

MASSACHUSETTS

Boston
WGBH-TV
Thu. 8:00 pm
Sat. 5:30 pm
WGBX-TV
Sun. 9:00 am
and 12:30 pm
Springfield
WGBY-TV
Thu. 8:00 pm
Sat. 5:30 pm
MICHIGAN
Alpena
WCML-TV
Sat. 2:30 pm



Topeka
KTWU-TV
Sat. 9:30 am
Wichita
KPTS-TV
Fri. 11:30 am
Sun. 11:00 am
KENTUCKY
Ashland
WKAS-TV
Sun. 5:00 pm
Bowling Green
WKGB-TV
Sun. 4:00 pm
WKYU-TV
Tue. 1:00 pm
and 6:30 pm
Covington
WCVN-TV
Sun. 5:00 pm
Elizabethtown
WKZI-TV
Sun. 5:00 pm
Hazard
WKHA-TV
Sun. 5:00 pm
Lexington
WKLE-TV
Sun. 5:00 pm

Murray
WKMU-TV
Sun. 4:00 pm
Owensboro
WKOH-TV
Sun. 4:00 pm
Owenton
WKON-TV
Sun. 5:00 pm
Paducah
WKPD-TV
Sun. 4:00 pm
Pikeville
WKPI-TV
Sun. 5:00 pm
Somerset
WKSO-TV
Sun. 5:00 pm
LOUISIANA
Alexandria
KLPA-TV
Sat. 4:00 pm
Sun. 10:00 am
Baton Rouge
WLPB-TV
Sat. 4:00 pm
Sun. 10:00 am
Lafayette
KLPB-TV
Sat. 4:00 pm
Sun. 10:00 am

NORM ABRAM

May 18-19 in Pasadena, CA
Orchard Supply Hardware How-To Fair
at Pasadena Convention Center
408-365-2372

Bad Axe
WUCX-TV
Tue. 12:30 pm
Sun. 5:00 pm
Cadillac
WCMV-TV
Sat. 2:30 pm
Detroit
WTVS-TV
Thu. 1:30 am
and 8:30 pm
Sat. 10:00 am
East Lansing
WKAR-TV
Thu. 9:00 pm
Sat. 1:30 pm
Sun. 5:00 pm
Flint
WFUM-TV
Thu. 9:00 pm
Sat. 1:30 pm
Grand Rapids
WGVU-TV
Thu. 8:30 pm
Sat. 10:00 am
Kalamazoo
WGVK-TV
Thu. 8:30 pm
Sat. 10:00 am
Manistee
WCMW-TV
Sat. 2:30 pm
Marquette
WNMU-TV
Sat. 1:30 pm
Mount Pleasant
WCMU-TV
Sat. 2:30 pm
University Center
WUCM-TV
Tue. 12:30 pm
Sat. 5:00 pm

MINNESOTA

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

Saint Paul/
Minneapolis
KTCA-TV
Wed. 7:30 pm
Sat. 10:00 am
and 6:30 pm
MISSISSIPPI
Biloxi
WMAH-TV
Sat. 7:00 pm
Booneville
WMAE-TV
Sat. 7:00 pm
Bude
WMAU-TV
Sat. 7:00 pm
Greenwood
WMAO-TV
Sat. 7:00 pm
Jackson
WMPN-TV
Sat. 7:00 pm
Meridian
WMAW-TV
Sat. 7:00 pm
Mississippi State
WMAB-TV
Sat. 7:00 pm
Oxford
WMAV-TV
Sat. 7:00 pm
MISSOURI
Joplin
KOZJ-TV
Sat. 12:30 pm
Kansas City
KCPT-TV
Thu. 7:30 pm
Sat. 12:30 pm
Saint Louis
KETC-TV
Wed. 12:30 pm
Sat. 6:30 pm
Sedalia
KMOS-TV
Sat. 12:30 pm
Springfield
KOZK-TV
Sat. 12:30 pm
MONTANA
Bozeman
KUSM-TV
Sat. 11:30 am
NEBRASKA
Alliance
KTNE-TV
Sat. 10:00 am
and 5:30 pm
Bassett
KMNE-TV
Sat. 10:00 am
and 5:30 pm

TV listings

Central TV

Hastings
KHNE-TV
Sat. 10:00 am
and 5:30 pm
Lexington
KLNE-TV
Sat. 10:00 am
and 5:30 pm
Lincoln
KUON-TV
Sat. 10:00 am
and 5:30 pm
Merriman
KRNE-TV
Sat. 9:00 am
and 4:30 pm
Norfolk
KXNE-TV
Sat. 10:00 am
and 5:30 pm

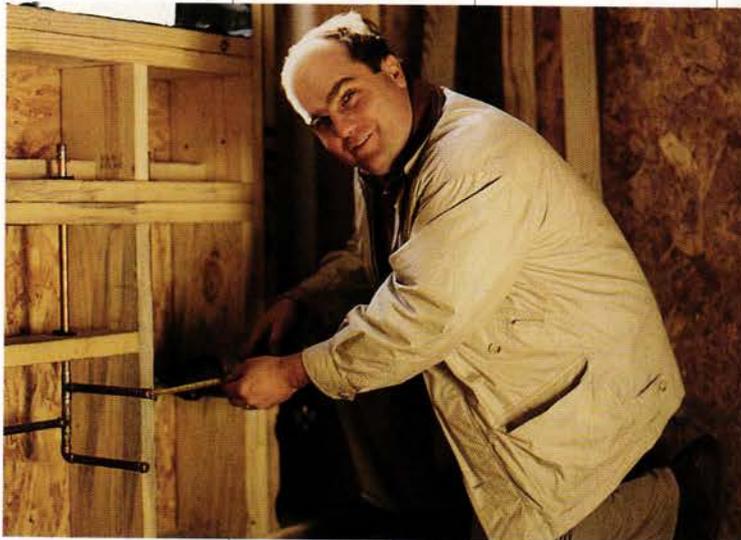
Littleton
WLED-TV
Thu. 8:30 pm
Sun. 10:00 am
NEW JERSEY
Camden
WNJS-TV
Tue. 8:00 pm
Sat. 8:00 pm
Sun. 5:30 pm
Montclair
WNJN-TV
Tue. 8:00 pm
Sat. 8:00 pm
Sun. 5:30 pm
New Brunswick
WNJB-TV
Tue. 8:00 pm
Sat. 8:00 pm
Sun. 5:30 pm

Long Island
WLIW-TV
Thu. 8:30 pm
Sat. 10:30 am
Sun. 8:00 pm
New York
WNET-TV
Sat. 5:30 pm
Norwood
WNPI-TV
Sat. 10:30 am
Plattsburgh
WCPE-TV
Sun. 11:30 am
Rochester
WXXI-TV
Sat. 10:30 am
Sun. 5:30 pm

Columbia
WUND-TV
Sat. 5:30 pm
Sun. 9:00 am
Greenville
WUNK-TV
Sat. 5:30 pm
Sun. 9:00 am
Jacksonville
WUNM-TV
Sat. 5:30 pm
Sun. 9:00 am
Linville
WUNE-TV
Sat. 5:30 pm
Sun. 9:00 am
Roanoke Rapids
WUNP-TV
Sat. 5:30 pm
Sun. 9:00 am

Minot
KSRE-TV
Mon. 10:00 pm
Tue. 10:00 pm
Wed. 10:00 pm
Thu. 7:00 pm
and 10:00 pm
Sat. 6:00 pm
Williston
KWSE-TV
Mon. 10:00 pm
Tue. 10:00 pm
Wed. 10:00 pm
Thu. 7:00 pm
and 10:00 pm
Sat. 6:00 pm
OHIO
Akron
WEAO-TV
Sat. 10:30 am
and 5:00 pm
Sun. 6:00 pm

Youngstown
WNEO-TV
Sat. 10:30 am
and 5:00 pm
Sun. 6:00 pm
OKLAHOMA
Cheyenne
KWET-TV
Sat. 9:30 am
and 12:30 pm
Sun. 3:00 pm
Eufaula
KOET-TV
Sat. 9:30 am
and 12:30 pm
Sun. 3:00 pm
Oklahoma City
KETA-TV
Sat. 9:30 am
and 12:30 pm
Sun. 3:00 pm
Tulsa
KOED-TV
Sat. 9:30 am
and 12:30 pm
Sun. 3:00 pm



Wilmington
WUNJ-TV
Sat. 5:30 pm
Sun. 9:00 am
Winston-Salem
WUNL-TV
Sat. 5:30 pm
Sun. 9:00 am
NORTH DAKOTA
Bismarck
KBME-TV
Mon. 10:00 pm
Tue. 10:00 pm
Wed. 10:00 pm
Thu. 7:00 pm
and 10:00 pm
Sat. 6:00 pm
Dickinson
KDSE-TV
Mon. 10:00 pm
Tue. 10:00 pm
Wed. 10:00 pm

Athens
WOUB-TV
Sat. 5:00 pm
Bowling Green
WBGU-TV
Mon. 3:00 pm
Sat. 1:30 pm
Cambridge
WOUC-TV
Sat. 5:00 pm
Cincinnati
WCET-TV
Thu. 8:00 pm
Sat. 9:00 am
and 6:00 pm
Cleveland
WVIZ-TV
Tue. 7:30 pm
Sat. 1:00 pm
Sun. 12:30 pm
Columbus
WOSU-TV
Thu. 8:00 pm
Sat. 4:30 pm

Bend
KOAB-TV
Thu. 8:00 pm
Sat. 5:00 pm
Corvallis
KOAC-TV
Thu. 8:00 pm
Sat. 5:00 pm
Eugene
KEPB-TV
Thu. 8:00 pm
Sat. 5:00 pm
Klamath Falls
KFTS-TV
Thurs. 8:00 pm
La Grande
KTVR-TV
Thu. 8:00 pm
Sat. 5:00 pm

North Platte
KPNE-TV
Sat. 10:00 am
and 5:30 pm
Omaha
KYNE-TV
Sat. 10:00 am
and 5:30 pm
NEVADA
Las Vegas
KLVX-TV
Sat. 12:30 pm
and 6:00 pm
Reno
KNPB-TV
Sat. 10:30 am
and 1:00 pm
NEW HAMPSHIRE
Durham
WENH-TV
Thu. 8:30 pm
Sun. 10:00 am
Keene
WEKW-TV
Thu. 8:30 pm
Sun. 10:00 am

Trenton
WNJT-TV
Tue. 8:00 pm
Sat. 8:00 pm
Sun. 5:30 pm
NEW MEXICO
Albuquerque
KNME-TV
Thu. 7:30 pm
Sun. 10:30 am
Las Cruces
KRWG-TV
Sat. 11:30 pm
Portales
KENW-TV
Sat. 3:30 pm
NEW YORK
Binghamton
WSKG-TV
Sat. 1:30 pm
Buffalo
WNED-TV
Sat. 10:30 am
WNEQ-TV
Sun. 7:00 pm

Schenectady
WMHT-TV
Tue. 1:30 pm
Sat. 10:30 am
Syracuse
WCNY-TV
Thu. 8:00 pm
Sat. 10:30 am
Watertown
WNPE-TV
Sat. 10:30 am
NORTH CAROLINA
Asheville
WUNF-TV
Sat. 5:30 pm
Sun. 9:00 am
Chapel Hill
WUNC-TV
Sat. 5:30 pm
Sun. 9:00 am
Charlotte
WTVI-TV
Tue. 12:30 pm
Thu. 8:00 pm
Sat. 5:00 pm
Sun. 11:00 am
WUNG-TV
Sat. 5:30 pm
Sun. 9:00 am

Thu. 7:00 pm
and 10:00 pm
Sat. 6:00 pm
Ellendale
KJRE-TV
Mon. 10:00 pm
Tue. 10:00 pm
Wed. 10:00 pm
Thu. 7:00 pm
and 10:00 pm
Sat. 6:00 pm
Fargo
KFME-TV
Mon. 10:00 pm
Tue. 10:00 pm
Wed. 10:00 pm
Thu. 7:00 pm
and 10:00 pm
Sat. 6:00 pm
Grand Forks
KGFE-TV
Mon. 10:00 pm
Tue. 10:00 pm
Wed. 10:00 pm
Thu. 7:00 pm
and 10:00 pm
Sat. 6:00 pm

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Home and Garden Show
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Dayton
WPTD-TV
Thu. 8:00 pm
Sat. 9:30 am
Sun. noon
Portsmouth
WPBO-TV
Thu. 8:00 pm
Sat. 4:30 pm
Toledo
WGTE-TV
Thu. 8:00 pm
Sat. 1:00 pm
Sun. 1:00 pm

Medford
KSYS-TV
Thu. 8:00 pm
Portland
KOPB-TV
Thu. 8:00 pm
Sat. 5:00 pm
PENNSYLVANIA
Allentown
WLVT-TV
Fri. 7:30 pm
Sat. 6:00 pm
Erie
WQLN-TV
Sat. 6:30 pm

PHOTOGRAPH BY DAVID BARRY

TV listings



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

RHODE ISLAND

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

SOUTH CAROLINA

Allendale
WEBA-TV
Sat. 1:30 pm
Beaufort
WJWJ-TV
Sat. 1:30 pm
Charleston
WITV-TV
Sat. 1:30 pm

Columbia
WRLK-TV
Sat. 1:30 pm
Conway
WHMC-TV
Sat. 1:30 pm
Florence
WJPM-TV
Sat. 1:30 pm
Greenville
WNTV-TV
Sat. 1:30 pm
Greenwood
WNEH-TV
Sat. 1:30 pm
Rock Hill
WNSC-TV
Sat. 1:30 pm
Spartanburg
WRET-TV
Sat. 1:30 pm
Sumter
WRJA-TV
Sat. 1:30 pm

SOUTH DAKOTA

Aberdeen
KDSB-TV
Sat. 4:30 pm
Brookings
KESD-TV
Sat. 4:30 pm
Eagle Butte
KPSD-TV
Sat. 3:30 pm
Lowry
KQSD-TV
Sat. 4:30 pm
Martin
KZSD-TV
Sat. 3:30 pm

Pierre
KTSD-TV
Sat. 4:30 pm
Rapid City
KBHE-TV
Sat. 3:30 pm
Sioux Falls
KCSD-TV
Sat. 4:30 pm
Vermillion
KUSD-TV
Sat. 4:30 pm

TENNESSEE

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

TEXAS

Amarillo
KACV-TV
Sat. 12:30 pm

Austin
KLRU-TV
Sat. 5:30 pm
College Station
KAMU-TV
Sat. 12:30 pm
Corpus Christi
KEDT-TV
Sat. 12:30 pm
and 9:00 pm
Dallas/Fort Worth
KERA-TV
Sat. 9:00 am
and 6:30 pm
El Paso
KCOS-TV
Tues. 7:00 pm
Harlingen
KMBH-TV
Sat. 12:30 pm
Houston
KUHT-TV
Mon. 1:30 pm
Sun. 11:30 am
Killeen
KNCT-TV
Sat. 12:30 pm
Sun. 9:30 am
Lubbock
KTXT-TV
Sat. 12:30 pm

Odessa
KOCV-TV
Tue. noon
Sun. 12:30 pm
San Antonio
KLRN-TV
Sat. 5:30 pm
Waco
KCTF-TV
Mon. 12:30 pm
Sat. 9:00 am
and 6:30 pm

UTAH

Provo
KBYU-TV
Sat. 9:30 am
and noon

VERMONT

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

VIRGINIA

Charlottesville
WHTJ-TV
Sat. 8:30 am
Falls Church
WNVT-TV
Sat. 4:00 pm
Harrisonburg
WVPT-TV
Sat. 1:30 pm
Sun. 10:30 am
Marion
WMSY-TV
Sat. 1:30 pm
Norfolk
WHRO-TV
Thu. 8:00 pm
Sat. 8:30 am
and 2:00 pm
Norton
WSBN-TV
Sat. 1:30 pm
Richmond
WCVE-TV
Sat. 8:30 am
WCVW-TV
Fri. 8:30 pm
Roanoke
WBRA-TV
Sat. 1:30 pm

Pullman
KWSU-TV
Mon. 7:30 am
Wed. 7:30 am
Sat. 2:00 pm
Richland
KTNW-TV
Thu. 7:00 pm
Sat. 2:00 pm
Sun. 4:30 pm
Seattle
KCTS-TV
Sun. 5:00 pm
Spokane
KSPS-TV
Sat. 9:30 am
Sun. 5:30 pm
Tacoma
KBTC-TV
Thu. 6:30 pm
Sat. 12:30 pm
Yakima
KYVE-TV
Sun. 5:00 pm

WEST VIRGINIA

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

WISCONSIN

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

WYOMING

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

STEVE THOMAS

May 3-4 in Atlanta, GA
Kitchen and Bath Show, Baldwin Hardware
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May 18 in Clarksville, TN
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Austin Peay State University Ballroom
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June 1 in Chicago, IL
Public Lecture at Salvage One
312-733-0098

Salt Lake City
KUED-TV
Sat. 8:00 am
and 5:00 pm

WASHINGTON

Centralia
KCKA-TV
Thu. 6:30 pm
Sat. 12:30 pm

May/June

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No. 5 of 20

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Photograph courtesy Florida Archives. Loggers use canals
to float logs to the rivers, Tallahassee, Fla, circa 1907.



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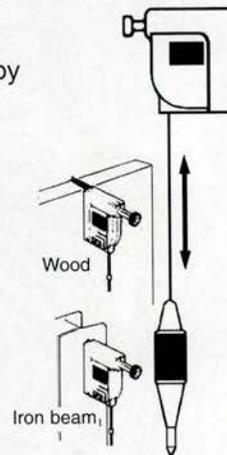
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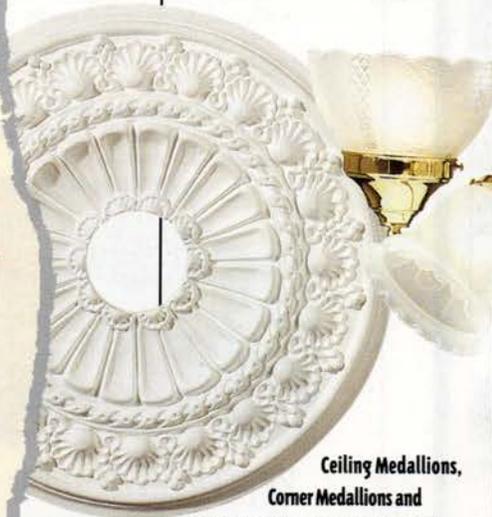
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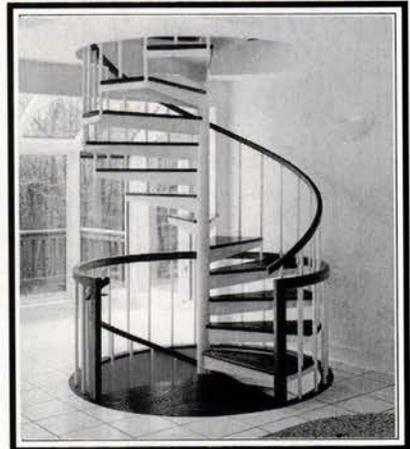
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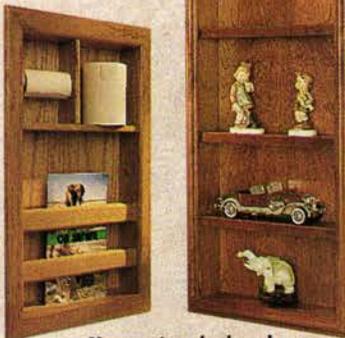
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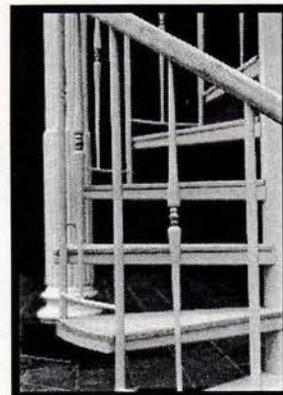


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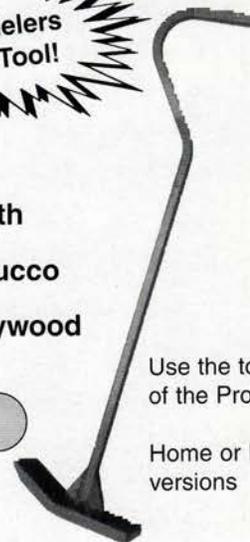
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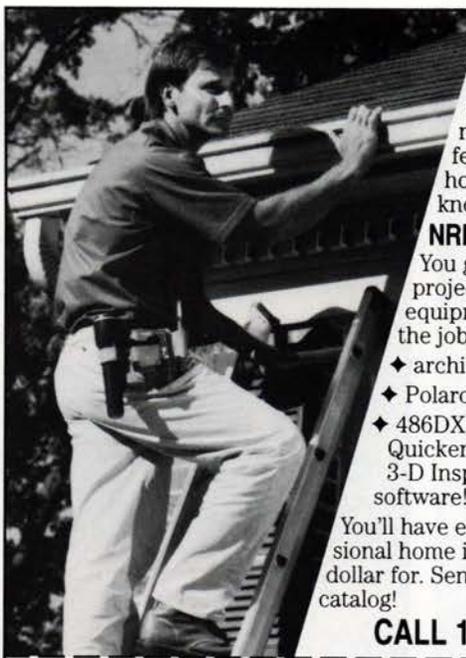
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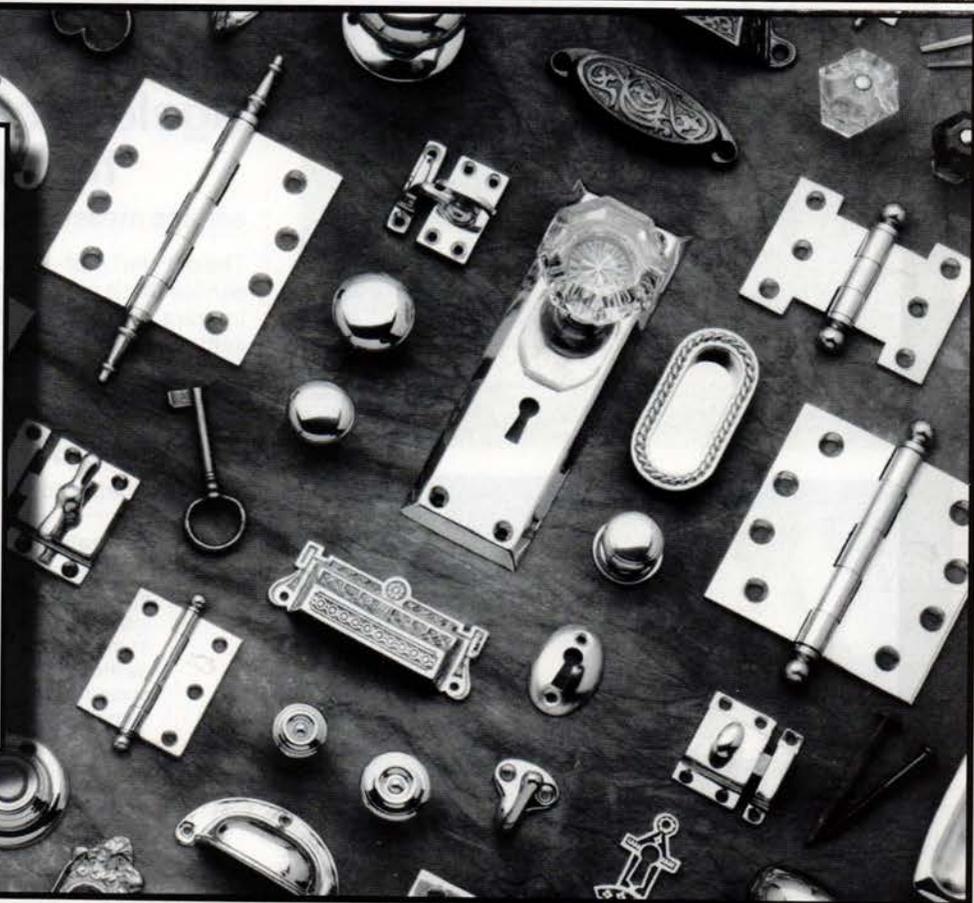
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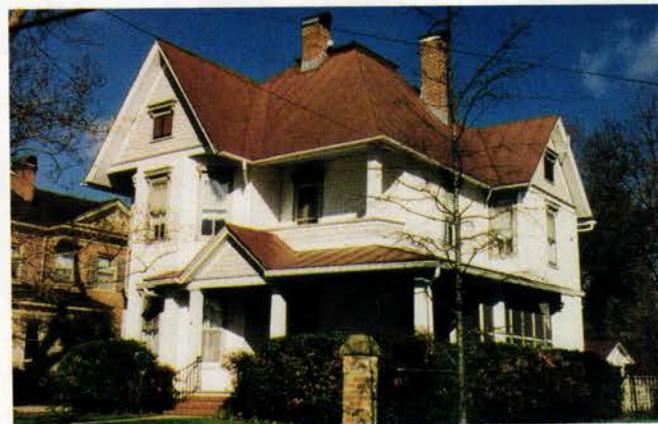
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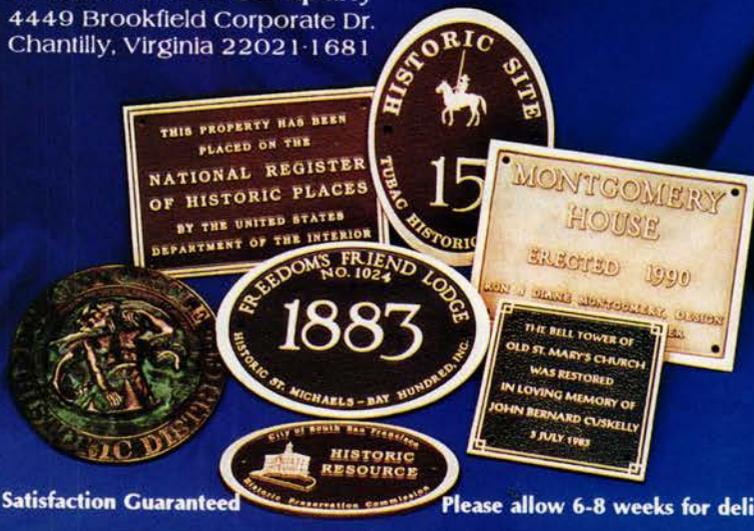
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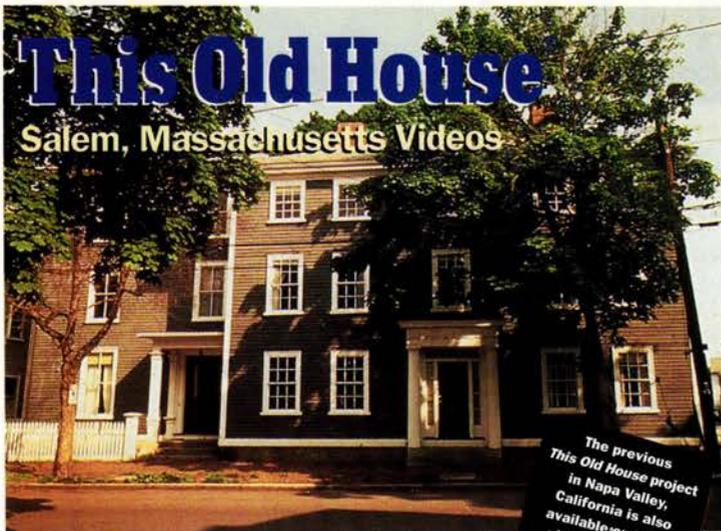


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This Old House®

ORIGINALS

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This Old Mug

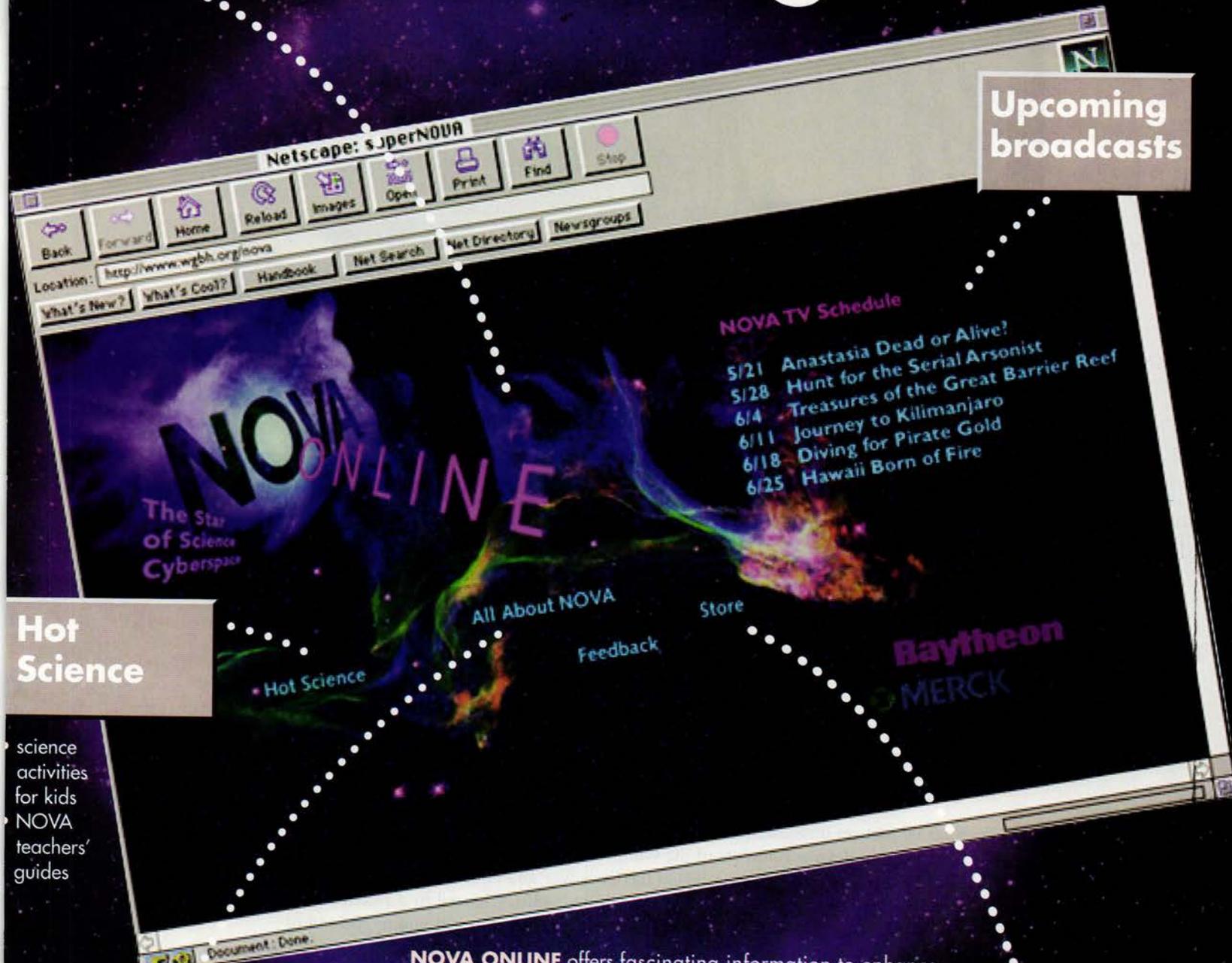
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Corporate funding for NOVA is generously provided by **MERCK** and **Raytheon**



The house retains many Greek Revival details, including modillions on the eaves and a rosette molding.

PRICE

\$55,000

LOCATION

432 South Chestnut Street, Ravenna, Ohio

Built by pioneer missionaries in 1822, this two-story, 10-room frame house served as a meeting site for the founders of the Ohio Republican Party, reportedly was a hiding place for escaped slaves during the Civil War and housed a prominent leader of the Women's Christian Temperance Union in the 1880s. Charred by a recent fire, it faces demolition by city building officials if a new owner is not found by the end of the year to rehabilitate it and return it to single-family use. Offered for about the cost of its .79-acre lot, the house requires considerable work, including renovating the fire-damaged wing and remodeling the three interior apartments.

CONTACT THE OWNER

Noel Blankenship
444 Park Avenue
Kent, OH 44240
216-673-1523