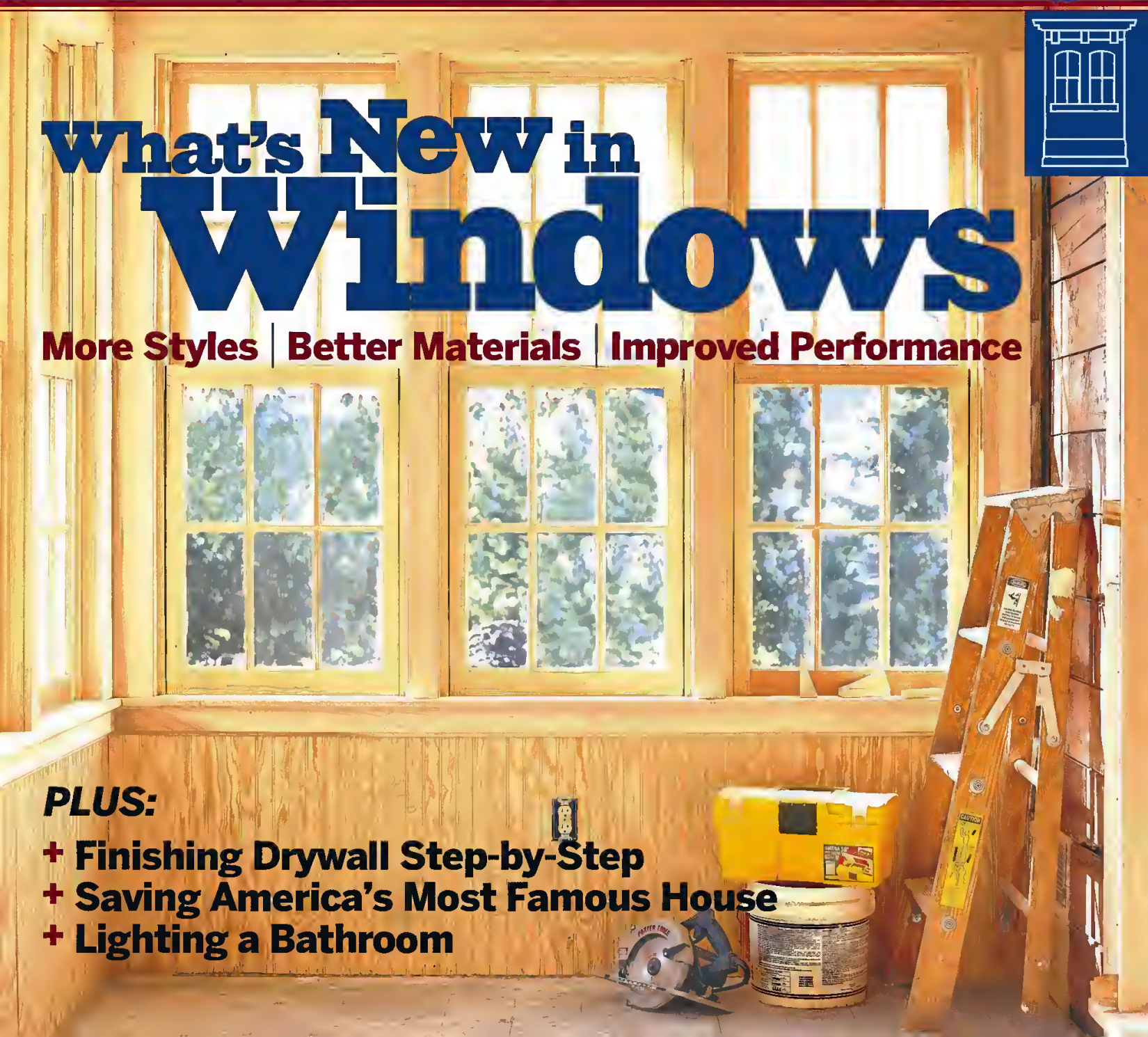
JANUARY/FEBRUARY 2003

This Old House



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CONTENTS

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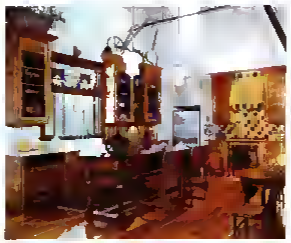
JANUARY/FEBRUARY 2003

The This Old House *TV team goes on location to tape the restoration of Fallingwater, architect Frank Lloyd Wright's signature 1930s house in Pennsylvania.* *For the full story, see page 84*

features

WINCHESTER TV PROJECT, P. 60

BATHROOM LIGHTING, P. 92



SPECIAL ADDITION, P. 66

cover With energy saving options available in a variety of styles, homeowners can let the sun shine in with lots of windows like the traditional double-hungs here at the TV project house in Winchester, Mass. For how to make the best choices for your home, see "Taking a Look at Windows," page 72. PHOTOGRAPH BY KELLER & KELLER

PHOTOS FROM BOTTOM LEFT: KINUKA OLIMPP; MANUELA MATURA; SYLVIA MARTIN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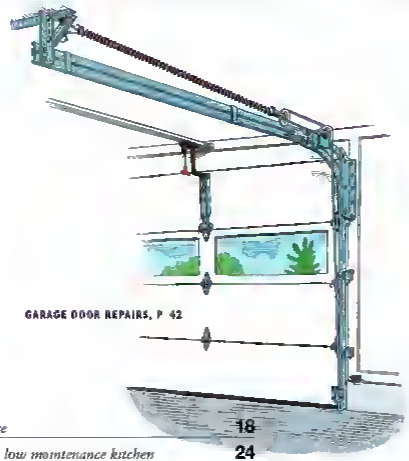
CONTENTS

SQUARES, P 32



GARAGE DOOR REPAIRS, P 42

departments

columns

SWEDISH STOVES, P 38

RETRO TOOLS P 21

PHOTOS: CLOCKWISE FROM TOP: NEDJELJKO MATIJEA (3); THE AMERICAN WINDSOR INSTITUTE; ILLUSTRATION: MILAN TRENC

plus

WHERE TO FIND IT → SEE DIRECTORY – PAGE 97

CONTRIBUTORS

BRAD LEMLEY has been fascinated by Fallingwater, architect Frank Lloyd Wright's famous cantilevered house in western Pennsylvania, since first reading about it years ago. Now, after writing about the multimillion dollar effort to correct engineering flaws that threatened to topple the masterpiece ("Saving Fallingwater," page 84), Lemley says he is "inspired" by the house's—and Wright's—failings. "It goes to show that even the great ones can make big mistakes," he says. Lemley, who designed and built his own home in Topsham, Maine, is a longtime contributor to *This Old House* and the coauthor of *Thos Moser: Artistry in Wood*, published by Chronicle Books.

In "TVs Where You Want Them" (page 46) technology writer **IAN AUSTEN** tells readers how to wire their homes to get the most out of new digital cable and satellite television services. "Simply adding on to your existing system of wires is like throwing money down the drain," he says, because outdated cable can't handle many of today's higher quality signals. Austen, who lives in Ottawa, Ontario, in Canada, writes about technology for the *New York Times* and *Canadian Business*.

Woodworker and furniture maker **JOHN KELSEY** points out that there are few household carpentry jobs that can be accomplished without some type of square ("Choosing and Using Squares," page 32). "For cabinetry, shelving, and other finish work, I keep a steel Starrett combination square on my workbench," he says. But for framing and exterior work around his Newtown, Connecticut, house, Kelsey carries a 6-inch speed square. "I can drop it off a ladder onto concrete and it won't be harmed." A regular tool columnist for *This Old House*, Kelsey is editor in chief of Cambium Books, which specializes in publications about woodworking and furniture making.

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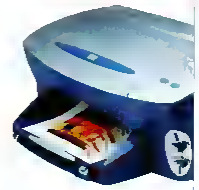

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All in the Family Tree

You folks made my wife very excited. We realized that the Concord, Massachusetts, house featured in the November 2002 Save This Old House [below] was built by her ninth great-grandfather, Deacon John Wheeler. She is currently doing some family history on Deacon Wheeler and his family. You've helped her with a small part of that history. One recent evening we were looking at a drawing my wife has and comparing it to the home you featured. Our drawing looks like it's drawn freehand and includes all the outbuildings.

I sure hope someone will buy this home and restore it to its former glory. Thanks to all at *This Old House*, especially Ryan Robbins. Your article was very special to us!

PAUL AND DONNA WALDER, LITTLETON, COLO.

Dear Mr. Silva...

[Re "Trade Deficit," by Tom Silva, November 2002:] You say there seems to be a diminished interest in the trades among young people. I think there's a ton of interest out there. There are a million apprenticeship programs, but every one I've contacted has said that things are slow now. Maybe they're just telling me that because they think I'm too old (39), or they don't think I'm serious, but I don't think so.

I have just moved east to get into an electrical apprenticeship program, and after I got here and got on the eligibility list they tell me there are no apprenticeships right now. I know that in the Boston area the very same apprenticeship program takes almost a year to even get on the list!

Where do you go, other than apprenticeship programs—a lot of them frozen right now—to get into a trade?

PAM NAGEL, COLUMBUS, OHIO

You mention that the trades can be lucrative, but that does not seem to be the case. I was looking at the *Occupational Outlook Handbook*, and carpenters on the average only make about $15.69 per hour. How can you really make a living on $15.69 per hour?

I work in the accounting field, but I have also gone through training as a builder in the Navy. I was in the Seabees for six years. There has been a long line of carpenters in my family, and I feel like it is in my blood. I would love to be a carpenter, and I truly respect people who work in all the trades, but it seems like there is not much money to be made.

MATT DICKINSON, DECATUR, GA.

Tom Silva replies: There is a catch-22 with apprenticeships. In parts of the country where there are a lot of them, there's usually not a lot of work, and where there's a lot of work, there aren't enough apprenticeships. But you can learn a trade in school or on-site. With persistence and the right attitude it's possible to find a good craftsman who's willing to take on a talented novice and let you learn on the job. And ultimately, to reap the full rewards of the work—like anything in life—you have to stick with it and improve yourself, fine tune your craft, and work your way up in the business.

I feel very fortunate in my life, and it's all because of the way my dad taught me. He made us work hard, but he made it fun. He never asked us to do anything he wouldn't do himself—he'd be on his knees in a dirty crawl space or working on a hot roof right alongside us—and he instilled in us a sense of pride in what we did. That's the kind of teacher you should try to find.

Ingenious Improv

I read the article "Marking Electrical Outlets on Drywall" in Norm's Notebook of October 2002. Recently, while helping my son hang drywall at his house, we were faced with the same dilemma. Plastic outlet boxes do not take chalk. So we borrowed one of my daughter-in-law's soft lip-liner pencils to color the corners of the boxes and then slapped the panel against the marked boxes, the location of the box corners transferred to the back of the panel, and the cutouts fit perfectly. I can't see Norm with a red lipstick in his toolbox, but this worked.

MONTE FISHER, WHITEWATER, KANS.

More Thoughts on Vinyl Siding

While one reader was disturbed by your article on vinyl siding ("The Dark Side of Vinyl Siding," Letters, October 2002), I was actually gratified to see you rationally discuss the use of this material on older homes.

Around here, it is not unusual for owners of historic homes to pay $20,000 to $30,000 to have their houses repainted. For those without the financial means to pay for such a project, their homes—and community aesthetics—deteriorate. Applied properly, modern siding alternatives can preserve a home's visual aesthetics and offer owners an affordable means of maintaining and preserving their house.

Undoubtedly there are some environmental downsides to vinyl. But are the consequences of vinyl production any greater than those of harvesting forests (for wood siding) or digging great holes in the earth (for mineral-based alternatives)?

I don't necessarily advocate vinyl siding for Monticello, but we often lose our sense of balance in our quest for political correctness.

MICHAEL BOOMGARDEN, NAPERVILLE, ILL.

The Nitty-Gritty of Sanding

I believe that there is an error in the table ["Matching the Paper to the Task"] on page 52 of the October 2002 article "True Grit." The grit values for bare wood to be painted and bare wood to be stained are reversed. It is much more important to go to a finer grit with a stained finish than with a painted finish.

RICHARD STRICKLAND, SOUTH SETAUKET, N.Y.

The grits are correct. Although it might seem counterintuitive, many woods will not take stain if they're too finely sanded. The pigments in the stain need a certain amount of roughness or open grain to penetrate the wood surface. You can then apply your clear finish and sand with a finer grit between coats.

Caveat Emptor

[Re "Choosing & Using Hand Planes," Talking Shop, October 2002:] I'd advise people buying planes at flea markets to check the soles and cheeks for hairline cracks. They are often why a good-looking plane is so cheap. The nranks typically emanate from the mouth or throat of the plane. In bright sun they are often invisible, so take along a piece of dark chalk, crayon, or water-erasable marker and a small rag. I learned the hard way, many years ago, and spent hours upon hours welding, grinding, and refiettening the soles and cheeks of my $20 bargains. I still have my two "nrankos" and they're okay, but I keep them mostly as a lesson in humility.

KIM NEWCOMB, OJAI, CALIF.

punch list

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

• In the October 2002 issue, we omitted mentioning that the architect of the guest house shown on pages 42 and 44 was Leonard A. Hoechs of Huntington, N.Y.

Address mail to: Letters, *This Old House* magazine, 1185 Avenue of the Americas, New York, NY 10036, or e-mail us at TOH_letters@timeinc.com. Please include your full name, address, and daytime phone number.

Published letters will be edited for clarity and length and may be used in other media.

PHOTO: BRUCE PERRIN

 By Dan DiClerico

Special Delivery

A stockpile of snacks—and caring homeowners—help keep this job site humming

Hardworking tradesmen need fuel, sure, but on most jobs they're not catered to with bottomless boxes of doughnuts, snack cakes, granola bars, and the like. Not to mention coolers overflowing with sodas and water. But that's the case at the TV project house in Winchester, Massachusetts. And amid the bounty you can usually find homeowner Kim Whittemore tidying up and brewing a new pot of coffee.

Kim is the queen of client-crew relations. "I may go to extremes," she says, "but whatever time and money I spend keeping these guys happy comes back to me tenfold." Besides providing goodies, she and husband Bruce Leasure make a point of getting to know everybody on a first-name basis, not just the bosses. "That way, I don't benefit from the wisdom of just the *TOH* crew. I get that of the thirty guys working behind them too," says Kim.

While *TOH* general contractor Tom Silva appreciates the refreshments, he agrees it's Kim and Bruce's presence that really makes the difference. "I've told them the food and drinks aren't necessary—we'll do the best possible job even without the endless supply of Twinkies," he says. "But when homeowners are this involved, they're more clued in to the project, and the end result is always better for it."

Style and Substance

Wood, a unique book by Chris Lefteri (Rockport, $35), deftly straddles the line between reference guide and coffee-table tome. Part of a series on materials—including plastic, glass, and metal—the book dishes up technical data on the woods of the world, and marries it with images of spectacular sculptural pieces. Besides listing the durability of Burmese teak (high) or the moisture movement of African walnut (medium), it shows how innovative designs (like the chair at right) have been applied to various species.

This Old House Personal Appearance Calendar
JANUARY/FEBRUARY 2003

STEVE THOMAS

January 25
EPA's Energy Star Program, Philadelphia Home Show, Pennsylvania Convention Center, 12th & Arch Sts., Philadelphia, PA. 800-756-5892. www.phillyhomeshow.com

NORM ABRAM

January 22
International Builders Show, Las Vegas Convention Center, Las Vegas, NV. 800-368-5242

January 30
Surfaces 2003, Sands Expo Convention Center, Las Vegas, NV. 800-547-3477

TOM SILVA

January 16
San Antonio Home and Landscape Show, Henry B. Gonzalez Convention Center, San Antonio, TX. 877-663-6186

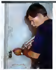
February 22
Builders Association of Eastern Connecticut Annual Home Show, Mohegan Sun Arena, Uncasville, CT. 800-294-7469

ILLUSTRATION: DREW FRIEDMAN. PHOTOS COURTESY OF ROCKPORT

BEFORE & AFTER

IT'S A KEEPER: Rather than tear down this dark 1950s brick-and-clapboard house and build anew—a common approach in Silver Lake, Ohio—Rocco and Marcy Cona went for a full-scale renovation. Several additions, including a pair of gable-end bump-outs on the back facade (above right), gave the house an additional 2,900 square feet and a handsome new look. The larger bump-out, which houses a 30-by-30-foot great room, is flooded with light, thanks to a cathedral ceiling, French doors, and several tiers of windows.

HAVE YOU DRAMATICALLY ALTERED THE LOOK OF YOUR HOME? IF SO, SEND BEFORE AND AFTER SNAPSHOTS, PLUS A BRIEF DESCRIPTION OF THE PROJECT, TO *This Old House*/DD, 1185 Avenue of the Americas, 27th floor, New York, NY 10036

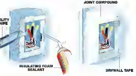


TOH TECHNIQUE

Patching around electrical boxes

This Old House **general contractor Tom Silva's fix for plaster marred during electrical work**

Installing an outlet or light switch on a plaster wall often leaves a jagged gap around the receptacle. "Especially in an older home with horsehair walls, the plaster crumbles as soon as you put a saw to it," says Tom. Packing the gap with joint compound is ineffective (it often falls behind the wall) and messy (it doesn't dry smooth). So instead Tom injects insulating foam sealant, which expands an inch beyond the face of the wall as it dries. He then shaves the foam flush to the wall with a utility knife or keyhole saw. Finally, he covers the foam with drywall tape and joint compound, then applies three more feathered coats of compound to smooth the transition.



DID YOU KNOW?

Duct tape actually emerged from the trenches of World War II. GIs used the government-issue sticky stuff to keep boots and ammo boxes dry, calling it "duck" tape for its ability to repel moisture. When soldiers brought the tape home after the war, the housing boom provided them with many uses for it, including holding together heating and cooling ducts. That's when it became "duct" tape, though Duck Tape survives as a trademarked brand.

PRODUCT RECALL

PRODUCT: cordless electric mulching lawn mower sold as Black & Decker CMM1000 or CMM1000R (sold nationwide February 1996 to August 2002) and Craftsman Cordless Lawn Mower (Sears model number 900.370520 sold January 1998 to December 2000)

PROBLEM: faulty electrical component, which is a fire hazard

WHAT TO DO: Stop using the mower immediately and contact the manufacturer for more information. Call Black & Decker at 866-229-5570 or visit a Sears store near you.

ILLUSTRATIONS: IAN WORPOLE. PHOTOS: REBECCA SINCLAIR (BOTTOM LEFT); NEBOJSA MATURA (BOTTOM RIGHT)

PHOTOS: FROM TOP LEFT: COURTESY OF UNIVERSITY OF COLORADO; NEBOJSA MATURA (2); KELLER & KELLER. ILLUSTRATION: ELWOOD SMITH

Energy Ingenuity

College students compete to build a better solar house

Forget those geeky solar homes of the '70s. If the first-ever Solar Decathlon is any indication, the next generation will harness the sun's energy to power houses that actually might fit in with the neighborhood.

To enter the design competition, student architects and engineers assembled project houses on the Mall in Washington, D.C. There they were fitted out with 32 monitors, which measured vital signs such as appliance efficiency, lighting quality, and power generation. The University of Colorado at Boulder took home the overall gold.

CU's cottage-style house (shown above) uses as much as 85 percent less energy than a conventional house of the same size. The framework consists entirely of structural insulated panels, which go up easily and boast a high R-value. And an "evacuated tube collector" heats all the house's hot water by sending solar energy down 12-foot-long glass tubes on the roof to a tank with a built-in heat exchanger.

The team hoped its house would appeal to builders and buyers alike. Says student Adam Jackaway, "Winning was one thing, but the ultimate prize would be to have a developer see the project and ask us to work on fifty more." For additional details, visit www.solardecathlon.com.

Don't Let the Retro Look Fool You

These limited-edition power tools may seem like something out of Granddad's workshop, but they deliver 21st-century performance. Behind the old-fashioned aluminum housing of the 85th-anniversary cordless drill from Black & Decker ($100, www.blackanddecker.com) is a two-position gearbox that delivers high torque and rapid-speed drilling, as well as an LED display that lights up when the drill is level. Porter-Cable's Heritage finishing sander ($179, 800-487-8665, www.porter-cable.com) has old-school metal construction yet revs up to 10,000 orbits per minute. Seems they still do make them like they used to—only better.

What I Learned the Hard Way

BY ROGER COOK, *TOH* LANDSCAPE CONTRACTOR

My first year in business, I landed what should've been a plum weekend job, spreading a layer of loam around a swimming pool and seeding it. Quick work, decent profit—I'm a happy camper. So I call in the order for 30 tons of loam to go to 10 Heart Street. Saturday comes, I show up bright and early at the site, and, sure enough, the loam has been delivered to 10 Heart Street. The only problem is the job's at 8 Heart Street. Luckily, No. 10 was another client of mine (which is how I mixed up the addresses in the first place), and no damage had been done to their driveway or lawn. But I still had to haul the entire shipment 60 yards up the road, one wheelbarrow at a time, 180 trips total. Needless to say, I lost my shirt on the job with all the extra labor involved, and my "profitable" weekend became my "loser" weekend. But I did take home a valuable lesson. Never, ever put through an order to a supplier without triple checking the details—especially the address.

Do you have your own hard-earned renovation lesson to share? If so, send it in writing to:
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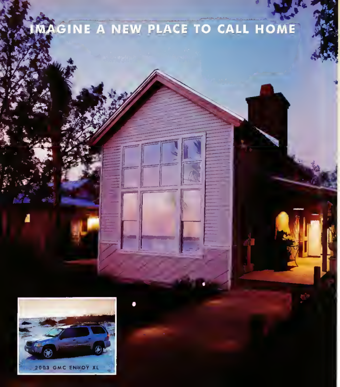
WHERE TO FIND IT → SEE DIRECTORY → PAGE 87



High Style, Low Maintenance

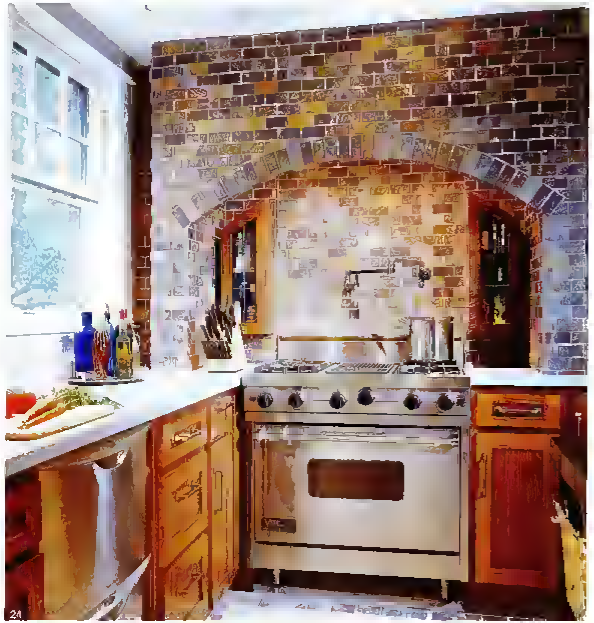
A kitchen mixes old-world character with sleek, modern surfaces

by Susan Perry

With a baby on the way, the owners of this two-bedroom apartment in a 1917 Atlanta duplex leapt at the chance to buy the apartment upstairs and take over the entire four-square house. In their renovation plans, the upstairs kitchen would become a master bath, and part of a bedroom would be transformed into a walk-in closet, but the downstairs was to remain the same, with one exception: the kitchen. The minimal, all-white 125-square foot galley was functional enough for apartment living, but would seem totally out of scale in their new 3,300 square-foot home. "We were doubling the size of the house, so it made sense to enlarge the kitchen," say the homeowners.

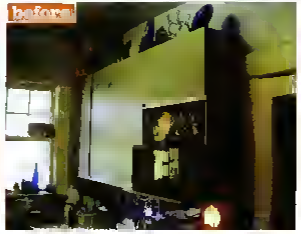
They envisioned an old-world, rustic-looking space, with a faux-brick fireplace and a big island where guests could hang out. While they were at it, they'd also upgrade to stainless steel appliances and trade the white tile floor and counter for ones that required less maintenance. "A white floor was hard enough to keep clean with just the two of us—imagine it with kids underfoot," says the wife.

"The first step in good kitchen design is knowing what you want, even if it bucks the trend," says *This Old House* host Steve Thomas. "Sleek, white, and minimal is what most people want, but these homeowners were sick of it."



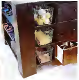
PHOTOGRAPHS BY EMILY J. FOLLOWILL

LEFT: *The confining galley kitchen* **(BELOW)** *nearly doubled in space by expanding into the next room. The brick-slate, hearthlike stove alcove anchors one end of the room and creates a bigger, bolder look.*



STEVE THOMAS (PHOTO: PASCAL BLANCHON; STYLIST: BRIAN CARTER)

ABOVE AND BELOW RIGHT: *Made of salvaged oak stained dark walnut, the island features six shelves and six deep drawers for stashing pots, pans, and baking wares* **BELOW LEFT:** *A three bowl stainless sink and commercial-grade pot washer faucet can take on even daunting clean up jobs The countertop is low-maintenance, poured-in-place concrete with a limestone backsplash*



OPENING UP

To carry out the $50,000 kitchen expansion, the couple sought the assistance of Atlanta designer Alicia Denton, of Seiber Design Inc Her renovation plan called for removing the wall between the old kitchen and the adjoining home office, and gutting the two spaces This gained 110 square feet and an additional window, nearly doubling the size of the kitchen and bringing in a lot more light

To create the look of an old-time hearth, Denton, working with a local contractor, recessed the stove in a chimneylike alcove and covered it with brick slate from countertop to ceiling. The alcove echoes the lines of two arched doorways, one on each end of the kitchen, and also houses a pot filler above the stovetop and two arched glass-front cabinets that hold spices and cooking oil Because the homeowners requested low-maintenance materials and a gray color scheme, Denton chose poured concrete countertops with a hammered limestone backsplash On the floor she used a randomly staggered pattern of large and small gray-toned ceramic tiles "The homeowners wanted a cobblestone effect that wouldn't show scuffs and spills," says Denton.

CREATING MORE STORAGE

Because of the wall of windows over the sink area, upper cabinets were out of the question. Denton instead created storage for china and glassware in floor-to-ceiling glass-front hutches built on either side of the living room entryway To the left of the sink is another floor to-ceiling storage unit This one holds a stainless steel side-by-side fridge, a microwave, and television Both pieces are oak, stained a honey maple shade to match the rest of the custom cabinetry.

The focal point of the kitchen—and another storage warehouse—is a 5-by-4-foot island built from salvaged oak, stained dark walnut to resemble a rough hewn piece of furniture. "The homeowner had seen one like it in a magazine, and a local cabinetmaker duplicated it," says Denton The island also serves as an informal dining area "Everyone naturally congregates around it, so we pull up stools for informal occasions," says the wife.

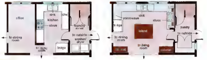
It's no wonder people are drawn to this space, says Steve. "This is a big, bold kitchen that makes you feel welcome " It also accomplishes the homeowners' goals "The textures and materials, including the timber island, concrete counters, and tile floor, don't have to be surgically clean to be presentable," Steve concludes "And the stainless appliances give the kitchen some sparkle " ■

The 2003 Dream Kitchen is getting under way
Go to **www.thisoldhouse.com**
(America Online keyword This Old House)
and click on the Dream Kitchen link.

Floor Plans

Removing the wall of the adjoining home office nearly doubled the dinky kitchen's 125 square feet Floor-to ceiling built-ins that house a fridge and microwave anchor one end of the room, while the stove alcove defines the other In between is a 5-by-4-foot island with generous storage capacity.

before / after



FLOOR PLANS: IAN WORPOLE

WHERE TO FIND IT – SEE DIRECTORY – PAGE 97

Ask THIS OLD HOUSE


STEVE THOMAS
Host


TOM SILVA
General Contractor


NORM ABRAM
Master Carpenter


ROGER COOK
Landscape Contractor


RICHARD TRETHEWEY
Plumbing & Heating Expert

Much to the consternation of some local residents, This Old House stripped the white paint off the Kirkside house in 1991 and painted it ochre, the original color of the 1815 house.

HISTORICALLY ACCURATE, OR JUST UGLY?

I'm always amazed that such care is taken to return old homes to their original colors, as determined by painstaking investigation, with apparently no consideration that the original owner might have been a tasteless idiot. Have you ever discovered original colors that were so hideous that you didn't use them even though they were "historically correct"?

Chuck McKeown, Black Mountain, N.C.

Steve Thomas replies No, but close. In 1991, at our Kirkside project in Wayland, Massachusetts, we were firsthand witnesses to a collision between modern taste and historical accuracy. After exactly the kind of investigation you describe, we found that the outside of the 1815 house, which had been painted white for many years, had originally been ochre with green shutters.

Not everyone wanted us to put those colors back on the house—including the members of the Wayland Historical Commission. But after a lot of discussion, history won out and the commission okayed the original hues. Many people loved them, but I'm sure some folks still grumble every time they pass by. There's just no pleasing everyone when it comes to house colors.

Here in New England, white was the rage during the Greek Revival period in the early to middle 1800s. But before and after that, colors were widely used. We tend to think of them as being muted, but that's partly because what we see has been dulled by time. Some of the original colors were actually quite vivid. That goes for interiors, too. Remember that colonial rooms generally had small windows and were lit by candles, not 60-watt bulbs. Paints that would seem garish now would have been much easier to tolerate under the less intense lighting conditions of the day.

CEDAR ROOF MAINTENANCE

I'm reroofing with red cedar shakes treated with a fire retardant. They have a class C fire rating, the minimum required by state law. We'd like to keep them looking light and new as long as possible. But mostly we just want to preserve them and maintain their fire resistance. Any suggestions?

Raymond Holly, San Jose, Calif.

Tom Silva replies: Just one: Forget about keeping your roof looking like new; wood is going to turn gray no matter what you do. As for fire resistance, do not apply any coating that claims to be a fire retardant. Shingles that are certified as fire-retardant will be permanently protected from fire.

As for preserving them, the main thing is to keep the roof clean. An annual sweeping (or blowing) removes pine needles, leaves, and other debris that can accumulate on the roof and trap water against the wood. Pruning overhanging tree branches will help reduce the debris and discourage the growth of moss, another surefire killer of wood roofs.

There are any number of products that claim to prolong the life of a cedar roof, and little agreement about their effectiveness. Even the Cedar Shingle & Shake Bureau doesn't come right out and recommend anything. It simply suggests that it

PHOTOS, FROM TOP: DAVID CARMACK; PATCA BLANTON; DAVID CARMACK; MICHAEL GRIMM; KINDRA CLINEFF; WEBB (CENTER); KELLER & KELLER (RIGHT)

you're going to put them on, you should at least enlist the services of a reputable contractor with a solid record locally. According to the bureau, the most suitable products will be formulated specifically for wood roofs and contain a UV inhibitor, a water repellent and/or an EPA-registered wood preservative. Before you apply anything, check with the company that made your shakes to be sure it's compatible with the fire retardant.

PORCH FLOOR REPAIR

The porch on my 95-year-old bungalow has a tongue-and-groove floor that is in great shape—except at the outside edge, where the ends of the wood are splintered and worn. Should I put a brass or stainless steel cap over this area to protect it? Or maybe you know of a better way to fix these otherwise solid boards.

JOHN THOMPSON, DENVER, COLO.

Norm Abram replies: A metal (or even a wood) cap over the ends of the boards would just make the problem worse: you'd trap moisture against the wood, which would encourage rot. And metal would put a slippery surface right where you need traction. If the wear is bad enough, there's only one right solution. Replace the damaged boards with new ones milled to the same size as the originals.

To prevent the new boards from sucking up water, soak their ends in a paintable, water-repellent wood preservative, then cover with deck paint. You might have to touch up the ends every year, but that's about the only way I know of to keep them fresh.

TREES IN THE GARDEN

I have a perennial garden in the shade of a mulberry tree and a crabapple tree. The garden looks great in the spring, but by the first stretch of hot weather, everything in the vicinity of the trees starts to wilt. I assume that the greedy tree roots are drinking up all the moisture, even though I mulch the area every year. Come spring, we're planning to take down the mulberry (it's ratty and drops messy berries everywhere) and plant a tree that will eventually grow 40 feet high. Is there anything you can recommend that won't suck my garden dry?

BARBARA HACKLEY, FAIRFIELD, CONN.

Roger Cook replies: Why replace it? Your perennial garden would flower better without the shade. Besides, the root competition from any tree is hard on perennials and will cause anything growing underneath them to wilt during a drought. It's the tree's way of eliminating competition for nutrients. The larger the tree, the larger the root system, and any tree that will grow to 40 feet will develop a root system of massive proportions.

Or perhaps you'd settle for a smaller tree with a less dense root system. Mimosa, Eastern redbud, weeping cherry, Japanese maple, or an oxydendron all might work for you. But if you absolutely must have a larger tree, then consider a white oak or thornless honey locust—both have deep, more garden-friendly root systems. And if locust gets your nod, make sure it's a variety like 'Halka' that doesn't drop big, messy seedpods.

REPLUMBING A TILED BATH

I live in a 1941 two-story brick rown house with plaster walls and ceilings. The galvanized water pipes that feed the back-to-back upstairs bathrooms have finally

Beneath the pristine tilework in this vintage bathroom lie leaking, rusted galvanized water pipes. Replacing them without damaging the walls or the floor will be a major challenge.

started to spring pinhole leaks. I'd like to replace all the pipe with copper, in part to eliminate the chronic problems with rusty water. But the supply lines are in the outside wall or the wall shared with the attached house. All these walls are partially tiled; the floors and shower stall are also covered in tile set on a mortar base. All the tile is in great shape. Is there any way to replace the old pipe without gutting the bathrooms?

BILL GEENEN, BALTIMORE, MD.

Richard Trethewey replies: I won't say it's impossible, but replacing all the pipe without stripping the room down to the studs will be tricky at best. Maybe you can get access to some of the supply lines by stripping the ceiling off the rooms below. That won't be a lot of fun, either, but I suppose replacing a drywall or plaster ceiling is easier and a lot less expensive than reworking the tile. Another possibility is to run the new pipes through the attic, although you'll have to insulate them from cold weather.

An access panel behind the tub or shower would simplify connecting new supply lines to fixtures. Otherwise, you'll have to connect the new pipes to the old ones as close to the fixtures as you can and hope that the last few feet of the old pipe won't fail. (You'll still have a rust problem, though.)

Here's another thought. Some bathrooms from that era had surface-mounted supply pipes. They were chromed and actually looked interesting, to some people. Maybe you could start the trend all over again.

No matter what you do, though, you'll probably have to rework the shower floor. Its drain won't last forever and may have a trap that's no longer code approved.

When you get right down to it, unless your town house is historic, the best and most efficient way to replace all that piping is to just take a deep breath and gear up for a major demolition job. That way you can do the pipes right and rework anything else in the bathroom that isn't the way you want it.

MILDEWED VINYL

Our house has white vinyl siding. Some areas are covered with pinhead-size black dots that I've been told are mold spores. I've tried all sorts of household cleaning products to remove them, but with no luck. What should I do?

HELEN PENN, VALHALLA, N.Y.

Tom Silva replies: Sounds like mildew to me. It grows on my vinyl-sided house, too, from time to time. I just mix a cup of bleach into a gallon of water and apply it to the areas with a pump sprayer. After letting it sit for 5 minutes or so, I rinse it off. Plants don't much like bleach, but you can protect them by spraying their leaves with clear water before and after you treat the house.

If that doesn't solve your problem, it's not mildew on your siding. Could it be overspray from someone who was painting nearby? ■

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WHERE TO FIND IT – SEE DIRECTORY – PAGE 97

Choosing & Using Squares

These simple but indispensable measuring tools can do some amazing tricks **by John Kelsey**

A right angle is the standard by which all carpenters build. When corners meet at 90 degrees, drawers fit snugly, windows close tight, and walls stand straight. The key to all this is a square. Most provide a fixed 90-degree angle in various forms, and some can help copy or draw other angles.

"The first square you buy should be a 12-inch speed square," says Tom Silva, *This Old House* general contractor. "It's versatile and unbreakable. It gives you 45- and 90-degree angles, it's also a ruler, and it's not hard to measure other angles with it, too."

Tom grew up using a traditional L-shaped framing square, which he still prefers for laying out a pattern rafter or a stair stringer. And anytime he's working in the shop, he keeps a combination square, with its sliding head, close at hand for gauging lines. On the job though, Tom does most routine carpentry with a couple of speed squares. "I use the 12-inch one as a crosscut fence for my saw and router, and the 6-inch one is always in my apron pocket—it's especially handy when I'm up on a ladder."

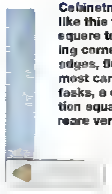
You'll find many types of squares on the shelf at the home center, but you don't need them all. Use the basic models we show here whenever you measure and cut, add specialty squares, such as a drywall square or a sliding T-bevel, as your current projects require.

PHOTOGRAPHS BY NEDJELJKO MATURA

Types of Squares

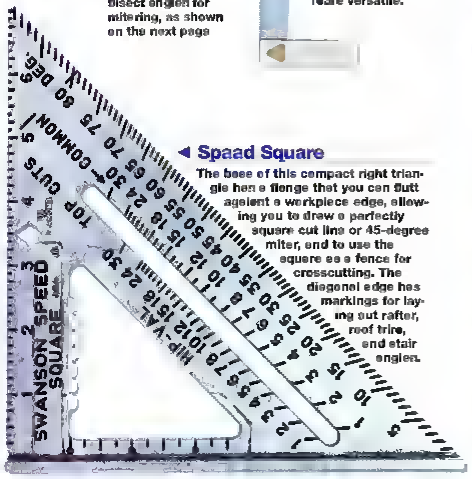
Sliding T-Bevel

The movable blade allows you to copy an angle and transfer it onto markings, lumber, or other materials. It won't measure the angle, but that doesn't matter—a match is what you're looking for. You can use a sliding T-bevel together with a compass to bisect angles for mitering, as shown on the next page



Try Square

Cabinetmakers like this fixed square for checking corners and edges, but for most carpentry tasks, a combination square is more versatile.

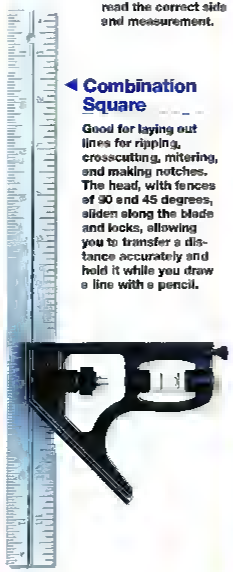


Speed Square

The base of this compact right triangle has a flange that you can butt against a workpiece edge, allowing you to draw a perfectly square cut line or 45-degree miter, and to use the square as a fence for crosscutting. The diagonal edge has markings for laying out rafter, roof trim, and stair angles.

Framing Square

Consisting of a long blade and shorter, narrower tongue, this L-shaped square comes in handy when marking up wide boards and sheet stock or checking their squareness. It's also good for laying out rafters and stair stringers. Ruler increments (in ⅛, 1/10, 1/12, and 1/16 inch) are printed on both the inside and outside edges; be careful to read the correct side and measurement.



Combination Square

Good for laying out lines for ripping, crosscutting, mitering, and making notches. The head, with fences of 90 and 45 degrees, slides along the blade and locks, allowing you to transfer a distance accurately and hold it while you draw a line with a pencil.

For tips on making perfect cuts
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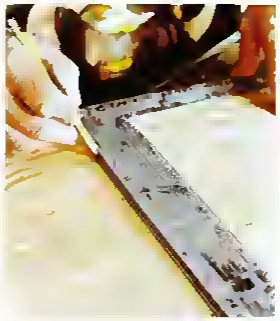
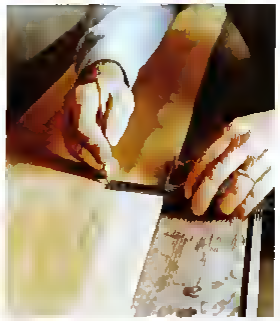
Square Tips and Tricks



Checking a square for accuracy

Before you use a framing square (or a combination square or try square, for that matter), make sure it's accurate. Align the tongue on a straightedge and draw a line down the blade. Then flip the tongue over along the edge, and draw another line down the blade in the same place. If the lines are parallel, the square is true, but if they make a narrow X or V, it's off.



Marking a board along its length

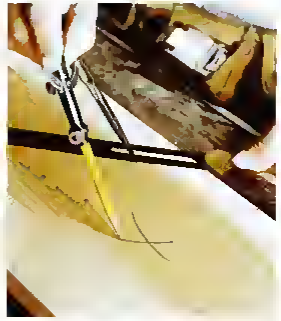
Make quick and straight lines for ripping a board or for locating a line of holes for shelf standards with a combination square. First, adjust the square so the blade projects the correct distance from the head. Then hold your pencil against the end of the blade and slide the body of the square along the edge of the board. This also works with a speed square.

Sawing square

Use a 12-inch speed square to guide your circular saw when crosscutting. With the saw switched off, position it on the layout line, then slide the square up to the saw shoe. To hold the square in position with one hand, but if that's not comfortable, you can clamp the square in place to free up both hands for guiding the saw.

Cutting drywall to size

Align the drywall square so the top of the T rests on the board's edge, and hold the blade with your toe. With a utility knife, score through the paper on the front, scrap the sheet back to make a V, and reach over to score the paper in the valley. Now snap the sheet the other way to break it free, and use the square to mark the stud centers.



Bisecting an angle

When mitering trim, you often need to divide an unusual angle in half. Copy the angle onto scrap wood with a sliding T-bevel. Draw an arc with a compass set on the tip of the V. Then draw intersecting arcs from the two points where the first arc hits the angle's sides. Bisect the angle with a line from the V to the intersection; copy it with the sliding T-bevel, and miter away.

Finding the center of a circle

Start by putting the corner of a framing square anywhere on the edge of the circle. Next, mark where the blade and tongue pass out of the circle. Connect these two dots with a straight line, then move the square and do it again. Where these two diameter lines cross is the circle's center.

PHOTOS: REEHA BAMAT

WHERE TO FIND IT – SEE DIRECTORY – PAGE 87

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ABOVE: *Gracing a bedroom in a converted carriage house, this Swedish stove dates from the early 1900s but works as well as those made today.* RIGHT: *A closer look at the stove's hand-painted tiles.*

Swedish Beauties

Antique or new, these tile stoves score high in looks and energy efficiency

by Max Alexander

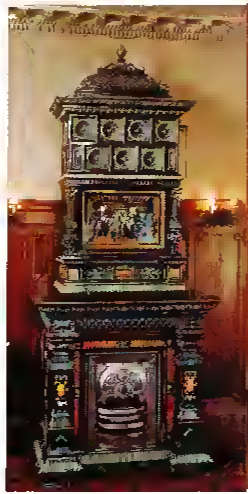
Tiled masonry woodstoves from Sweden are so rare in this country that few Americans would even recognize one of these colorful columns as a heating device, until they place a hand on its sensuously warm surface. But the owners of one Pennsylvania home, inspired by their son's visits with family in Sweden, sought one out. "They are incredibly decorative," says the son, "and every one is different." So when the old potbellied stove in their carriage house cracked, they imported an antique tile stove from Sweden and had it assembled on-site by a specially trained mason. The stove features a hand-painted floral pattern, one of the more popular styles there—perhaps because it suggests the warmer days to come.

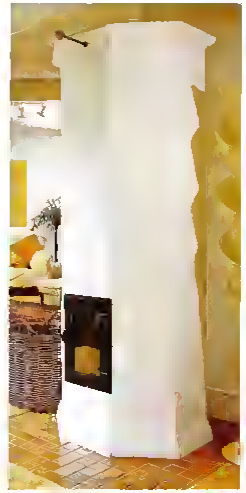
A PRACTICAL HISTORY

Swedish stoves were born of necessity during an early energy crisis: the timber shortage of the 18th century. As Europe's population grew, its forests were being depleted for heat and building materials. So in 1767 the Swedish government commissioned architect Carl Johan Cronstedt to design a stove that would burn less wood. Cronstedt and his partner, Fabian Wrede, came up with a system that has barely changed since: a round or rectangular masonry column (about 3 feet wide by 7 feet high) with a small firebox at

PHOTOGRAPHS BY JOHN GRUEN




ANTIQUE SWEDISH STOVES
Dating back to the 18th century, these elaborately tiled stoves are still in hot demand. The sampling above shows popular motifs, including fleur-de-lis, floral patterns, and other decorative elements. Stoves with a mirror above the mantel (FAR LEFT) *were popular in the late 19th century.*

the bottom. It is typically connected to five vertical flues totaling about 35 feet in length. The firebox doors are usually made of iron, steel, or brass and, when opened, provide the only air supply. A damper near the top of the stove is shut down after the wood has burned fully, capturing the residual heat inside.

If the inner workings of the Swedish stove are dictated by practicality, the outside shape and decoration were left to the whimsy of the maker. Some resemble medieval castles with elaborately tiled battlements, others are inspired by classical and Renaissance architecture. But the tiles are not merely decorative: On the inner side, each tile is actually a concave, hollow "vessel" about 2½ inches thick and filled with mortar, adding more heat-storing mass to the stove.

REBUILT AS GOOD AS OLD

Connoisseurs like Peter Moore, a Vermont–based mason and expert on Swedish stoves, favor antique versions because of their individuality. Moore installed the Pennsylvania stove (shown on page 38), which was probably made in the early 20th century. "The handmade-tile craftsmanship back then was really exceptional," says Moore, who learned stove assembly from master masons in Sweden. But the manufacturing of stove tiles died out with the advent of central heating around 1910.

While modern Swedish stoves replicate the look of old stoves (and perform just as well), the new factory-made tiles have a much simpler look. And while you wouldn't know it from the outside, they incorporate nontraditional construction elements, such as a core of stackable, cast concrete sections capable of withstanding very high temperatures, versus the firebrick and soft red brick used in the antiques. On the plus side, they are cheaper to buy and install, easier to find, and feature curved glass doors to allow viewing of the fire.

To help his American customers find what they're looking for, Moore has developed a network of antique stove sources in Sweden. Still, buying one requires persistence and a robust checking account. The Pennsylvania antique stove cost about $10,000 for the tiles alone, then another $6,000 for Moore's eight-day installation, including materials. Expect to pay around $10,000 for a new Swedish stove, including delivery and installation.

When considering a Swedish stove, it helps to think of it as a fireplace that can be dismantled and moved. Weighing in at about a ton, the stove is typically installed on the first floor, but it can be placed on a second floor as well. In either case it must be supported all the way to the ground.

The next requirement is a chimney. "It can be an old masonry chimney that's been relined, or a new metal chimney, as long as it's safe," says Moore. In Sweden, most stoves are positioned in corners, but they can go anywhere, provided the wall behind them meets local fire codes (most antique Swedish stoves are not tiled on the back side).

PHOTOS COURTESY OF THE AMERICAN SWEDISH INSTITUTE

PHOTOS COURTESY OF THE CERAMIC STOVE COMPANY

MODEL OF EFFICIENCY

Swedish tile stoves release less than half the toxic emissions of EPA certified cast-iron woodstoves, and lose no heat up the chimney. That's thanks to a mazelike system of up-and-down flues, which allows the heat to be absorbed into its dense mass of brick and mortar. "It's one of the most efficient stoves ever invented," says Nick Hills, an Oxford, England, mason and distributor of Swedish and other masonry stoves.

Swedish woodstoves have little in common with cast-iron woodstoves, which warm the air by conducting intense heat from the firebox through the metal surface. Swedish stoves rely on radiant heat to slowly spread warmth into a room over many hours. A 30- to 40-minute burn in the stove's five-channel system can be sufficient for an entire day's warmth. Smoke and heat go up the center channel before being divided and forced down the two front channels. Then they flow back past the combustion chamber and are directed up the two rear channels and vent into the chimney. The high-density masonry smoke channels absorb heat, then the ceramic tiles radiate it to the walls, floors, and the human body.

By the time the smoke leaves the chimney, about 80 to 85 percent of the heat has been transferred to the masonry mass, which explains how Swedish stoves make so little wood go so far. (Cast-iron woodstoves send about half their heat up the chimney, and open fireplaces waste even more.) Unlike larger masonry stoves—such as the Finnish version, which works the same way—Swedish stoves are compact enough to install in small rooms. However, they can't heat a whole house. "I wouldn't use it as a primary heat source," says Peter Moore.

NEW SWEDISH STOVES
The models pictured above recreate the look of old stoves and perform just as well. However, they incorporate some nontraditional elements, such as glass doors and stackable, cast-concrete sections for the core.

Swedish stoves must be installed by a mason who specializes in stove and fireplace construction. The antique stoves are built one course at a time, working from the inner brick core out to the tilework. For the firebox, Moore uses special firebricks and mortar able to withstand intense heat; the rest of the inner construction employs common soft red bricks.

The most unusual material is the mortar itself, a homemade recipe of clay and sand that contains no drying agents. "It dries by air, not chemicals," says Moore. The reason is simple. Should the owner decide to move, the stove can be dismantled and the air-set mortar easily scraped off. "You can take it apart yourself," says Moore. "Just be sure to number every tile, using masking tape."

The last construction step, grouting the tiles, is also accomplished with a homemade mix that allows the tiles to expand and contract. "Regular grout would bond to the tiles," says Moore, "but as the stove expanded with the heat of the fire, the tiles would chip." Moore recommends waiting two weeks after the stove is built before starting a fire, to allow the mortar to cure. That may be the last time you leave your house all winter. ■

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WHERE TO FIND IT – SEE DIRECTORY – PAGE 97

Staying on Track

Regular maintenance will keep your garage door gliding effortlessly

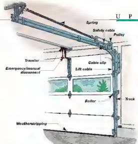
By Elizabeth Gahrman

After a few thousand trips up and down its tracks, a garage door can start to shake, rattle, and not roll as it should. Most people don't pay much attention until a roller jams or, worse, a spring breaks, which can damage property or cause serious injury. But a couple of hours of work twice a year can ensure that such mishaps are rare. "If a garage door is properly maintained with quality components, it'll last virtually forever," says Bernie Udell, owner of Middlesex Overhead Doors, in Burlington, Massachusetts.

Whether your door opens with the push of a button or the tug of your biceps, it's the track, spring, cables, and rollers that most often cause a malfunction. Regular maintenance should include inspecting those parts, as well as hinges, screws, and bolts. Most homeowners can handle replacing worn, broken, or missing components; new parts can be purchased from a door installation company. Remember, if you find a weak part on one side of the door—say, a frayed cable or a tilting roller—you'll probably need to replace its partner on the other side, too. Let the pros handle repair problems with the automatic opener itself. The same goes for a door that's rotting, warping, sticking, or sagging—it probably needs to be replaced.

The following inspections and repairs apply to segmented roll-up doors, the most common type, but every door is slightly different, so consult your owner's manual for specifics.

PHOTOGRAPHS BY WEBB CHAPELL



GARAGE DOOR ANATOMY

1. Test the safety reverse

If you have an electric opener, you need to regularly check that the door will stop and reverse when it hits an obstacle. Stand with your shoulder under the door or place a chair in its path. (Don't use a block of wood; it could damage the door if the safety reverse fails.) If the door doesn't stop and reverse on contact, consult the owner's manual to find out how to adjust the opener's sensitivity. Also, lubricate the opener's mechanism using lithium grease (such as Lubriplate) for a screw drive, oil for a chain drive. Never lube a belt drive.

2. Disconnect the opener

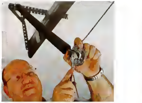
Disconnect the traveler of the electric opener with a tug of the red release handle so you can manually check the door's balance. Good balance keeps the door from crashing down or springing back when it touches the ground. Raise the door by hand: it should move smoothly and remain open at about the halfway point. If it doesn't, the springs are weak and need to be replaced, or the door has become heavier from water infiltration or too many layers of paint and you'll need to install larger springs (as in Step 4).

3. Secure the door for safety

When doing repairs, safety is paramount. The door must remain open; if you try to replace parts with the door closed, the tension could make springs or cables fly off, which can cause serious injury. To secure the door in the open position, clamp a pair of vise grips high on the track just below the door's bottom edge. "If the door can't begin to roll, it can't come down," says Udell.

warning! **DO NOT ATTEMPT REPAIRS if you have a one-piece flip-up door, a door wider than 14 feet, or a segmented door with a torsion spring (a large spring wound around a horizontally mounted shaft that is centered just above the garage door). Flip-up and wide double doors are dangerously heavy, and the force produced by a torsion spring can inflict serious injury. Contact a garage-door professional instead.**

ILLUSTRATION: GREGORY NEMEC



4. Replace worn springs

It's time to replace the springs if the coils are separated when the door is open and the spring is at rest. Take one of the old springs with you when you buy new ones so you get the proper size and strength. To connect the new springs, unhook the lift cable so that you can lower the pulley to which the spring is attached. If safety cables run through the springs, disconnect these. Then remove the bolt in the pulley to detach the spring. Unhook the spring's other end and attach the new spring in the same manner; then rehook the safety cable.

5. Add missing safety cables

If your door is not equipped with safety cables (they run through the springs' centers to keep them tethered if the springs break or come loose), they are easy to retrofit. Thread the cable through the spring and secure the ends beyond where the spring fully extends. Tie each end to steel supports (above) or use an S-hook with a cable clip. The safety cable should be slack enough for the spring to extend fully but not so slack that it interferes with movement.

6. Check the lift cables

Lift cables, which handle the door's up and down motion, can fray, particularly where they run over the pulleys or connect to the door. To replace a lift cable, disconnect it from the door and from the track (if you haven't already done so to replace the spring). Then thread the new one around the pulleys, following the original route. Cables come in standard lengths by door height and should be taut whether the door is open or closed. If the cable's pulleys don't roll smoothly, replace them as well.

7. Service the rollers

Replace rollers that are bent, don't work smoothly, sag, or make noise. Do it one at a time, changing those at the door's bottom with the door secured open and the rest with the door closed. Remove the hinge that holds the roller in place and pop in the new one. Lubricate the shaft of steel rollers that don't need replacing (nylon rollers are factory-greased). Use an oil such as 3-In-One rather than a solvent like WD-40.

8. Repair the track and weatherstripping

Straighten small dents on the track with a hammer and vise grips. Remove rust with a wire brush or a rust dissolver (available in the paint department of hardware stores). Clean the track with household spray cleaner or WD-40 and paper towels, but never lubricate it. Finally, replace worn weatherstripping at the bottom of the door and around the opening.

For more advice on home upkeep
Go to **www.thisoldhouse.com** (America Online keyword: This Old House) and click on Repair & Maintenance.

WHERE TO FIND IT — SEE DIRECTORY — PAGE 97

TVs Where You Want Them

How to bring a quality signal, via cable or satellite, to any room in the house

by Ian Austen

CONSTRUCTION BY SUSAN SAAS

PHOTO: DAVID HAMSLEY

Time was, hooking up a television set required nothing more complicated than a pair of rabbit ears. Not anymore. With the bulk of today's programming coming through cable or satellite, adding a TV can mean buying or installing a lot of hardware, including cable splitters, signal amplifiers, and set-top boxes. And that's not all. "Unless it's a brand new home, we typically abandon all the existing cable wiring," says Buddy Davis, whose company, Davis Antenna, has installed TVs in the residence at the White House, among other Washington, D.C.-area homes.

The reason is simple. Like a water pipe that's too small, the old RG-59 coaxial cable strung behind the walls and along the baseboards of most American homes doesn't have the capacity (called bandwidth) to reliably deliver all the features cable and satellite broadcasters now offer, such as digital and high-definition programming. "You don't want a signal fighting its way through old cable," says Robert Mercer, of digital satellite broadcaster DirecTV. "If it does, you're defeating the whole purpose of having digital-quality video and sound."

UPGRADING OR INSTALLING CABLE

Any TV that's going to handle digital programming today—or in the future—needs RG-6 cable, the electrical equivalent of fat, 1-inch water pipe. When installed properly, RG-6 can carry satellite or cable signals to multiple televisions with little loss of signal clarity or strength. The best type, called "quadshield," has a copper-clad steel conductor at the center and four layers of insulation to shield against electromagnetic interference from household appliances.

Many satellite dish retailers and cable providers will offer to upgrade your cable at no charge. That sounds attractive, but generally these installations provide only a limited number of outlets in one or two rooms. And typically the cables are left exposed, snaking across the tops of doors and along baseboards, rather than running behind walls, out of sight.

Hiring your own installer costs more (look for one under "antenna" in the Yellow Pages), but the cables will be hidden from view, and you can put outlets right where you want them and even add extra in case you decide to move furniture later. Davis

charges about $75 to $100 an outlet if the walls are open for new construction or renovation work. When he has to thread cable through walls, the average cost per outlet rises to between $150 and $200.

But any homeowner who knows how to fish electrical wire (for an example, see "Hanging a Light Fixture," October 2000) can accomplish the same thing for not much more than the cost of the cable: about 65 cents a foot, including connectors (see "Tips for Running Your Own Cable," below).

HOOKING UP MULTIPLE TVs

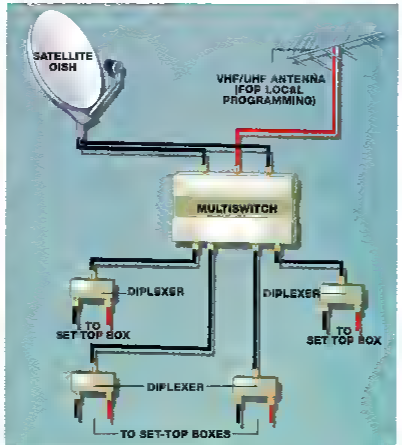
To enjoy a high quality signal in any room of the house, you have to get it from its source—the incoming cable or satellite feed—to the desired location. For cable TV, that takes a splitter, an $8 item that can route the incoming signal to multiple televisions. Satellite systems require a more sophisticated type of splitter called a multiswitch. This device, which costs between $70 and $150 depending on how many TVs you want to hook up, can also be connected to a UHF/VHF antenna to pick up local programming that satellite services may not deliver. A second piece of hardware, called a diplexer (about $7), is then needed at each TV to separate the satellite's signal from the antenna's (see diagram, "Distributing a TV Signal").

Once you get the cable where you want it, you still need one more critical piece of equipment: the set top box that decodes the cable or satellite signal for viewing. With today's "cable-ready" TVs, you may not need a set-top box in some cases, but you'll have access to only limited channels. And in order to receive satellite programming, you'll need a box for each set. Cable boxes are supplied by the service provider; satellite boxes can be purchased for between $50 and $500, depending on features.

In his own house, Davis has run RG-6 cable to 48 locations, including two on the deck and at least one in every bathroom. While he acknowledges that that's more than anyone would ever need, he advises customers not to underestimate the importance of multiple televisions for preserving domestic peace. "It gives family members the convenience of being able to watch what they want, when they want, where they want." ■

Find out more about emerging television technologies
Go to www.thisoldhouse.com (America Online keyword This Old House) and type "television" in the search box.

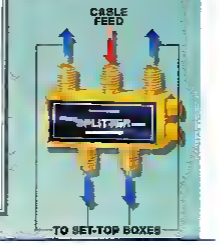
Satellite system



DISTRIBUTING A TV SIGNAL

The multiswitch (in diagram, above) is the heart of the distribution network for satellite TV. It takes signals from the dish and from the UHF/VHF antenna and feeds them through to a diplexer, which separates the signals into two streams that lead to the set top box. For cable systems, a splitter (in diagram, right) divides the signal. A typical multiswitch or splitter serves four TVs, although some can connect as many as 18. Just remember: The more TVs you add, the greater the chance of weakening the signal; an amplifier may be needed to boost the incoming feed.

Cable system



Tips for Running Your Own Cable

Installing cables to carry TV signals around a house isn't that different from stringing wires for electricity: You drill a hole at the beginning and at the end of the run, and pull the cable through. But according to Mark Aloeitz, director of technical services for cable maker CommScope, there are a few factors to keep in mind to ensure optimal performance:

• USE A "HOME RUN" SYSTEM. Every outlet in the house should be individually connected to the home base—that's the multiswitch in satellite systems, the splitter in cable setups. An old-fashioned "daisy chain," where the cabling starts at a central point and then jumps from outlet to outlet in series, robs a signal of strength.

• KEEP CABLE RUNS TO LESS THAN 125 FEET. For cable systems, the distance is measured from the outlet to the splitter. With satellites, the run is calculated from the multiswitch. For best results, a multiswitch should be installed in a central location, roughly the same distance from each of its outlets. If a run exceeds 125 feet, an amplifier may be needed to make sure the signal reaches its destination.

• USE THE RIGHT TOOLS. For stripping cable ends and crimping connections, a pocket knife and a pair of pliers won't do. Even the old hexagonal crimpers for RG-59 cable may distort the wire's shape and impede its ability to carry signals. Instead, use a stripper and crimper specially designed for RG-6, which together sell for about $30 at home centers or electronics supply stores.

• AVOID DISTORTING THE CABLE. For a clear signal, avoid sharp bends in the wire. Also, hold the cable in place with plastic cable clips rather than staples, which can crush the cable jacket.

• LET VERTICAL RUNS HANG FREE. This reduces the chance of damage later from screws or nails coming through the wallboard.

BARBARA VAN WORMER

WHERE TO FIND IT – SEE DIRECTORY – PAGE 97

HOMEOWNER'S HANDBOOK

STEP-BY-STEP PROJECT SERIES

DETACH HERE

The third and final coat of joint compound is applied here with a 10-inch knife. Because each coat needs to dry overnight before it can be sanded, a smooth, seamless job takes at least four days from start to finish.

Finishing Drywall

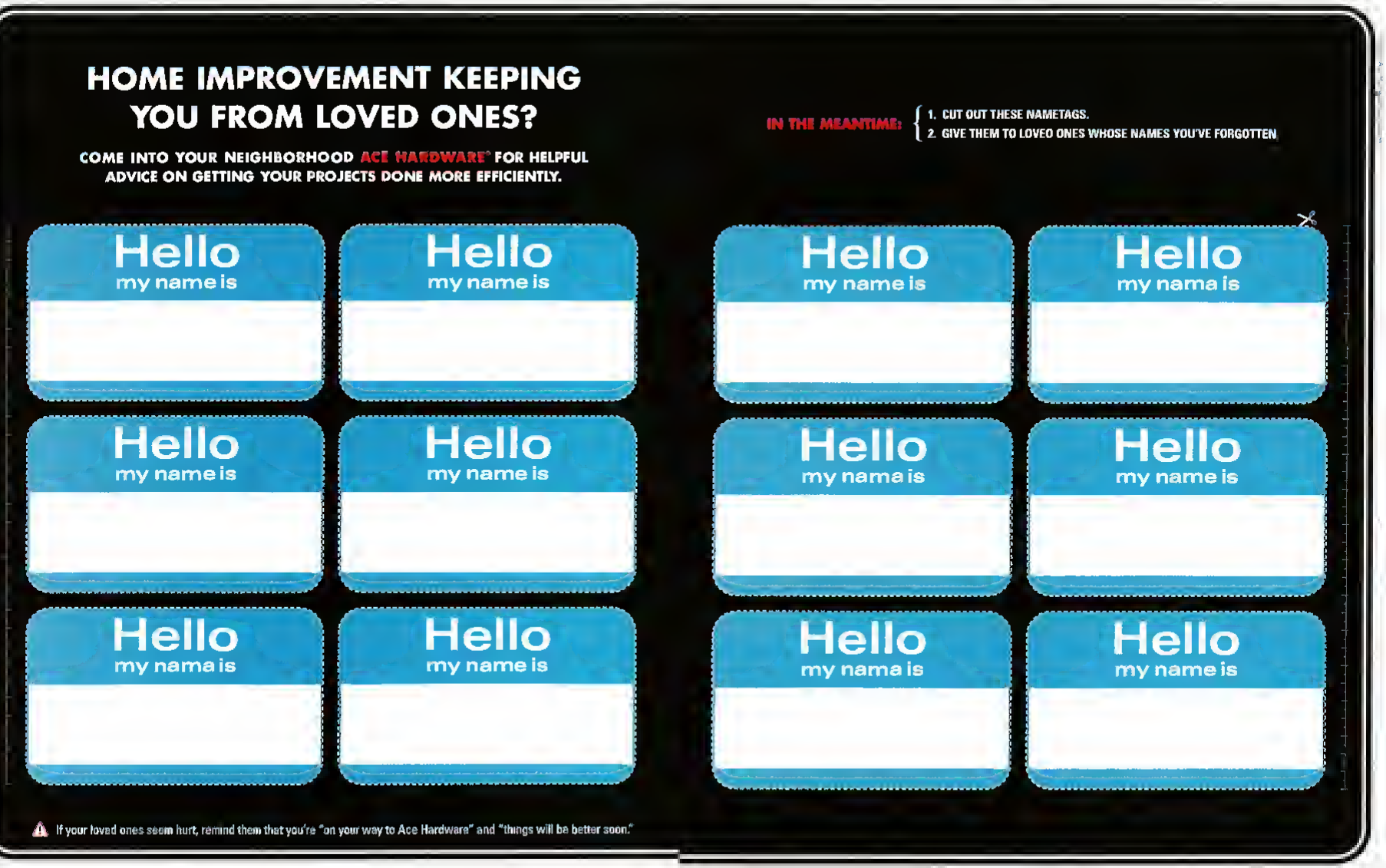
BY JEFFERSON KOLLE PHOTOGRAPHS BY ALLEN PENN

HOME IMPROVEMENT KEEPING YOU FROM LOVED ONES?

COME INTO YOUR NEIGHBORHOOD ACE HARDWARE® FOR HELPFUL ADVICE ON GETTING YOUR PROJECTS DONE MORE EFFICIENTLY.

IN THE MEANTIME:

1. CUT OUT THESE NAMETAGS.
2. GIVE THEM TO LOVED ONES WHOSE NAMES YOU'VE FORGOTTEN.



⚠ If your loved ones seem hurt, remind them that you're "on your way to Ace Hardware" and "things will be better soon."

ACE
The helpful place.

Getting Started

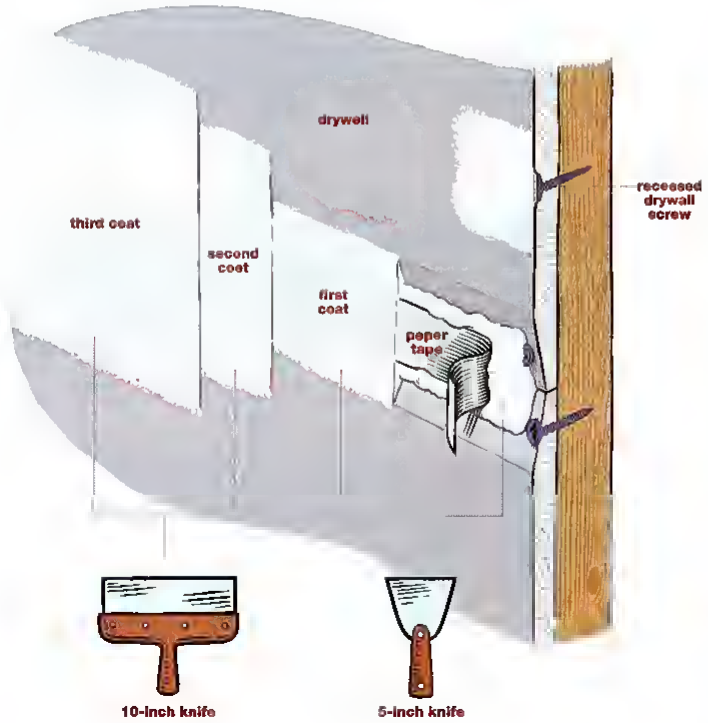
ILLUSTRATIONS BY GREGORY NEMEC

Hanging drywall takes a little muscle (see Homeowner's Handbook, Jan./Feb. 2002), but the next step, getting the drywall ready for paint or wallpaper, requires finesse. The goal here is simple: Make the joints between drywall panels disappear so that walls and ceilings are perfectly smooth. The process isn't complicated, either. It takes just a few tools—a small and a large drywall knife and a swivel-head pole sander—to do the job. Here, Paul Landry, of P.L. Drywall in Waltham, Massachusetts, shows how it's done, using premixed joint compound (a.k.a. "mud") and drywall tape.

> "The first coat of 'mud' isn't critical; it's the second and third coats that really matter."
> —PAUL LANDRY, DRYWALL CONTRACTOR

The tricky part is learning how to properly bed the tape and feather out the compound to an imperceptible edge. "First time out, you'll probably get more 'mud' on the floor and on your clothes than you do on the wall," says Landry, who finished the walls at *This Old House*'s recent TV project in Manchester, Massachusetts.

Sanding is the other key skill. Joint compound is soft, so the challenge is to avoid removing so much that you risk fraying or tearing the paper tape. "Be patient," Landry advises. "Even beginners can do a fine job if they take their time."



Step by Step

1 Stir compound and prep surfaces

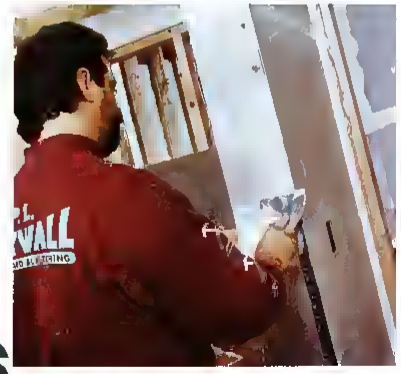
- Cut band on top of the bucket with a utility knife or tin snips and pry off lid.
- If there's water on top of the compound, chuck a mixing paddle into a ½-inch drill. Mix at slow speed until water is blended and compound is smooth (ABOVE). If there's no water, the compound is ready to use.
- Look for any screwheads poking above the drywall surface and drive them until slightly recessed.
- Tear away any loose or torn paper from drywall (especially at corners and cut edges) to prevent bits from ending up in the compound.

2 Cover joints and screwheads

- Using 5-inch knife, fill mud box halfway with compound.
- Load the edge of the knife blade with about 2 inches of compound.
- Starting in one corner of the room, force the compound into the joints between sheets (ABOVE). When they're completely filled, hold the knife at a 25-degree angle to the surface and smooth out the compound in a single pass.
- Scrape excess compound off knife and into mud box.
- Fill screw holes with a swipe of a compound-loaded knife.
- When all the joints and screwheads on a wall or ceiling are filled, go to Step 3.

5 Tape Inside Corners

- Using a 5-inch knife, fill the seam and cover 2 inches on either side of the corner with compound.
- Cut a piece of tape the full length of the corner; crease it in half lengthwise. With knife, gently push into corner (ABOVE).
- Starting in the middle, draw the knife along the drywall, smoothing the tape on one side of the crease. Skew blade 45 degrees to squeeze out excess mud.
- Run knife in the same way on the opposite side of the crease. Finish by smoothing back to the starting point.



6 Cover outside corners

- Make sure the metal corner bead on outside corners is nailed or clinched every 10 inches. Straighten bends, if necessary, with corner clincher (see "Tools," FAR RIGHT).
- Using the 5-inch knife, smear one side of bead with compound (ABOVE). Repeat on the other side.
- Holding the blade against drywall and bead at the same time, run the knife down the corner, smoothing the compound in a single stroke. Repeat on the other side.
- Let compound dry overnight.

3 Apply paper tape

- Unroll 3 feet of tape from dispenser, but don't tear it off.
- Center tape over seam and, using fingers, gently press into the fresh compound.
- Unroll and bed tape into rest of joint (ABOVE).
- At the end of the joint, place the knife edge perpendicular to the tape face and tear.

4 Smooth tape

- Starting halfway along the joint, hold the 5-inch knife against the tape at a 25-degree angle to the wall.
- Pull knife to one end of the joint in a single stroke, smoothing the tape and pressing it firmly into the compound (ABOVE).
- Scrape excess compound from the blade into mud box.
- Return to the starting point and repeat in the other direction. (This technique prevents tape from pulling off wall.)
- Repeat Steps 2, 3, and 4 on remaining walls or ceiling.

7 Sand the first coat

- Check that compound is uniformly white, which indicates that it is dry. (Wet areas appear darker.)
- Sand inside corners with corner sanding block.
- Sand all other surfaces using a pole sander with medium-grit abrasive (ABOVE). Apply gentle, even pressure. Sand only enough to smooth rough areas; don't sand down into paper tape.
- Feel for rough areas and sand as needed.

TIP: Don't try to sand out indentations or craters; these will be filled by subsequent coats of compound.

8 Apply second and third coats

- With the 10-inch knife, scoop up 2 inches of compound. Then scrape off 2 inches worth at each end of the blade.
- Apply compound to all joints and screwheads, then smooth it in a separate pass. Allow to dry overnight.
- The next day, sand with fine-grit drywall sandpaper.
- For third coat, load entire edge of 10-inch knife with compound and apply to joints and screwheads as before (ABOVE). Smooth to an imperceptible, feathered edge.
- Let dry overnight, then sand as before. Wipe all surfaces with a damp cloth to ready them for priming.

To-Do List

Tools

1. **Half-inch drill and mixing paddle: for blending compound**
2. **Swivel-head pole sander with medium-grit sanding screen or drywall sandpaper: for smoothing first coat of compound**
3. **Fine-grit sandpaper: for smoothing second and third coats of compound**
4. **Sanding blocks: for sanding corners**
5. **Joint compound**
6. **Paper tape (shown with belt dispenser)**
7. **Mud box: for holding small batches of compound and cleaning knives**
8. **5-inch drywall knife**
9. **Rubber mallet and corner clincher (see below)**

ALSO NEEDED
10-inch drywall knife (shown on opening page of Homeowner's Handbook)

LEFT: A clinching tool (about $30) is handy when hanging drywall because it quickly secures metal corner bead with a few smacks of a mallet. But the 14-inch-long tool is also useful during the finishing phase for straightening a bent or misaligned bead, ensuring that outside corners turn out crisp.

Dust Management

The dust from sanding joint compound is insidious stuff. When you're sanding, a dust mask is mandatory to protect your lungs, but the dust will also waft into the far corners of your house, leaving a white coating on everything from the coffee table to the inside of your CD player. And once the dust has spread, cleanup isn't easy. The powder will pass through most household vacuum bags and can ruin their motors. Using a damp cloth to pick up the dust is a bad idea; it leaves a stubborn gypsum haze.

Given all this, the best strategy for controlling dust is to contain it before it spreads. The low-tech solution is to stuff rolled towels under doors, tape plastic sheets over openings leading to the rest of the house, and place a box fan in an open window so it will blow dust outdoors (just make sure the other windows on that side of the house are closed).

In addition, you can buy or rent sanding tools that connect to a shop vac and capture the dust at its source (make sure the vac is equipped with a filter bag). Some of these tools are manual. Others, like the Porter-Cable motorized drywall sander (right), spin the sandpaper; you just steer the head while a shop vac sucks away the powder. These powered heads require a light touch. Otherwise, you could end up removing too much of your carefully applied compound.

For an archive of Homeowner's Handbooks (including instructions on how to hang drywall) Go to **www.thisoldhouse.com** (America Online keyword: This Old House) and click on Homeowner's Handbook

The Stuff of Dreams

by Steve Thomas

I was just a kid the first time I heard about architect Frank Lloyd Wright and Fallingwater, his marvelous creation in western Pennsylvania, featured in this issue (page 84). Back then, I got to know the famous house through pictures, and just thought, "Wow, that is so awesome." With its cantilevers over the Bear Run falls and its sandstone construction, it reminded me of things I loved as a kid, like forts, tree houses, and streams. Wright incorporated a kind of childlike playfulness into the house's form, with protruding levels that suspend you so high above the hillside that you're up in the trees, and a staircase that leads you from a hatch in the living room down to the rushing water, leaving you facing upstream.

It wasn't until this past summer that I actually got the chance to visit this incredible structure. And I found all my early impressions confirmed. Cloaked within this very sophisticated and advanced design—so different from the rustic cabins that were the norm in the area—is the ultimate riverside fort. A cave of stone, glass, and steel seems to be chiseled right out of the land. Wright had harnessed the elemental forces of the site—water, rock, sky—and channeled them through Fallingwater. It took me right back to the places I used to play as a kid.

Of course, I'm not a kid anymore. I'm a homeowner myself, and one involved in the business of keeping old houses going. So while my visit brought back my lifelong desire to build a new house, something that grows right out of the earth, I can really sympathize with Fallingwater's current trustees, the Western Pennsylvania Conservancy. The place is a maintenance handful. Vast cantilevers perched on a rock ledge, down which a lot of water trickles, are inherently a structural nightmare. If I picture myself as the owner of the place, I imagine I'd need to spend all my time just keeping it going. Still, that doesn't mean I'd give up the chance to live in a house like Fallingwater.

Because that's the reality of home ownership. While it starts as a dream, sometimes one formed when we are very young, a real house requires not only love but time, effort, money, and, often, compromise. But as long as you hold on to your inspiration—keep imagining what moved you when you were a kid—you'll create a home that will always bring you that childlike joy.

For This Old House *host Steve Thomas, Frank Lloyd Wright's Fallingwater conjures a kid's delight in the outdoors.*

coming next issue

March: *On sale February 17*

- Storage solutions
- Exterior stains
- TV project house kitchen

PLUS:

- Landscaping: Pruning guide
- Semi-pro stoves
- Caring for wood surfaces

PHOTOGRAPH BY KELLER & KELLER

While tradesmen work on every inch of the Winchester house, homeowners Kim Whittemore and Bruce Leasure meet with TOH general contractor Tom Silva to check on progress. OPPOSITE: Later that day, Kim has a sit-down with Roger Cook to finalize the landscaping plan.

here come the SUBS

As work in Wincheester kicks into high gear, dozens of tredesmen deecend on the house. Here's an update on their progress

by Jefferson Kolle Photographs by Kindra Clineff

Since May, *This Old House* general contractor Tom Silva and his crew of carpenters have been working on the TV project house in Winchester, Massachusetts, building a new kitchen addition and sunroom, reconfiguring the master bedroom suite and basement media room, and beefing up weakened or undersized parts of the original structure. As autumn gives way to winter and the rough carpentry is finished, Tom has put down his tool belt (for awhile, at least) so that he can orchestrate the next phase of the remodeling process. "When the framing is all done," says Tom, "the subcontractors arrive." Plumbers, electricians, plasterers, and roofers have descended on the house, and the property is swarming with subs.

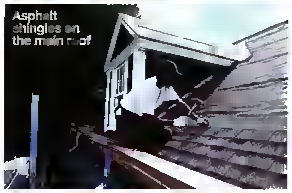
The job is far from over, and there are still plenty of decisions to be made—Tom and other members of the *TOH* team confer almost daily with homeowners Kim Whittemore and Bruce Leasure. Says Tom of the hubbub at the house: "Everybody here is real good at their job. The hardest thing is keeping them out of each others' way." Turn the page to see what's going on.

Go behind the scenes at the Winchester house

Up-to-the minute progress reports, field notes from the crew, and more. Go to **www.thisoldhouse.com** (America Online keyword: This Old House) and click on This Old House Television.

metal & asphalt **roofing**

Most of the roof is being covered in architectural asphalt shingles (bottom left), a durable and inexpensive roofing material. But asphalt is not recommended for a roof with a pitch shallower than 4 in 12 (meaning for every horizontal foot the roof covers, it rises 4 inches) because wind and rain can force their way underneath. So on the kitchen addition, Tom Silva called for a metal roof (top). The roofers soldered together sheets of lead-coated copper (bottom right) over the plywood sheathing to form an impermeable barrier against the elements, then added integral lead-coated copper gutters with decorative copper hangers (top). "The asphalt has a 40-year warranty," says Tom. "The metal will probably last into the next century."



planting **trees**

TOH landscape contractor Roger Cook to the rescue. To screen out the new neighbors after they cut down all the trees on their side of the backyard property line, Roger and crew planted three blue spruces, six giant western red cedars, and seven pyramidal white pines—chosen for their shape and dense foliage. The effect on viewing the neighbor's house, as Roger puts it: "Now you see it, now you don't."

insulation inspection

Buttoning up the house against cold New England winters (and the occasional scorching summer day) requires a tight and thorough insulation barrier. It's also a requirement of the Massachusetts building code, which is why an inspector showed up to meet with Tom and verify the completion of the installation, peering into walls and crawl spaces to examine the goods (below left).

Tom used two types of insulation: blown-in mineral wool for the walls and sprayed-on Icynene foam on the underside of the roofs (below right). "Mineral wool has excellent insulating abilities, but if you use it on the underside of a roof, it has to be vented, just like fiberglass batts," he explains. "We could have put in roof ridge and soffits vents, but by using the Icynene, which doesn't need venting, we saved some money in the long run."

skim-coat **plastering**

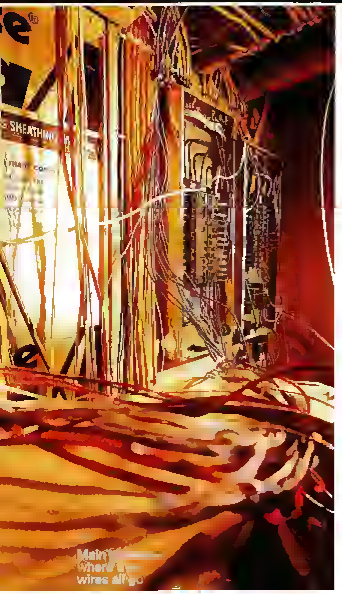
Only the renovated master bedroom and kitchen needed new walls, so Kim and Bruce decided to go with plaster, to match the rest of the house. (The media room gets drywall, which doesn't echo as much.) So master plasterer Steve Norton and his crew troweled on a ⅛-inch coat of veneer plaster over blueboard. "It's a much harder wall than regular drywall," says Norton. "And with a full coat covering everything, it's unlikely you'll ever see a seam or a popped nail like you sometimes do with drywall."

sizing a **tv screen**

Planning the media room in the refurbished basement of the Winchester house is more than just wiring the room for sound. Kim had to consider the size of the TV screen, because that dictates how far away the seating should be for optimum viewing. (A good rule of thumb: Viewer distance from the TV should be equal to twice the diagonal measurement of the screen.) So Kim marked the wall with the outlines of five different sizes of flat-screen plasma televisions and then measured recommended seating distances. In the end, she and Bruce settled on the smallest, a 42-inch screen, which gave them cozy seating that makes good use of the tight space. "The cost was also a plus," she says. "The bigger the screen, the higher the price tag. There may be optimum seating distance, but we were also thinking optimum checkbook balance."

sunroom trim

To replicate the decorative exterior panels under the new sunporch's double-hung windows (below right)—rectangular "spider webs" of applied 1x2 redwood pieces—Silva Brothers carpenter Tim Oglesby built a jig (below left) to make the job go faster. "It took about an hour to lay out and build the jig with perfectly square corners, stops for the 16 pieces, and the nearly three dozen saw cuts that make up each panel," says Oglesby. "But then, all I had to do was cut a series of identical pieces and drop them in place, kind of like a big jigsaw puzzle." When a panel was complete, Oglesby simply nailed the pieces in place. The finished design will be primed and painted the same cream color as the rest of the exterior trim.



wiring the **house**

The confusing ganglion of roughed-in wires and cables in the Winchester basement utility room will eventually send signals and currents throughout the house. Along with standard electrical wiring, electrician Allen Gallant and his crew strung Category 5 cable for Internet and phone lines to every room. Gallant's favorite device is a $300 whole house surge protector. "Most everybody uses a plug in surge protector for their computer," Gallant says. What they don't realize is that most new appliances also have electronic circuitry, and without whole house protection, one lightning strike or return from a power outage could take out your refrigerator, oven, and home theater system."

Checking out the flooring

assessing the **floors**

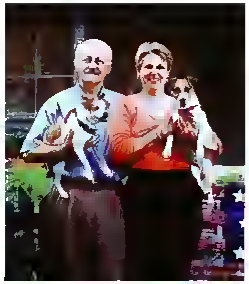
"You never know what you'll find when you rip up an old carpet," said Tom Silva, eyeing the filthy beige wall-to-wall that covered the living room and dining room floors. His hope was that there would be gold underneath: strip oak floors, which were popular in 1920s Colonial Revivals like the Winchester house. So he lifted a corner in the front hall, and with a wipe of paint thinner dissolved years of grime and old wax to find glowing oak underneath. "I know we'll have to replace some boards, and put in some patches," he said. "But after a light sanding and a couple of coats of finish, this will be beautiful."

radiant heat prep

Before master plumber Ronald Coldwell could retrofit radiant heating under the first story's floors, he had to get one thing out of the way. Well, actually, hundreds of things: sharp-edged cut nails, used to install the original flooring, that were poking through the bottom of the floorboards right where the heating's plastic PEX tubing was to run. It took Coldwell a full day to cut the 400 nails with an angle grinder. As he put it, "Some days my job is lots of fun. Others, it's a real grind."

Cutting protruding nails

WHERE TO FIND IT ▸ SEE DIRECTORY – PAGE 97



In many ways, the cozy, century-old Craftsman cottage, nestled in a lovely, historic neighborhood in Fairhope, Alabama, was perfect for Jackie and Dennis Frodsham. The 1,800-square-foot house, built in 1908, had a view of Mobile Bay and a park directly across the street. That made it easier for the Frodshams to overlook the dreary asbestos-shingled exterior and obsolete kitchen and baths. They paid $380,000 for the house and figured that the cost of a new great room/kitchen addition wouldn't be astronomical, especially since they were going to do much of the work themselves and reuse a lot of the vintage materials from the house.

Homeowners Jackie and Dennis Frodsham **(ABOVE)** *carefully planned their new two story great-room wing* **(RIGHT)** *to blend with the rest of their home. The room features beadboard walls and ceilings, and the floor and cabinets were crafted with materials salvaged from the house*

special ADDITION

A new wing blends right in to a century-old house

by Danny Flanders
PHOTOGRAPHS BY CHIPPER HATTER
STYLING BY ASHLEY GORDON

The quaint 1908 Craftsman with its outmoded kitchen and broken asbestos shingles (LEFT) *was thoughtfully renovated to include a gabled great-room wing that is well concealed behind the newly extended wraparound porch*

Disguising the new addition

Jackie and Dennis hired Fairhope architect Lea Verneuille to design their addition, with one stipulation: "We wanted it to look as though it had been there all along," says Jackie. Verneuille suggested the new kitchen/great room extend the full two stories on the bay-view side of the house. Jackie and Dennis loved the idea, since they were planning to tear off the old bathroom bump-out on that side anyway.

In his design, Verneuille paid strict attention to scale, repeating the existing house's window shapes and extending the roofline to the dormered wing. He also continued the home's ample front porch so it wrapped around the great-room wing.

Inside, the great room was connected to the rest of the house by a wide entryway, which also serves as a new dining room. In fact, Jackie and Dennis and their architect found themselves repurposing rooms and their uses all over the house. The old dining room with its prime views of the water became the new master bedroom suite, a downstairs bedroom became the new study, and the old kitchen and an adjoining closed-in back porch contributed space for a new master bedroom.

A scavenger hunt

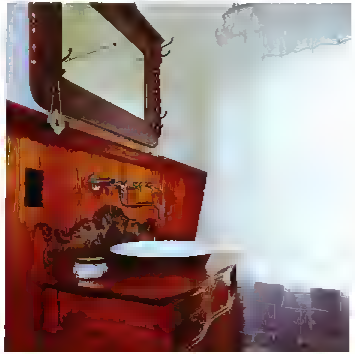
Dennis, who is a commercial real estate agent, tackled most of the demolition on weekends. After ripping off the home's asbestos shingles, he discovered old heart-pine siding. "When we saw how pretty it was, we thought it would be great to use it on the exterior of the new addition," says Jackie, a former teacher, who was on-site every day from sunup until after dark. "She kept the carpenters organized, turning the backyard into an assembly line to clean, sand, and stack every splinter of salvageable heart pine," says Dennis proudly.

But because the new wing required more siding than they had, Jackie and Dennis decided to use it elsewhere. Removing the siding allowed them to insulate their home without disturbing the interior beadboard walls, and carpenter Dennis Hermecz jumped at the chance to use the siding to build the kitchen's Craftsman-style cabinets.

In extending the dining area into the great room, Jackie and Dennis didn't try to blend new material with the original beadboard ceiling. Instead, they carefully removed the ¾-inch-thick clear heart-pine boards and created the great room's new gleaming floors by turning the material over. "We love finding new uses for old things," says Jackie. "Renovating this house was like a scavenger hunt."

The couple, who had been collecting odd pieces of salvage for years, knew that their "new" kitchen cabinets demanded countertops that were equally special. Remembering an old timber they'd pulled from the bay five years earlier, they had the 16-foot pine piling sawed into wide boards and finished. The focal point of the room, an antique window accented

The wide screened-in porch wraps around the new addition and serves as a second living room where the homeowners can kick back and relax



with stained-glass panes, came from a Mobile salvage yard. Even the pine library ladder that glides along the floor and provides access to the great room's high display shelves is a salvage find. "It was made in 1908, the same year our house was built," says Jackie. "It came out of a country store in Selma."

The kitchen area of the great room (BELOW) *was designed around a favorite salvaged window. The homeowners added stained-glass panes that repeat the home's exterior color scheme. The kitchen cabinets were made from the home's original siding, and the wood countertop was sawn from a timber salvaged from Mobile Bay. Recycled wainscoting, a vessel sink, and a vintage mirror give the bathroom* (RIGHT) *a period feel.*

Renovation detour

Halfway through the project, Dennis and Jackie got hit with some bad news. Termite damage had rotted the old back porch. "We had to tear it off, rebuild, and rework the master bedroom plan from scratch," says Dennis.

The good news in starting over was that they could use the old porch foundation to create a rear addition in the same footprint. Half the space became a large master bath; they turned the other half into a laundry room and a powder room. Because of its steep roof pitch, the rear addition also provided attic space for an upstairs bedroom and an enlarged bath. "That blew our budget, but we're glad we did it, because we ended up getting more rooms," says Dennis, who estimates that for what they paid for the total renovation they could have built a new house.

But then, Jackie and Dennis recognize the intrinsic pleasure of living in a historic old home. "We like the feel of living with the past, but we also love our big modern kitchen and great room," says Jackie. "When guests visit, they think we simply opened up an existing room to the second floor. They don't realize they're standing in a brand-new addition." ■

TELL US YOUR STORY

Did you renovate your house and do most of the work yourself? If so, we'd like to hear about your project. Please send copies of before and after photos, a floor plan (we cannot return any materials), and a brief description of the work you did to:

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taking a look at **windows**

They can be the most expensive feature in a house. Here's how to get the most for your money

by Max Alexander
Photo-illustration by Mark Hooper

A window is simple: glass held in a sash that fits into a frame. Buying windows is anything but. Whether it's for a new home or an addition, the range of options can be mind-boggling.

The good news is that windows are better than ever, with a wide variety of styles, frames that hardly ever need maintenance, and glazing systems that can slash energy costs. Double-pane insulated glass, heat-resistant coatings, and airtight frames can cut household energy expenditures by as much as 15 percent compared with the leaky single-pane models of yesteryear. As a result, homeowners are letting the sun shine in like never before. "Windows are getting bigger and bigger," says *This Old House* general contractor Tom Silva, "and people are adding more of them."

That improved technology comes at a price. While windows once accounted for 3 to 5 percent of a new home's cost, today 8 to 10 percent or more is common. On the pages that follow, we offer some pointers to help you cut through the confusion and spend your money wisely.

WINDOW TYPES

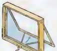
The style of its windows sets the tone for a house. Punctuate a wall with two symmetrical rows of small, double-hung windows, and it looks Colonial. Fill the same wall with casements, and suddenly it's Arts and Crafts. An all-glass wall says contemporary. When choosing a style, it's important to consider the house's architecture, and also the windows' locations—certain types work better in some settings than in others.

Casement windows, which operate with a crank are commonly used over the kitchen sink, where they are easier to open than double-hungs

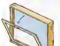
Double-hung windows are the most popular Modern versions have a tilt in sash for easy cleaning of the outside panes. These all-around favorites have some limitations, for example, they're not the best choice in locations where you have to stretch to open them, such as over a kitchen sink.

Casement windows are hinged at the side and typically swing out. The full height opening provides excellent ventilation. But casements, especially those made of wood, can suffer damage if left open in the rain They're a poor choice where they would open onto patios or other traffic areas

Sliding windows function like double hungs turned sideways They look best in contemporary homes, and work well opening onto a deck or exterior stairway, where a casement's swing would cause trouble



Awning windows are hinged on the top and open out from the bottom They're often used for ventilation under large, fixed-pane picture windows in contemporary-style homes They keep out rain even when open, as long as the wind isn't blowing too hard.



Hopper windows are like awnings in reverse They're hinged on the bottom and swing in Hoppers are typically used in basements or high up on a wall over a large, fixed-pane window

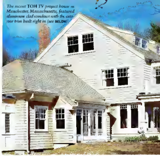
Fixed windows don't swing, tilt, or glide, the sash is permanently fixed to a frame Often flanked by double-hungs or casements, or set above or below an awning or hopper, fixed sash come in a variety of shapes including round, half round diamond, and trapezoid (to echo gable-end rafter pitches).

PHOTO ANDRE BARANOWSKI ILLUSTRATIONS GREGORY NEMEC

PHOTOS PASCAL BLANCON (TOP) SAMIR HADDAD (6)

FRAME MATERIALS

A window frame's style is what gets noticed, but there's more to frames than meets the eye. Because they seal out moisture and drafts, frames are almost as important as glazing when it comes to insulating ability. All-wood frames are the most traditional, but they require the most upkeep. Other frame materials are designed to reduce maintenance time and expense.

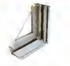


The recent TOH TV project house in Manchester, Massachusetts, featured aluminum clad windows with the exterior trim built right in (see **BELOW***).*

All-vinyl frames
These are among the least expensive options and are the easiest to maintain Like vinyl siding, they never need painting Early versions were plagued by long-term deterioration from sunlight and leaks caused by heat distortion, but manufacturers now use sturdier materials to combat these problems.

Solid wood frames
You can paint these classics any color you choose, but they require a lifetime of maintenance to ward off rot and keep paint looking fresh Regardless of the cost of a wood window—the price varies with quality—maintenance time and expenditures should be factored in to any buying decision Most manufacturers offer preprimed wood windows.

Clad wood frames
Wood frames covered on the exterior with a skin of aluminum or vinyl, these are the most popular choice They cost more than solid wood but are easier to maintain. Vinyl costs slightly less than aluminum, but aluminum is stronger and comes in more colors. For a premium, you can even get aluminum-clads painted at the factory to match any custom house color



High-tech composites
Fiberglass and other composites have many advantages. They can be painted like wood, and they're often stronger and more durable than wood. Tom Silva likes a composite made of recycled vinyl and wood dust. "It looks, feels, and acts just like wood," he says. That versatility doesn't come cheap, however; composites are generally the priciest choice

SIMULATED DIVIDED LIGHTS
Designed to mimic old-fashioned multi-pane windows, simulated divided lights, known as SDLs, are one of the fastest-growing segments of the window business. The latest design innovations—muntins affixed to both interior and exterior panes, with spacer bars in the gas-filled core—look better than less expensive snap-in grilles "Authenticity" is the name of this game Andersen and others have developed exterior muntin profiles with chamfered edges to suggest the appearance of wood and putty frames.

FACTORY-TRIMMED WINDOWS
Another recent development is aluminum-clad windows with all the exterior trim—including casings, moldings, sill, and flashing—built right in The cladding, which comes in a variety of styles, is virtually indistinguishable from painted wood Integrated casings can add 30 percent or more to the cost of a window, but that's still cheaper than building and painting wood trim "I think they're good," says Tom Silva. "I like traditional looks, and if you can get a product such as extruded aluminum to look like wood, I'm all for it."

Awe Illustrated

There are those who fall but get back up.
Lose, but don't accept
because they will not fa
teach by words, they
—*As Illustrated in Spor*

GLAZING

Window glass, called glazing, has come a long way since the days when windows had only a single pane between you and the elements. Today's energy-efficient windows come with glazing "systems" that incorporate multiple panes of glass, gas fillings, and high-tech, heat-sensitive coatings. Sorting through the options takes a bit of effort, but it more than pays off in increased comfort and reduced energy costs.

Double-pane insulated glass with low-E coating is a major energy saver. Here, Tom Silva installs a tilt-in double-hung sash at the TOH "Project" house in Charlestown, Mass.

PHOTO: DAVID GARMAIN

Single-Pane
Windows with just one layer of glass suck energy dollars from a house and offer little protection against heat or cold. That explains why few new single-panes are sold today. If you opt for single-pane windows because of their traditional look, choose ones in well-made wood frames, and combine them with snug fitting storm panels to boost their energy efficiency.

Double-Pane Insulated Glass
Most new windows sold today are dual-pane glass (sometimes called insulated glass or by the formerly trademarked name Thermopane), in which a layer of inert gas—typically argon or krypton—is sealed between inner and outer panes. The gas is a poor thermal conductor, so it slows the passage of heat through the glass, eliminating the need for storm windows.

Triple-Pane Insulated Glass
More efficient still are triple-pane windows, which seal two layers of gas within the frame. Triple panes are excellent performers in extreme northern climates (and good sound-reducers for houses near highways), but the extra pane of glass makes for a very thick, heavy, and expensive sash.

Low-E and Heat Mirror Glass
Adding panes and gas-filled spacers is one way to get a more efficient window. Another way is with low emissivity (low-E) coating, an invisible layer of metallic oxide that reduces the amount of heat that passes through the glass. Virtually all new windows sold today offer this feature.

Depending on the climate, low-E coatings can be tailored to let the sun's energy in or to block it out. In cold regions, where heating costs dominate, homeowners can choose coatings that maximize the amount of heat transmitted from the outside, called solar heat gain, in hot regions, low-solar gain coatings can keep cooling costs down (see "Evaluating Energy Efficiency," right).

While low-E coatings add 10 to 15 percent to the cost of a window, research has shown that they cut energy expenditures by about 25 percent over plain insulated glass. That means that depending on the type of fuel used in a home, low-E windows can pay for themselves in 5 to 10 years. It's possible to buy dual-pane glass without a low-E coating, but Tom Silva doesn't recommend it. "The extra cost is minimal, and it's really beneficial in the long run," he says, pointing out that because low-E coatings also filter ultraviolet radiation, they protect furniture, rugs, and artwork from fading.

Another high-tech glazing system, called Heat Mirror, can match or even exceed the energy efficiency of triple-pane windows—without the extra weight. It's made by suspending a sheet of low-E film between panes of insulated glass. Superglass, the most expensive glazing system on the market and one of the best insulators, suspends two layers of Heat Mirror between panes of glass with gas-filled spacers.

EVALUATING ENERGY EFFICIENCY

You can't judge a window's efficiency just by looking at it. Fortunately, most new windows sold in the United States carry a label from the National Fenestration Rating Council, a nonprofit organization that certifies energy performance. The label shows how the window performs in three key areas (see "Understanding Window Ratings," opposite).

If puzzling through the label is daunting, the EPA's Energy Star program makes judging efficiency easier. An Energy Star sticker means a window has met the minimum standard for insulating ability specifically for the climate of the region where it's sold. Energy Star windows generally exceed building code requirements and cost about 15 percent more than windows without the rating.

You can also go to http://windows.lbl.gov and download a program called Resfen. The software, which is free (PC-compatible only), lets you calculate how windows with different glazing systems and frame materials will affect your energy bill.

For step-by-step window installation instructions
Go to **www.thisoldhouse.com**
(America Online keyword: This Old House)
and type "Installing a window" in the search box.

UNDERSTANDING WINDOW RATINGS

Window glazing is rated on three criteria: how well it insulates, how much light it lets through, and how effectively it blocks heat from the sun. By taking these values into account, you can choose the best windows for your climate, and even tailor windows for specific rooms in your house.

U-Value
What it is: U-value measures a glazing system's insulating ability. The lower the U-value (expressed as a number between 0 and 1), the better the insulation.
What to look for: Regardless of whether you live in a heating or a cooling climate, go for windows with the lowest U value you can afford. Single-pane windows have a U-value of around .90, while the most sophisticated Heat Mirror glazing systems have values as low as .11.

Visible Light
What it is: Visible light transmittance (VT) measures the amount of light that passes through a window. Clear glass has a VT rating of .90, meaning that it admits 90 percent of visible light. Add multiple panes and low-E coatings and that number starts to go down.
What to look for: To maintain good light transmittance and visibility, choose glass with a VT of .6 or above, which will appear clear to the naked eye. Lower VTs indicate tinted windows, which can cut down on solar heat gain but will also reduce visibility, especially at night.

Solar Heat
What it is: The solar heat gain coefficient (SHGC) measures the amount of the sun's heat that passes through a glazing system.
What to look for: Lower numbers are best in warm climates where cooling costs dominate, while higher numbers mean more of the sun's heat will radiate indoors. For low solar heat gain, look for numbers in the .40 range; for high heat gain, look for .70 and above.

REPLACEMENT SASH: When to consider this alternative to new windows

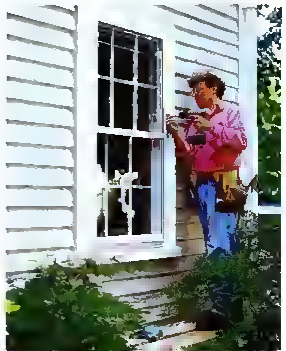
You've seen the ads in the local paper or gotten a flier in your mailbox: "Affordable replacement windows cut drafts and heating bills for a fraction of the cost of new windows!" Designed to fit into existing window openings, "replacement" windows are double-hung sash units inside thin frames. They're a way for owners of older homes to get the benefit of today's energy-efficient windows without ripping out existing trim and siding. The contractor pulls out the old sash and balance ropes, then fits the new frame into the opening. (The glass area will be somewhat smaller, to accommodate the replacement frame.)

Replacements are a good idea—as long as the new windows are well made and the old ones really need replacing. The first step is having a reputable contractor make that determination. Good contractors don't show up at your door unsolicited, bearing brochures for new windows.

Tom Silva says too many old windows get replaced for the wrong reasons. Broken balance ropes can be fixed, which takes care of one common annoyance—falling sash. And leaky frames can be weatherstripped and protected with storm windows. "For a lot less money than buying replacements, you can get them in good condition," he says.

So when is it time to replace? "When the window itself is failing," says Tom. "If the sash is coming apart and all the glazing is falling out, it's going to cost a lot of money to fix." Lead paint is another reason to consider replacing old windows. Old jambs and sash can shed tiny particles of lead every time the window is operated.

Sometimes it makes sense to go beyond replacing the sash and put in a whole new window frame. If the sill is rotting, or if you suspect water leaks, pulling out the entire frame will allow you to correct any problems.



Rather than replace his old, leak-prone windows, TOH host Steve Thomas installs storm windows to improve their efficiency.

PHOTO: PASCAL BLANCHARD ILLUSTRATION: IAN WORPOLE

WHERE TO FIND IT – SEE DIRECTORY – PAGE 87

Norm's Notebook

TRIMMING A DOOR

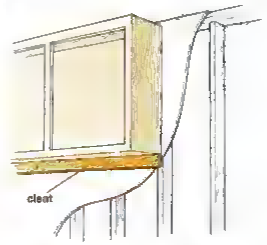
It's common on most major remodeling projects to replace at least some of the flooring. That's certainly been true for every *This Old House* project we've done in the last 23 years. Sometimes it's carpeting going over hardwood, sometimes it's ceramic tile replacing sheet vinyl. Whatever the case, if the height of a floor increases, then the bottoms of the existing doors have to be trimmed accordingly. But a circular saw can splinter the wood badly, especially on veneered hollow-core doors. Here's what I do to prevent that from happening.

First, I set the door on padded sawhorses, with the side I'll see the most facing down. Then I score the cutline with a sharp utility knife guided by a straightedge. Scoring severs the fibers on the surface of the wood and stops any splinters from being lifted off the face of the door by the saw blade. To make sure the cut will be straight, I clamp a straightedge to the door to guide the saw. Also, I make sure the blade cuts on the waste side of the cutline. That way, the score can do its job.

Easy Cabinet Support

When you're hanging upper kitchen cabinets, there's no need to call a husky neighbor to help you lift and hold them in place while you screw them to the wall. A far better solution is to hold the cabinets up with a temporary cleat. Unlike your neighbor's shoulders, cleats don't move or get tired, so your cabinets end up exactly where you want them.

First, mark a level line on the wall exactly where the bottoms of the upper cabinets will go. Then position a ¾-by-3-inch plywood cleat so its top edge is even with the line, and fasten it to the studs using 2½ inch-long No. 8 screws. Once the cleat is secure, rest the cabinet's back edge on it and tip the cabinet into place. You can easily hold it against the wall with one hand while driving screws with the other. After you secure the cabinets themselves to the studs, remove the cleat. If your backsplash won't cover the screw holes, just fill them with spackle.



Tape Hangups

Tape is so commonly used these days it's hard to imagine how we ever managed without it. The versatility of duct tape is legendary, but all sorts of other tapes are useful, too—electrical tape, masking tape, air barrier tape, even caution tape.

Whatever is in your collection, if you store them in a drawer it's a sure bet that you'll never find the one you want and that the sticky edges will have collected dirt. My solution is to hang tape rolls on ½-inch wood dowels fastened to the side of a cabinet on my workbench. And before I return a roll to its dowel, I always turn down one corner—then I can quickly find the starting point when I need tape in a hurry.

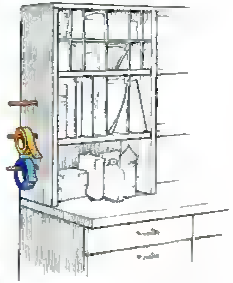
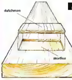


PHOTO: KELLER & KELLER; ILLUSTRATIONS: HEATHER LAMBERT

Patching Damaged Wood

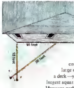


There are times when a flaw in a piece of wood is too big to be filled with wood putty, but the wood itself is otherwise perfectly sound and doesn't need replacing. It might be a floorboard with a divot, or a beautiful old door casing with hinge mortises cut in the wrong place for the way you want the door to swing. When that happens, I use a dutchman, a patch of similar wood made to conceal the damage.

The idea is to cut around the flaw in a shape that's easy to fill with the patch. Simple shapes—rectangles or diamonds—work well, and they're easy to make. For a tight fit and a nearly invisible joint, the trick is to cut the patch first, then use it as a template to mark the area being removed. For extra precision, I trace around the patch with a utility knife. Then I use a router or chisel to cut out a shallow, flat-bottomed mortise within the layout lines. There's no point going more than about ⅛ inch deep—the patch won't be any better for it.

The patch itself should be solid wood that, ideally, matches the surrounding wood in species and grain. I make it a little thicker than the depth of the mortise so that after I glue it into place I can use a block plane or sander to make it flush. I'll also bevel the edges of the patch slightly to guarantee a snug fit against the edges of the mortise. Making a dutchman is fussy work, but if the damaged wood is worth keeping, it's worth the fuss.

Finding Square With a Triangle



Move both tapes until their 12- and 20-foot marks intercept

If someone asked me to sum up the basics of good building in a few words, I'd say: Make your work plumb, level, and square. There are lots of tools that help you do this. But when it comes to checking for square on a large scale—like laying out piers for a deck—you'll soon discover that even the largest square you own is much too small. However, with the help of some simple geometry, you can mark out a giant triangle that will do the same job with great accuracy.

Remember the Pythagorean theorem from school? That's the one that says you have a right triangle if the square of one leg plus the square of the other equals the square of the triangle's hypotenuse ($a^2 + b^2 = c^2$). As it turns out, the numbers 3, 4, and 5 fit perfectly into this equation (if c = 5).

You can make use of the easy-to-remember 3-4-5 relationship to create right triangles as big as you need simply by measuring out distances in multiples of 3, 4, and 5. Here's an example for finding the location of deck piers. Stretch a tape measure 12 feet (3 x 4) straight out from the corner of the foundation. Leave it in place. Then go back to the corner and measure along the foundation 16 feet (4 x 4) with a second tape. From the 16-foot point, stretch the tape 20 feet (5 x 4) to create the hypotenuse of a triangle. Slide the crossed tapes from right to left until the 12- and the 20-foot marks intersect. You now have a perfect right triangle. A corner pier located exactly at that intersection point will be perfectly square (90 degrees) to the face of the foundation.

Measure for Measure

A tape measure is the one indispensable tool for any contractor. My favorite happens to be a 20-footer, but some carpenters go for 16, 25, or even 30 feet.

One thing most tapes have in common is a series of highlighted numbers and symbols on the blade. They indicate the on-center spacing for studs, rafters, and joists. On my tape, a thick black arrow appears every 12 inches, and a red rectangle with two narrow black arrows occurs every 16 inches. I use these all the time for joists and studs. A third symbol occurs every 19.2 inches (about 19³⁄₁₆ inches). That's an intermediate spacing for joists and roof trusses when 16 inches is too close and 24 inches is too far apart.

By the way, these increments aren't random. Each one divides evenly into 8, the standard length (in feet) of most building panels, including plywood, OSB, and drywall. When you space joists at 12, 16, or 19.2 inches, the ends of each subfloor panel will meet on a solid framing member.

ILLUSTRATIONS: HEATHER LAMBERT

Poised above Bear Run, Fallingwater's cantilevered terraces stretch out improbably into thin air, but serious shortcomings during the construction 65 years ago left the gravity-defying design on the brink of collapse. That danger is now past, thanks to a recently completed restoration.

PHOTO: ROBERT P. HARBISON

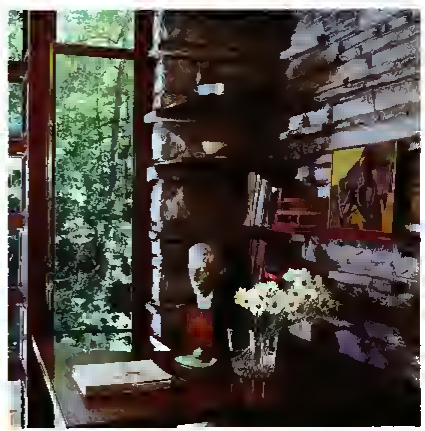
saving FALLING WATER

How a high-tech fix kept Frank Lloyd Wright's masterpiece from tumbling down

by Brad Lemley

Fallingwater, Frank Lloyd Wright's masterpiece, has been featured on a U.S. postage stamp, on the cover of *Time* magazine, and in perhaps a shelfful of coffee table books. Since the house was opened to the public in 1964, some 3.5 million visitors have made the pilgrimage to its sylvan location off Route 381 in the hills of western Pennsylvania. Wright's stunning creation—the

From multipurpose **great rooms** to window walls to the foam rubber that cushions its custom-built furniture, there's a bit of **Fallingwater** in virtually every **American home** built since.



ABOVE: *Surrounded on three sides by steel windows, Fallingwater's living room offers sweeping views of the neighboring woods.* **TOP RIGHT:** *The bumps of stone in front of the fireplace are part of the pinnacle on which much of Fallingwater rests. A round red kettle for mulled wine swings into the fireplace so its contents can be warmed.* **RIGHT:** *On the second floor, Edgar Kaufmann Sr.'s desk is wedged beside the sandstone-ledge walls that are a Fallingwater signature. The desk's quarter-circle cutout accommodates the in-swinging, floor-to-ceiling casement window.*

PHOTO: CHRISTOPHER LITTLE COURTESY OF WESTPHN PENNSYLVANIA CONSERVANCY

PHOTOS: ROBERT P. RUSCHAK

living room with its mound of native sandstone swelling up through the floor, the ribbons of red-rimmed steel windows, and, above all, those daring cantilevered planes hovering over the falls of Bear Run—has enchanted architectural critics and the general public since its completion 64 years ago.

Too bad it wasn't built properly. While millions of people have a nodding acquaintance with Fallingwater, relatively few of them know the latest, most dramatic chapter in its history. Only an ingenious repair, completed last spring, removed the growing risk that a large chunk of the house might tumble into the creek below.

The problem had been brewing since the beginning. The concrete beams that support the hung-in-space living room, its two adjoining terraces, and the master bedroom terrace above were too weak for the load they needed to carry. The beams sagged from the moment their supports were removed during construction and continued to droop a little more each year, until by 1994 they were an alarming 4 to 7 inches out of level. It took five years of assessment and planning, four months of actual work, and $1.5 million to stabilize the structure (see "Stopping the Sag," page 55), but now, at last, Fallingwater is secure in its airy perch.

WHEN WRIGHT WROTE IN 1955 THAT "FALLINGWATER is a great blessing—one of the great blessings to be experienced here on earth," it wasn't just more hyperbole from the legendary self promoter. "The house has a real presence in the American psyche," says Richard Cleary, an architectural historian and Wright scholar at the University of Texas at Austin. "That view of it over the waterfall is a sort of perfect American fantasy. It showed we could have both technology and the natural world, and make them work beautifully together."

A tour of the house reveals Wright's brilliant integration of building and site, so seamless and confident that the dicey engineering seems somehow forgivable. The structure's three levels echo the rock ledges over which the falls flow, as does the rough stonework inside and out. The flagstone floors, always waxed to a high gloss, evoke the wet river rocks. Even the low ceilings—in some places just 6 feet 4 inches high—direct attention outward, to the maples and rhododendrons clinging to the steep hillsides. Good ideas have flowed out of this house and into the American building vocabulary for decades. From multipurpose great rooms to window walls to the foam rubber (a novelty in the 1930s) that cushions its custom-built furniture, there's a bit of Fallingwater in virtually every American home built since.

Yet in 1934, when the project started, Wright was an unlikely choice of architect. At the time Edgar J. Kaufmann, a wealthy Pittsburgh department store owner, and his wife, Liliane, decided to build a weekend house, the Depression had trimmed the ranks of clients who could afford Wright's radical, expensive designs. In fact, many believed the 67 year old was in the twilight of his career. It was the Kaufmanns' son, Edgar junior, then working as an apprentice at Taliesin, Wright's Wisconsin studio, who persuaded his parents that they needed the master's bold, mature aesthetic.

In December 1934, Wright traveled to the stream-side site the Kaufmanns had selected and was instantly charmed. "The visit to the waterfall in the woods stays with me, and a domicile has taken vague shape in my mind to the music of the stream," he wrote to them a few weeks later.

But it wasn't until late summer 1935 that Wright, prompted by his client's imminent arrival at his studio, finally put his vision on paper. Those first sketches, created in a matter of hours, depicted Fallingwater almost exactly as it would be built. While Kaufmann had expected the house to be situated below and to the side of the creek, Wright perched it on the boulders above the falls, leaning out nearly 15 feet over the rushing water. The illusion was perfect. The stream would appear to have eroded Fallingwater's

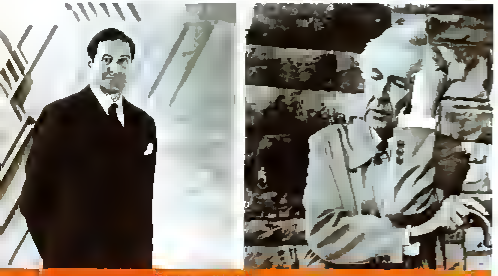
foundation over centuries, lending the house the instant gravitas of a geologically ancient outcrop

WHILE THE IDEA FOR FALLINGWATER WAS INSPIRED, THE execution was fraught with difficulties. The remote site proved inaccessible to concrete trucks, forcing workers to make thousands of small batches by hand, with shovels and drum mixers. A quarry was opened on-site to extract native sandstone for the masonry walls. Skilled labor was scarce, as the just-formed Works Progress Administration siphoned off the region's best stonemasons for government jobs.

But the biggest problem was the 15-foot cantilevers. Made of concrete, the beams projecting over the creek needed additional reinforcement just to support their own weight, not to mention the loads pressing down on them from above. Wright ordered a slab poured under the beams to stiffen them from below and steel reinforcing rods (rebar) embedded primarily along the tops of the beams to prevent them from cracking.

Suspicions soon arose at the building site that Wright's engineer, Mendel Glickman, had badly bungled a crucial aspect of the design. The plans called for just eight 1-inch thick steel rods within each of the four main concrete cantilever beams. Metzger-Richardson, the Pittsburgh engineering firm that supplied the steel, urged Kaufmann and the general contractor, Walter J. Hall, to double that number to 16. Hall complied, with Kaufmann's approval, a move that infuriated Wright, who thought that the extra steel would only add to the load on the beams. He wrote to Kaufmann: "I have put so much more into this house than you or any client has a right to expect that if I haven't your confidence—to hell with the whole thing." Kaufmann smoothed Wright's ruffled feathers, but the rods remained. A good thing, too. "Without that extra steel, the cantilever definitely would have failed," says Robert Silman, president of Robert Silman Associates, the structural engineering firm that devised the means to stabilize the cantilevers and save the building from collapse. (For details of the repair, see opposite page.)

Even with the added reinforcement, the living room dipped nearly 2 inches when workers pulled away the cantilever's temporary timber supports in 1936. Ominous cracks quickly opened in the



Client Edgar Kaufmann Sr., left, and the architect, right, wrangled over nearly every detail during the three years it took to complete the construction of Fallingwater. But in the end, nothing could alter the indelible stamp of Frank Lloyd Wright's masterful hand.

Stopping the Sag

Cables stabilize Fallingwater's famous—and famously drooping—cantilevers

For more than 60 years, four massive concrete cantilever beams projecting 19 feet into thin air held up Fallingwater's cantilevered terraces and living room. But the unrelenting loads were so great that, over time, the cantilevers deflected, cracking the beams and causing the steel reinforcing bars embedded in the concrete to stretch. Structural engineers Robert Silman Associates examined the building in 1994 and concluded that unless action was taken, the rebar would continue stretching, to the point where the cantilevers might collapse.

Silman's solution was "post-tensioning," a technique that has been used to shore up sagging concrete bridges. In essence, the process involves securing a length of steel cable to both ends of a section of concrete, then pulling the cable taut. The cable acts like a giant clamp, compressing the concrete so it resists further bending.

Prepping the floor

Before repairs even began, temporary steel bracing was placed in the streambed to support the ends of the beams. Then, in November 2001, workers carefully numbered and removed each of the 600 waxed flagstones on the living room floor and pulled up the redwood subfloor, revealing the underlying grid-work of concrete beams and joists.

Next, the post-tensioning contractor, VSL, threaded a bundle of thirteen ½-inch steel cables alongside each drooping cantilever beam. One end of each bundle was secured in a concrete anchor block attached to both the beam and the house's foundation pier (see illustrations, opposite). At the other, unsupported end of the beam, the cables passed through another anchor block and exited through the terrace wall. Near the middle, the cables passed over a concrete deviator block, anchored to the beam above the outermost end of the pier. In theory at least, pulling on the exposed ends of the cables with sufficient force would raise the beam end, transfer its stresses back to the foundation.

Things get tense

Over a three-day period last March, the VSL crew gingerly put theory into practice. Standing on scaffolding set above the creek, they attached powerful hydraulic jacks to the exposed cable ends and slowly pulled (photo, far right). "It was hard to say who was under more stress: the beams, the contractor, or the engineers," says Silman associate John Matteo, who supervised the operation. But the old concrete held, and the beam ends rose slightly, just as planned. Each of the new ultrataut cable strands was then fixed to a metal cone and grouted into the anchor blocks on the beam ends. VSL used this same technique to stabilize some of the concrete joists, running perpendicular to the beams, that support the living room terraces.

The post-tensioning did not raise the cantilevers back up to level, nor was that Silman's aim. "We brought them up only about ¾ inch," he says. Raising them any higher would have opened new cracks in the long-settled structure. Besides, Silman says, "that sag is part of the story of the building."

PHOTOS COURTESY WESTERN PENNSYLVANIA CONSERVANCY (LEFT); ELLIOT KAUFMAN/TIMEPIX (RIGHT)

How They Did It

Beneath the living room floor at Fallingwater, as shown in the illustrations above and at right, a network of steel cables was installed to stabilize the sagging cantilever beams and joists. The cross section shows how a cable is run alongside the central beam, anchored at each end and positioned over a deviator block in the middle. When tension was applied with a hydraulic jack (photo, bottom right), the cable tightened, lifting the end of the cantilever beam. The photo below shows the work in progress.

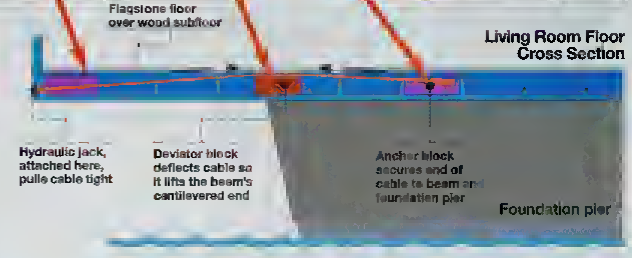


PHOTO: THOMAS A. HEINZ COURTESY OF WESTERN PENNSYLVANIA CONSERVANCY (TOP); ROBERT P. HUNCHACK (BOTTOM LEFT); ROBERT HUMAN ASSOCIATES (BOTTOM RIGHT); ILLUSTRATIONS, IAN WORPOLE

With the living room's polished flagstone floor removed, the thick, black-sheathed tensioning cables could be positioned along the sides of the cantilever beams. The cable passes through the forms for an anchor block **(LOWER LEFT)** *and a deviator block, soon to be filled with concrete.*

A hydraulic jack, attached where the tensioning cables exited the building, gradually tightened the cables until they exerted a static pull of 195 tons on each side of the beam, lifting it about ¾ inch. Then the cable ends were embedded in the anchor blocks and trimmed, and the holes were patched.

“Fallingwater is a **great blessing**—one of the great blessings to be experienced here on earth ”
—Frank Lloyd Wright

parapet walls of the master bedroom terrace directly above After feverish analysis, Metzger-Richardson argued for permanent steel bracing to be placed in the streambed below. Wright stubbornly defended his original vision “I have assured you, time and again, that the structure is sound,” he wrote to Kaufmann in January 1937

In the end, Kaufmann sided with the architect The first floor remained brace-free, and construction moved ahead even as costs spiraled The original budget of $40,000 had seemed generous in a time when a four-bedroom brick home could be built for about $4,000

ABOVE [illegible] **BELOW** [illegible] cleverly mimics the [illegible] tops

But the difficult site, endless wrangling between a determined Wright and an equally willful Kaufmann, and the dearth of skilled labor pushed the final cost to $155,000, equivalent to nearly $2 million today

Fortunately, the Kaufmanns could afford it And they adored the finished house, which quickly became a magnet for the elite of the time But the ever-drooping terraces and widening cracks worried Edgar senior until his death in 1955. Edgar junior deeded the house to the Western Pennsylvania Conservancy in 1963, and by 1994 its directors had grown concerned enough about the house’s problems to hire Silman’s engineers to get a clearer picture. Using impulse radar, ultrasound, and high resolution magnetic detection, they were able to gauge the condition of the cantilever beams The findings were sobering. “Stresses were at critical levels The steel in the concrete beams was still stretching,” Silman says “The building was at the point of incipient failure.”

HOW GLICKMAN COULD HAVE MADE SUCH A MISTAKE puzzles Silman “Mendel Glickman was a first-rate engineer,” he says, “and this was a calculation any first-year structural engineering student could do ” Silman theorizes that Glickman and Wright underestimated the load of the master bedroom terrace on the cantilever below During construction, four fat steel mullions were inserted between the windows in the living room to help hold up the terrace, but these vertical supports also transferred the terrace’s massive 50-ton load to the outer ends of the cantilever beams, leaving them dangerously overstressed

Today, assigning blame is tricky The house’s challenging design, combined with slow prewar communications (plans and instructions usually traveled from Wright’s Wisconsin studio to the job site via overland mail), made mistakes almost inevitable “Wright was definitely pushing the envelope with this building, so it’s hard to know exactly what happened,” concludes Fallingwater museum programs assistant Clinton Piper.

The fact is many of Wright’s creations simply outran the technology available at the time (Another example can be seen in the reconstruction of his dramatic but chronically leaky roof at Wingspread, near Racine, Wisconsin See the Web link below.) While few doubt the genius of Wright’s designs, it is perhaps a blessing that many of his most ambitious concepts, including whole cities and a mile-high office tower, were never built

Stabilizing the cantilevers wasn’t the end of the work needed at Fallingwater. Leaking roofs had to be peeled back and waterproofed, parapet walls reinforced, and every steel window frame stripped and repainted Repairs and upgrades to the house and property, including building an on-site sewage treatment plant and extensive landscaping, totaled $11 5 million, funded through private, corporate, and government donations Still, no one involved in the restoration effort holds any grudge against Wright “It’s a very complex house, and to repair it in a respectful way has been challenging,” says Lynda Waggoner, director of Fallingwater “Now, it looks as good as it did 64 years ago ” ■

To read about the restoration of another Wright house
Go to www.thisoldhouse.com (America Online keyword: This Old House) and type “wingspread” in the search box

PHOTOS: ROBERT P. RUSCHAK

WHERE TO FIND IT • SEE DIRECTORY • PAGE 87

A lesson in bathroom lighting

A designer explains the basics

by Susan Arnold

When it comes to interior lighting, bathrooms are probably given the least consideration of all the rooms in the house. The average client I meet doesn't think to invest there—save it for the living room or kitchen, they say. I see a lot of baths with inadequate lighting at the mirror. Often there's just a single ceiling fixture that's supposed to do it all.

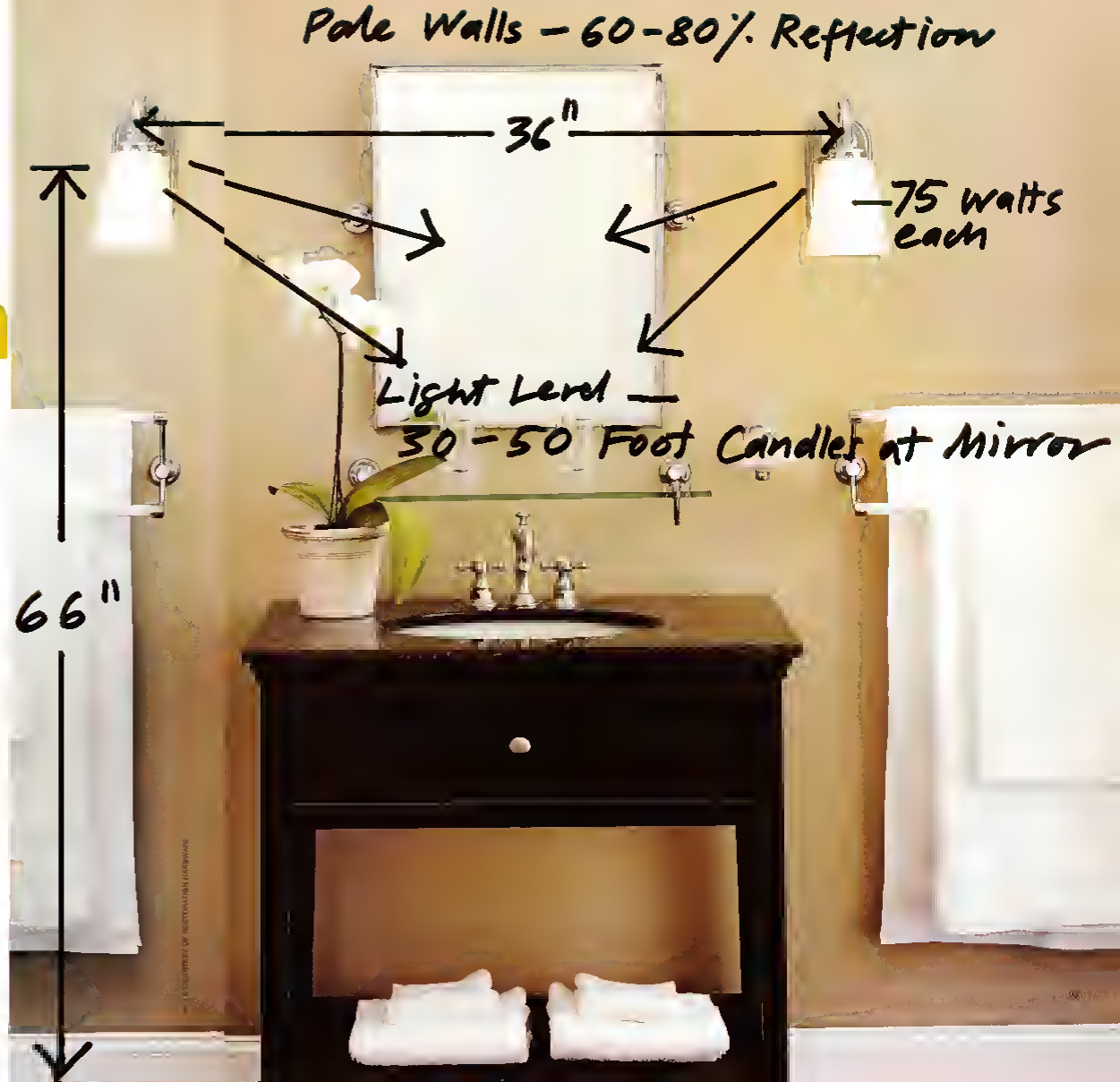
But as the bathroom increasingly becomes a place to relax and recharge, complete with steam shower and spa tub, the lighting requires extra thought. And when it's done right, the payoff is great. After all, this is the room where you start and end your day.

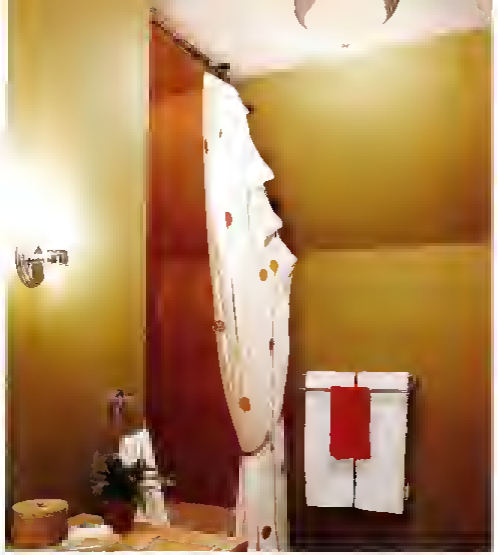
A good lighting plan is a series of layers—placing ample light where it is needed for showers, shaving, or putting on makeup, for instance, while other light sources enhance the overall mood of the room.

DECODING THE LAYERS OF LIGHT

Task Lighting Vanity lighting gets top consideration because these fixtures work the hardest to illuminate the head and face for grooming. The most common mistake people make is putting recessed ceiling fixtures directly over the mirror. These cast shadows on the face, making daily grooming rituals more difficult.

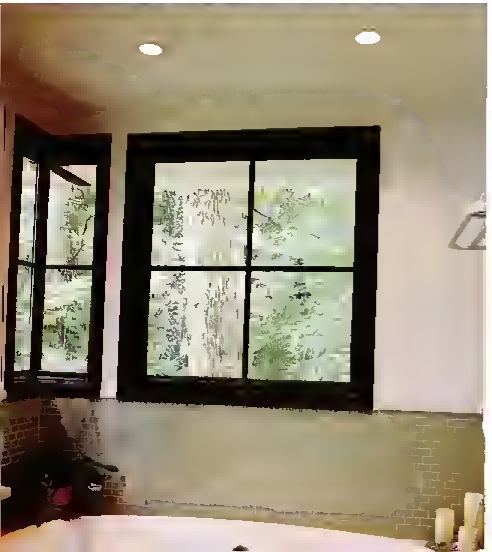
Vertical fixtures or sconces mounted on either side of the mirror are best for casting an even light across the face. (For correct placement, see "Lighting the Vanity Right," page 95.)





ABOVE: A pair of elongated sconces provides evenly diffused light at the vanity mirror. In the shower stall, a recessed ceiling fixture, rated for wet-location installation, provides task lighting. BELOW: Once the sun goes down, two unobtrusive recessed ceiling lights illuminate the tub area in this master bath.

ABOVE: A ceiling-mounted fixture provides ambient light. BELOW: In this children's bath, the vanity lights are installed at standard height; the wall-hung mirror can be raised as the kids grow. Set on a separate switch, rope lighting hidden along the vanity's bottom edge functions as a night-light.



OPPOSITE PAGE, PHOTOS: BARBARA WHITAKER—STYLING: BRIAN CARTER
THIS PAGE, ILLUSTRATION: IAN WORPOLE

But given the size and positioning of some vanity mirrors, sidelights can be impractical (mounting them directly to the mirror is always an option, but at greater planning and cost). Only then do I suggest a fixture for over the mirror. It should be placed 75 to 80 inches above the floor and, like all vanity lighting, contain at least 150 watts—ideally spread over a fixture that's at least 24 inches long so that the light will wash evenly over the hair and face.

The shower is a secondary area of task lighting. In smaller bathrooms, if the stall has a clear glass door, a dedicated fixture may not be necessary. Otherwise, I recommend a recessed light with a glass lens (plastic will yellow). Similar recessed fixtures work well over a freestanding tub or the toilet.

Ambient Lighting This "fill-in" light serves as a substitute for natural light. It is most often supplied by a central fixture, usually a surface-mounted ceiling light. I encourage clients to think more creatively in their choices, suggesting they consider a pendant lamp or chandelier instead. Another option is "cove lighting"—rope lights hidden behind a molding dropped several inches below ceiling height—which adds a soft glow around the perimeter of the room.

Accent Lighting A small recessed spotlight directed at a piece of decorative art or a beautiful powder room basin creates another layer of light in the bathroom. Similarly, a recessed shower fixture can be angled (most can be tilted up to 35 degrees at installation) to highlight nice tilework or fixtures and make them sparkle.

OTHER CONSIDERATIONS

Choosing Bulbs A crisp white light tends to render skin tones most accurately. Halogen bulbs set the gold standard. Low-voltage varieties (with a built-in transformer that converts 120 volts to 12 volts) are especially compact, and the smaller bulb gives a nice sparkling effect. Halogen bulbs cost a few dollars more than standard incandescents but can last three times as long. Many fixture screw-in bases, those labeled medium-base (MB) are shaped like standard incandescents, so they fit most fixtures. The newest compact fluorescent bulbs also offer good color rendering and are up to 10 times more efficient than regular incandescent bulbs.

Think Dimmers These are a lighting designer's best friend because they grant absolute control over the lighting, and thus the mood, of the room. In a very small space like a powder room, dimming the vanity fixtures might even provide all-in-one task, ambient, and accent lighting. Plus, dimmers conserve energy. The total savings depends on how much you dim the bulb, but one dimmed just 10 percent will last twice as long as a bulb at full brightness.

Today's dimmers work for every kind of light source, though you need to know what to ask for. A 120-volt incandescent or halogen light source will need an incandescent dimmer, while low voltage and fluorescent fixtures require their own compatible dimmers. Occasionally, dimmed bulbs will buzz as the filament vibrates. Switching to a lower watt bulb (which has a smaller filament) should reduce or even eliminate the noise.

Safety First Attention to aesthetics in the bathroom doesn't diminish the importance of safety. Electricity and water are still lethal companions, and nowhere do they mingle more closely than in the bathroom. Always consult a certified electrician before tackling even the simplest lighting project.

The National Electric Code requires all new outlets to have GFCIs, ground fault circuit interrupters; the newer ones can be retrofitted to existing outlets. Even with a GFCI, freestanding plug-in lamps should never be placed near a sink or tub.

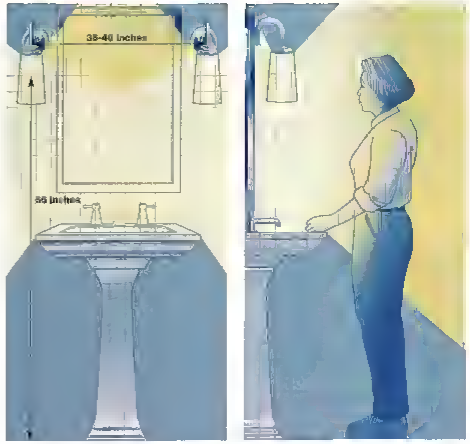
Fixtures that are going to be within a certain distance of the tub or shower (usually 6 feet, though local codes vary) must be "wet" or "shower-location" rated. Don't confuse this with the less rigorous "damp-location" rating that's ascribed to most outdoor lighting.

Designing a new bath or updating an old one?
Go to **www.thisoldhouse.com** (America Online keyword: This Old House) and click on Bath for ideas, advice, and tips.

Susan Arnold is a lighting designer with Wolfers Lighting, in Woburn, Massachusetts (www.wolfers-lighting.com), and has been a consultant on many This Old House *TV projects.*

Lighting the Vanity Right

To eliminate shadows under the chin, eyes, and cheeks, fixtures should be mounted on either side of the vanity mirror (or on the mirror's surface, if it's large), 36 to 40 inches apart. The center of each fixture should be roughly at eye level, or about 66 inches above the floor. This will guarantee even illumination across the face for grooming.



LEFT: This reproduction art deco pendant light, in satin nickel, is a jazzy alternative to ho-hum surface-mounted ceiling fixtures. By Rejuvenation, $105.

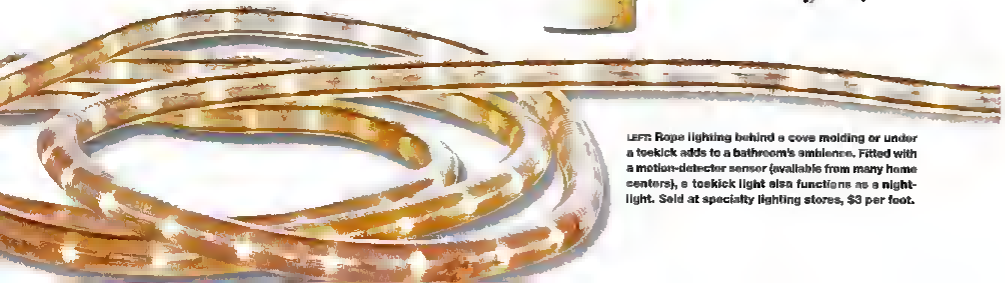
BELOW LEFT: Two lights in one, this fixture's top half functions as the main light source for grooming, while the bottom is switched separately so it can work alone as a night-light. The "Synchro," available in matte or polished chrome or polished brass, by Ginger, $225.

BELOW: The sleek, etched-glass lens on this halogen wall sconce stands 12 inches tall, providing even light diffusion. The "Snowshoe," in satin nickel, by Forecast, $155.

ABOVE: These vanity lights—a pair of recessed fluorescent tubes—are built right in to the 2-foot-square mirror. At Design Within Reach, $345.

a fresh look at fixtures

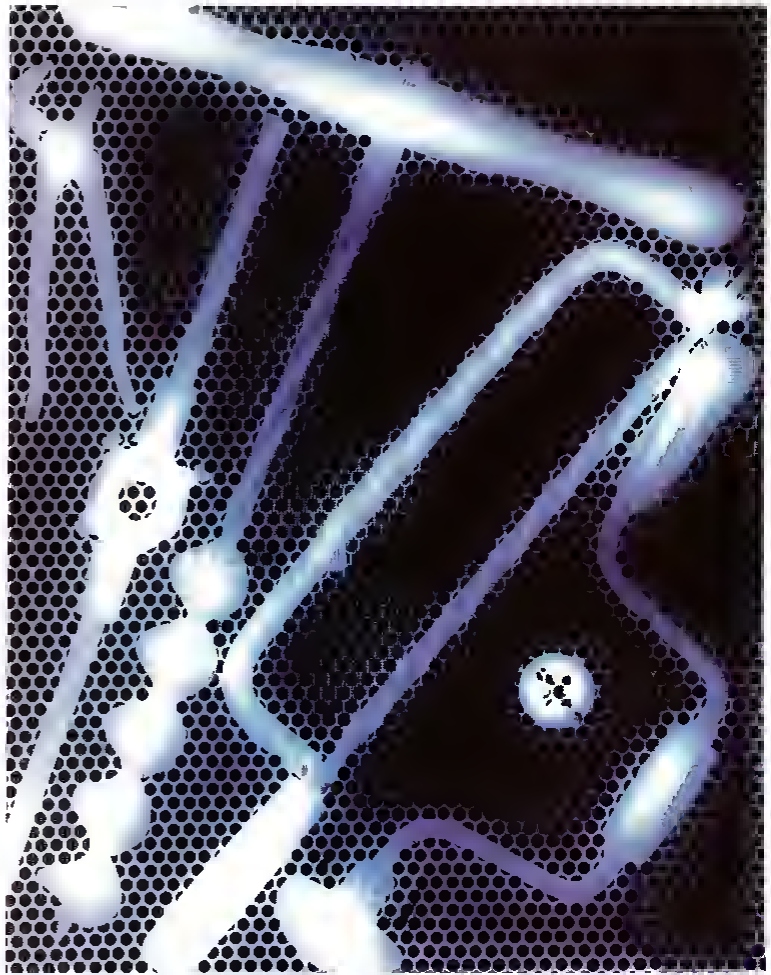
Don't just settle for standard-issue stuff. As attention to bathroom lighting increases, there is an ever-widening range of fixtures to choose from. Here are five that will light any bathroom in style. —*Dan DiClerico*



LEFT: Rope lighting behind a cove molding or under a toekick adds to a bathroom's ambience. Fitted with a motion-detector sensor (available from many home centers), a toekick light also functions as a night-light. Sold at specialty lighting stores, $3 per foot.

DIRECTORY

WHERE TO FIND IT, PAGE 98 • PROGRAM SCHEDULE, PAGE 100 • TV CLASSICS, PAGE 103



PHOTOGRAPH BY GWENN THOMAS

ON TNE JOB
pp. 18–21

Before & After—General contractor: Robert's Remodeling and Construction Co , Inc., Cuyahoga Falls, OH, 330-923-1940, www robertsremodel com
TOH Technique—Foam sealant: Great Stuff, Dow Chemical Company, Marietta, GA, 888 668 3801; www dow com
Did you know?—Duck Tape: Henkel Consumer Adhesives, Avon, OH, 800-321-1733, www henkelca com
Retro tools—Cordless drill: #RD144OK, Black and Decker, 800 544 6986, www BlackandDecker com Finishing sander: #505H, Porter Cable, 800 487 8665; www porter-cable com

HOUSE CALLS WITN STEVE
pp. 24–26

Kitchen designer: Alicia Denton, Seiber Design Inc , Atlanta, GA, 404-875-6765; www.seiberdesign com
General contractor: James Lane, South Peak Contractors, Atlanta, GA, 404-622 6533 Cabinets and island: Kitchens International, Carrolton, GA, 770 832 1343 Range: Viking, Green wood, MS, 888-845 4641; www vikingrange com Refrigerator. KitchenAid, St. Joseph, MI, 800-422 1230, www kirchenaid com Dishwasher drawers: Fisher & Paykel, Irvine, CA, 800 863-5394, www fisher-paykel com Sink: Elkay, Oak Brook, IL, 630-572-3192, www elkay com Dish sprayer faucet: Kohler, Kohler, WI, 800-456-4537, www kohler com Pot filler faucet: Chicago Faucets, Des Plames, IL, 847-803-5000, www chicagofaucets com Concrete countertops: Dex Studios, Atlanta, GA, 404 753 0600, www dexstudios com Slate brick. Renaissance Tile & Bath, Atlanta, GA; 404 231 9203

ASK *THIS OLD HOUSE*
pp. 28–31

Cedar shingles: Cedar Shingle & Shake Bureau, Snmas, WA, 604-820-7700; www cedarbureau org

House Calls, p. 24. A three-bowl sink and pot-washer faucet help upgrade a kitchen.

TALKING SHOP: CNOOSING & USING SQUARES
pp. 32–35

Sliding T-bevel: 7½ inch Rosewood Sqnare #24N03.02 by Garrett Wade Co , Inc , New York, NY, 800-221-2942, www garrettwade com Speed square: Swanson Tool Co , Inc , Frankfort, IL, 815-469 9453, www swansontoolco com Drywall square: Craftsman #39572 by Sears, Roebuck & Co., Hoffman Estates, IL, 800 549-4505, www sears com/craftsman Try square: 8 inch Solid Hardwood Try Square #46-209, Stanley Handtools, New Britain, CT, 800 262 2161, www stanleytools com Combination square: Craftsman 16 inch Combination Square #39681 Framing square. Swanson Tool Co

Luxuries, p. 38. Warm and decorative, antique Swedish stoves are in demand.

LUXURIES: SWEOISN BEAUTIES
pp. 38–41

Opener—Swedish stove: Antique dealer, Ove Wiklnnd, Stockholm, Sweden, (011) +468 7478930, +468 6423366
Our thanks to Nick Hills, The Ceramic Stove Company, Oxford, England, (011) +44 (0)1865 245077, www ceramicsfove com.

UPKEEP: STAYING ON TRACK
pp. 42–45

Garage door sales and installation: Bernie Udell, Middlesex Overhead Doors, Burlington, MA, 781-270-5066
Our thanks to Don Van Buren, Consolidated Overhead Door & Gare, Santa Barbara, CA, 805 965 0533, www consolidatedoverheaddoor com

NOME TECHNOLOGY: TVs WHERE YOU WANT TNEM
pp. 46–48

Installer: Buddy Davis, Davis Antenna Inc., Waldorf, MD, 301-843-1166.
Multi-TV routers—
4-way multiswitch: Jayco Ventures, Inc , Fort Lauderdale, FL, 800-841-7970; www jviparts com
Splitter (CATV) & diplexer. Channel Master, Smithfield, NC, 919-934-9711, www channelmaster com
Our thanks to Cory Larsen, Jayco Ventures, Inc

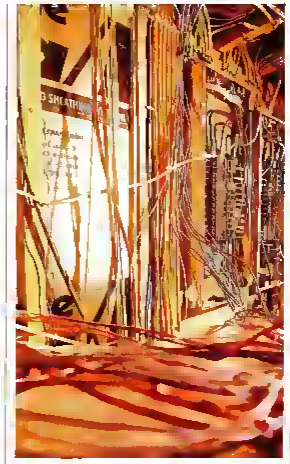
NOMEOWNER'S HANOBOOK: FINISHING ORYWALL
pp. 51–56

Our thanks to Paul Landry, PL Drywall, Waltham, MA, 781-899-6524
Drywall sanders with dust collection—
Drywall sander #7800 and Power tool triggered wet/dry vacuum #7810 Porter-Cable, Jackson, TN, 888 848 5175, www porter-cable com
Turbo Drywall sander: Love-Less Ash Company, Price, UT, 800 568 3949, www lovelessash com
Vacuum drywall pole sander and vacuum drywall hand sander: FibaTape Products, Saint Gobain Technical Fabrics, Niagara Falls, NY, 800 762-6694, www fibatape com.

PHOTOS: EMILY FOLLOWILL (TOP); AMERICAN SWEDISH INSTITUTE (BOTTOM)

WINCHESTER TV PROJECT: NERE COME THE SUBS
pp. 60–64

Plaster contractor: Stephen Norton, Stephen's Plastering, Winchester, MA, 781-721-7315
Electrician: Allen Gallant, Gallant Electric, Lexington, MA, 781 862-4636
Landscape contractor: Roger Cook, K & R Tree and Landscape, Burlington, MA, 781-272-6104
Master plumber: Ronald Coldwell, Trethewey Brothers Inc , Roslindale, MA, 617-325-3283, www tbros com
Architectural sheet metal: Yankee Steeplejack Company, Canton, MA, 781-821-1003, www yankeetower com
Plasma screen TV: Plasma WEGA, Sony Style USA, Sony Electronics e-Solutions Company, LLC, 877-865 7669, www sonystyle com
Our thanks to: Kostas Reissis, Audio Visions, Woburn, MA, 877-283-4681, www audiovisions com



Winchester TV Project, p. 60. A basement tangle of wires and cables awaits expert sorting

PHOTO: KINDRA CLINEFF

TAKING A LOOK AT WINOOWS
pp. 72–75

Frames—
Wood: Marvin Windows and Doors, Warroad, MN, 800 268 7644; www marvin com Vinyl: Harvey Industries, Waltham, MA, 800-942 7839, www harveyind com Vinyl-clad: Andersen Corporation, Bayport, MN, 888 888-7020, www andersenwindows com
Aluminum-clad: Hurd Millwork Company, Medford, WI, 800-223-4873, www hurd com Fiberglass: Marvin Windows and Doors

This Old House

Where to watch current-season *This Old House* and *Ask This Old House* on PBS and *This Old House Classics*● on commercial stations (● vintage episodes, check local listings for times)

ALABAMA
DOZIER
WBIQ (Alabama Public Television), Sat. 5 p.m. (TOH); Sun. 5:30 p.m. (Ask TOH)
● WBMA
DEMOPOLIS
WIIQ, same as WBIQ Birmingham
DOZIER
WDIQ, same as WBIQ Birmingham
FLORENCE
WFIQ, same as WBIQ Birmingham
HUNTSVILLE
WHIQ, same as WBIQ Birmingham
● WHNT
LOUISVILLE
WGIQ, same as WBIQ Birmingham
SELMA
WEIQ, same as WBIQ Birmingham
● WALA
MONTGOMERY
WAIQ, same as WBIQ Birmingham
● WAKA/WTTV
MOUNT CHEAHA
WCIQ, same as WBIQ Birmingham

ALASKA
ANCHORAGE
KAKM, check local listings
KMTK, check local listings
KYUK, check local listings
● KIMO
BETHANY
KUAC, check local listings
● KATN
JUNEAU
KTOO, check local listings
● KJUD

ARIZONA
MORGAN
KAET Sat. 9 p.m. (TOH/Ask TOH); Thu. 2 p.m. (Ask TOH)
● KTVK/KASW
TUCSON
KUAT Sat. 9 p.m. (TOH/Ask TOH); Sat. 10 a.m. (TOH)
● KTTU/KMSB

ARKANSAS
AETN (Arkansas Educational TV Network)
Sat. 12:30 p.m. (Ask TOH/TOH)
ARKADELPHIA
KETG, same as AETN
FAYETTEVILLE
KAFT, same as AETN
FORT SMITH
● KPBI/KFTA
JONESBORO
KTEJ, same as AETN
LITTLE ROCK
KETS, same as AETN
● KLRT/KASN
PINE BLUFF
KEMV, same as AETN

CALIFORNIA
BAKERSFIELD
● KUVI
CHICO
● KRCR
EUREKA
KEET, check local listings
● KAEF
FRESNO
KVPT, check local listings
● KFSN
HUNTINGTON BEACH
KOCE, check local listings
LOS ANGELES
KCET Sat. 5 p.m. (TOH/Ask TOH)
● KTLA
MONTEREY/SALINAS
● KCBA/KION
PALM SPRINGS
● KPSP
REDDING
KIXE, check local listings
ROHNERT PARK
KRCB, Sat. 3:30 p.m.; Wed. 12 p.m. (TOH); Sat. 3:30 p.m., Tue. 12 p.m. (Ask TOH)
SACRAMENTO
KVIE Thu. 7 p.m., Fri. 1 p.m. (TOH/Ask TOH)
● KOVR
SAN BERNARDINO
KVCR, Thu. 8 p.m. (TOH/Ask TOH)
SAN DIEGO
KPBS, Thu. 8 p.m. (TOH/Ask TOH); Sat. 4:30 p.m. (TOH)
● KGTV
SAN FRANCISCO
KQED, Sat. 5 p.m. (TOH/Ask TOH)
● KPIX
SAN JOSE
KTEH, check local listings
SAN MATEO
KCSM, check local listings
SANTA BARBARA
● KSBY

COLORADO
BOULDER
KBDI, check local listings
COLORADO SPRINGS
● KRDO
DENVER
KRMA Sat. 4:30 p.m. (TOH/Ask TOH); Sun. 5:30 (TOH)
● KCNC
GRAND JUNCTION
KRMJ, check local listings
● KJCT
PUEBLO
KTSC, check local listings

CONNECTICUT
FAIRFIELD
WEDW, same as WEDH Hartford
HARTFORD
WEDH, Sat. 7 p.m., Thu. 11 p.m. (TOH/Ask TOH); Sun. 11 a.m. (Ask TOH)
● WTNH/WCTX
NEW HAVEN
WEDY, same as WEDH Hartford
NORWICH
WEDN, same as WEDH Hartford

FLORIDA
BONITA SPRINGS
WGCU, check local listings
DAYTONA BEACH
WCEU, check local listings
FORT MYERS
WGCU Thu. 9 p.m., Sat. 1:30 p.m. (TOH/Ask TOH)
● WZVN
GAINESVILLE
WUFT, check local listings
JACKSONVILLE
WJCT, Sat. 12 p.m. (TOH/Ask TOH)
● WJXT
MIAMI
WLRN, check local listings
WPBT Sat. 8 a.m. (TOH/Ask TOH)
● WSVN
ORLANDO
WMFE, Sat. 5 p.m. (Ask TOH); 5:30 p.m. (TOH)
● WKCF
PANAMA CITY
WFSU, check local listings
PENSACOLA
WSRE, check local listings
SARASOTA
● WWSB
TALLAHASSEE
WFSU, check local listings
TAMPA
WEDU Sat. 11 a.m. (Ask TOH); Sat. 11:30 a.m. (TOH)
● WMOR/WSCN
WEST PALM BEACH
WXEL, Thu. 8 p.m. (TOH/Ask TOH)
● WFTV

GEORGIA
ALBANY
● WSST
ATLANTA
WGTV Thu. 8 p.m. (TOH/Ask TOH); Sat. 5:30 p.m. (TOH); Sat. 2 p.m. (Ask TOH)
● WXIA
AUGUSTA
WEBA, same as WGTV Atlanta
● WBEW
CHATSWORTH
WCLP, same as WGTV Atlanta
COCHRAN
WDCO, same as WGTV Atlanta
COLUMBUS
WJSP, same as WGTV Atlanta
● WXTX
DAWSON
WACS, same as WGTV Atlanta
MACON
● WPGA
PELHAM
WABW, same as WGTV Atlanta
SAVANNAH
WVAN, same as WGTV Atlanta
● WJCL/WTGS
WAYCROSS
WXGA, same as WGTV Atlanta
WRENS
WCES, same as WGTV Atlanta

HAWAII
HONOLULU
KHET, Sat. 3:30 p.m. (TOH/Ask TOH)

IDAHO
BOISE
KAID, Sun. 4:30 p.m. (TOH/Ask TOH)
● KTRV
COEUR D'ALENE
KCDT Sun. 5:30 p.m. (TOH/Ask TOH)
IDAHO FALLS
● KPVI/KPVI
MOSCOW
KUID Sun. 5:30 p.m. (TOH/Ask TOH)
POCATELLO
KISU, Sun. 4:30 p.m. (TOH/Ask TOH)
TWIN FALLS
KIPT Sun. 4:30 p.m. (TOH/Ask TOH)

ILLINOIS
CARBONDALE
WSIU, check local listings
CHAMPAIGN/URBANA
WILL, Thu. 7 p.m., Sat. 10 p.m., Sun. 3 p.m. (TOH/Ask TOH)
CHARLESTON
WEIU, check local listings
CHICAGO
WTTW Sat. 6 p.m. (TOH/Ask TOH)
WYCC, check local listings
WYIN, check local listings
● WCIU
DECATUR
● WAND
JACKSONVILLE
WSEC, check local listings
MACOMB
WQPT, check local listings
OLNEY
WUSI, check local listings
PEORIA
WTVP, Thu. 7 p.m., Sat. 12:30 p.m. (TOH/Ask TOH)
● WAOE
QUINCY
WQEC, check local listings
WMEC, check local listings
● WGEM
ROCKFORD
● WTVO

INDIANA
BLOOMINGTON
WTIU, check local listings
EVANSVILLE
WNIN Thu. 8 p.m. (TOH/Ask TOH); Sat. 3 p.m. (Ask TOH)
● WTVW
FORT WAYNE
WFWA, check local listings
● WKJG
INDIANAPOLIS
WFYI Thu. 8 p.m. (TOH/Ask TOH); Sat. 12:30 p.m. & 5 p.m. & Sat. 5 a.m. (TOH)
WBHI, check local listings
● WALV
● WTHR
MERRILLVILLE
WYIN, check local listings
MUNCIE
WIPB, check local listings
SOUTH BEND
WNIT, check local listings
● WNDU/WHME
TERRE HAUTE
● WNDX
VINCENNES
WVUT, check local listings

IOWA
CEDAR RAPIDS
● KWWL
COUNCIL BLUFFS
KBIN, same as IPT Johnston
DAVENPORT
KQCT, check local listings
● WQAD
DES MOINES
KDIN, same as IPT Johnston
FORT DODGE
KTIN, same as IPT Johnston
IOWA CITY
KIIN, same as IPT Johnston
JOHNSTON
IPT (Iowa Public Television), Wed. 6:30 p.m., Sat. 1:30 p.m. (TOH); Sat. 2 p.m., Thu. 6:30 p.m. (Ask TOH)
MASON CITY
KYIN, same as IPT Johnston
OTTUMWA
● KYOU
RED OAK
KHIN, same as IPT Johnston
SIOUX CITY
KSIN, same as IPT Johnston
KMNE, check local listings
● KPTH
WATERLOO
KRIN, same as IPT Johnston

KANSAS
BUNKER HILL
KOOD, check local listings
DODGE
KSWK, check local listings
WICHITA
KPTS, check local listings
● KTMJ
TOPEKA
KTWU, check local listings
KSNT, check local listings
● KSAS/KSCC

KENTUCKY
ASHLAND
WKAS, check local listings
BOWLING GREEN
WKGB, check local listings
WKYU, Tue. 6:30 p.m. (TOH)
COVINGTON
WCVN, check local listings
ELIZABETHTOWN
WKZT, check local listings
HAZARD
WKHA, check local listings
LEXINGTON
KET, check local listings
KET2, check local listings
WKLE, check local listings
● WTVQ
LOUISVILLE
WKMJ, check local listings
WKPC, check local listings
● WDRB/WFTE
MADISONVILLE
WKMA, check local listings
MOREHEAD
WKMR, check local listings
MURRAY
WKMU, check local listings
OWENSBORO
WKOH, check local listings
OWENTON
WKON, check local listings
PADUCAH
WKPD, check local listings
WKSO, check local listings
● WPSD/WKRB
PIKEVILLE
WKPI, check local listings
SOMERSET
WKSO, check local listings

LOUISIANA
ALEXANDRIA
KLPA, check local listings
BATON ROUGE
KLPB/WLPB, Sat. 1 p.m. (TOH)
● WBRZ
LAFAYETTE
KLPB, check local listings
● KADN/KLAF
LAKE CHARLES
KLTL, check local listings
MONROE
KLTM, check local listings
● KNOE
MORGAN CITY
● KWBJ
NEW ORLEANS
WYES, Thu. 7 p.m. (TOH/Ask TOH)
● WVUE
SHREVEPORT
KLTS, check local listings
● KTBS

MAINE
BANGOR
WMEB, Sat. 1:30 p.m. (TOH/Ask TOH)
● WBGR
CALAIS
WMED, same as WMEB Bangor
LEWISTON
WCBB, same as WMEB Bangor
PORTLAND
WMEA, same as WMEB Bangor
● WMTW
PRESQUE ISLE
WMEM, same as WMEB Bangor

MARYLAND
ANNAPOLIS
WMPT, check local listings
BALTIMORE
WMPT Sat. 6 p.m. (TOH/Ask TOH); Thu. 3:30 p.m. (TOH); Fri. 5:30 a.m. (Ask TOH)
● WBFF/WNUV
FREDERICK
WFPT, check local listings
HAGERSTOWN
WWPB, check local listings
● WJAL
SALISBURY
WCPB, check local listings
WBPB, check local listings

MASSACHUSETTS
BOSTON
WGBH, Ch. 2, Sat. 5 p.m. (TOH/Ask TOH); Mon. 7:30 p.m. (TOH)
WGBX, Select 44, Thu. 8 p.m. (TOH/Ask TOH)
● WHDH
SPRINGFIELD
WGBY Thu. 8 p.m. (TOH/Ask TOH)

MICHIGAN
ALPENA
WCML, check local listings
BAD AXE
WUCX, check local listings
CADILLAC
WCMV, check local listings
● WWTV/WWUP
DETROIT
WTVS, Thu. 8 p.m., Fri. 1 a.m. (TOH/Ask TOH); Sat. 10 a.m. (TOH); Sun. 7:30 p.m. (Ask TOH)
● WKBD
EAST LANSING
WKAR, Thu. 8 p.m. (TOH/Ask TOH); Sat. 4:30 p.m. and 5:30 p.m. (TOH)
FLINT
WUCX/WDCQ, check local listings
WFUM, check local listings
● WNEM
GRAND RAPIDS
WGVU, Thu. 8 p.m. (TOH/Ask TOH)
● WOOD/WOTV/WXSP
KALAMAZOO
WGVK, check local listings
LANSING
● WHTV
MANISTEE
WCMW, check local listings
MARQUETTE
WNMU Sat. 7 p.m., Sat. 1:30 p.m. (TOH/Ask TOH)
● WLUC
MOUNT PLEASANT
WCMU, check local listings
UNIVERSITY CENTER
WUCM, check local listings

MINNESOTA
APPLETON
KSMN, check local listings
KWCM, check local listings
AUSTIN
KSMQ, check local listings
BEMIDJI
KAWE, Thu. 7 p.m. (TOH/Ask TOH)
BRAINERD
KAWB, check local listings
DULUTH
WDSE, check local listings
MINNEAPOLIS/ST. PAUL
KTCA, check local listings
KTCI/ES, check local listings
TPT Thu. 8 p.m., Fri. 1 p.m., Sat. 5:30 p.m. (TOH/Ask TOH) Sat. 10:30 a.m. (TOH)
● KSTP/KSTC
ROCHESTER
● KTTC

MISSISSIPPI
BILOXI
WMAH, check local listings
BOONEVILLE
WMAE, check local listings
BUDE
WMAU, check local listings
COLUMBUS/TUPELO
● WCBI
GREENWOOD
WMAO, check local listings
● WXTV
JACKSON
WMPN, check local listings
● WDBD/WXMS
MERIDIAN
WMAW, check local listings
MISSISSIPPI STATE
WMAB, check local listings
OXFORD
WMAV, check local listings

MISSOURI
COLUMBIA
● KMIZ/KQFX
JOPLIN
KOZJ, check local listings
● KOAM
KANSAS CITY
KCPT Sun. 6 p.m. (TOH/Ask TOH); Sat. 12:30 p.m. (TOH)
● KMBC
ST. LOUIS
KETC, Sun. 11 a.m. (TOH/Ask TOH); Wed. 1:30 p.m. (TOH)
● KNLC
SEDALIA
KMOS, check local listings
SPRINGFIELD
KOZK, check local listings
● KDEB

MONTANA
BILLINGS
● KULR
BOZEMAN
KUSM, check local listings
BUTTE
● KXLF/KBBM
GREAT FALLS
● KRTV
MISSOULA
KSKC, check local listings
KUFM, check local listings
● KMSH/KECI

NEBRASKA
ALLIANCE
NETV, same as NETV Lincoln
BASSETT
NETV, same as NETV Lincoln
HASTINGS
NETV, same as NETV Lincoln
LEXINGTON
KLNE, same as NETV Lincoln
LINCOLN
NETV Sun. 5 p.m. (TOH/Ask TOH); Tue. 5:30 p.m. (Ask TOH)
● KHAS
MERRIMAN
NETV, same as NETV Lincoln
NORFOLK
NETV, same as NETV Lincoln
NORTH PLATTE
NETV, same as NETV Lincoln
● KNOP
OMAHA
NETV, same as NETV Lincoln
● KPTM/KXVO

NEVADA
LAS VEGAS
KLVX/KVVU, Sun. 4 p.m. (TOH/Ask TOH)
● KTNV
RENO
KNPB, check local listings
● KAME/KRXI

NEW HAMPSHIRE
DURHAM
WENH, check local listings
KEENE
WEKW, check local listings
LITTLETON
WLED, check local listings

NEW JERSEY
CAMDEN
WNJS, check local listings
MONTCLAIR
WNJN, check local listings
NEW BRUNSWICK
WNJB, check local listings
TRENTON
WNJT, check local listings

NEW MEXICO
ALBUQUERQUE
KNME, check local listings
● KOB
LAS CRUCES
KRWG, Thu. 7 p.m. (TOH/Ask TOH); Sat. 12 p.m. (TOH); Sat. 2 p.m. (Ask TOH)
PORTALES
KENW, check local listings

NEW YORK
ALBANY
● WXXA
BINGHAMTON
WSKG, check local listings
● WBNG
BUFFALO
WNED, check local listings
WNEQ, check local listings
● WIVB/WNLO
BURLINGTON
● WCAX
ELMIRA
● WTBG
LONG ISLAND/PLAINVIEW
WLIW, Sun 8 p.m., Tue. 7:30 p.m., & Sat. 10 a.m. (TOH); Wed. 7:30 p.m., Sat. 11 a.m. (Ask TOH)
NEW YORK CITY
WNET, Sat. 7 p.m. (TOH/Ask TOH)
● WCBS, check local listings
NORWOOD
WNPI, check local listings
PLATTSBURGH
WCFE, check local listings
ROCHESTER
WXXI, Sat. 10 a.m., Sun. 5 p.m. (TOH/Ask TOH)
● WHEC
SCHENECTADY
WMHT, check local listings
WMHQ, check local listings
SYRACUSE
WCNY/WCNY2, check local listings
● WSTM
WATERTOWN
WPBS, check local listings

NORTH CAROLINA
ASHEVILLE
WUNF, same as WUNC Chapel Hill
CHAPEL HILL
WUNC, Sat. 4:30 p.m. (Ask TOH); Sat. 5 p.m., Sun. 9 a.m. (TOH)
CHARLOTTE
WUNG, same as WUNC Chapel Hill
● WCCB
CONCORD
WUND, same as WUNC Chapel Hill
GREENSBORO
WUNK, same as WUNC Chapel Hill
GREENVILLE
● WCHP, Sat. 6:30 a.m.
GREENVILLE/NEW BERN
● WCTI
GREENVILLE/SPARTANBURG
WUNK, same as WUNC Chapel Hill
● WLOS/WBSC
JACKSONVILLE
WUNM, same as WUNC Chapel Hill
LINVILLE
WUNE, same as WUNC Chapel Hill
LUMBERTON
WUNU, same as WUNC Chapel Hill
RALEIGH
● WTVD
ROANOKE RAPIDS
WUNP, same as WUNC Chapel Hill
WILMINGTON
WUNJ, same as WUNC Chapel Hill
● WSFX
WINSTON-SALEM
WUNL, same as WUNC Chapel Hill

NORTH DAKOTA
BISMARCK
KBME, check local listings
DICKINSON
KDSE, check local listings
ELLENDALE
KJRE, check local listings
FARGO
KFME, Thu. 7 p.m. (TOH/Ask TOH)
● KXJB
MINOT
KSRE, check local listings
● KMOT/KXMC
WILLISTON
KWSE, check local listings

OHIO
AKRON
WEAO, check local listings
ATHENS
WOUB, check local listings
BOWLING GREEN
WBGU, Thu. 8 p.m., Sat. 1:30 p.m. (TOH/Ask TOH)
CAMBRIDGE
WOUC, check local listings
CINCINNATI
WCET Sat. 4:30 p.m. (TOH/Ask TOH); Sat. 9 p.m. and 4 p.m. (TOH)
WCVN, check local listings
● WSTR
CLEVELAND
WVIZ, Sat. 4 p.m., Sat. 1:30 p.m. (Ask TOH); Sat. 4:30 p.m., Sun. 2 p.m. (TOH)
● WEWS
COLUMBUS
WOSU, Sat. 4:30 p.m., Sat. 6 a.m. (TOH); Thu. 1 p.m. (Ask TOH)
● WSYX/WTTE
DAYTON
WPTD Thu. 8 p.m. (TOH/Ask TOH); Sat. 9 a.m. and 12:30 p.m. (TOH)
● WHIO
LIMA
● WOHL/WLQP
OXFORD
WPTO, check local listings
PORTSMOUTH
WPBO, check local listings
TOLEDO
WGTE, Sat. 1 p.m. (TOH/Ask TOH); Sun. 1 p.m. (TOH)
● TTWB-TV5
YOUNGSTOWN
WNEO, check local listings
● WYTV

OKLAHOMA
CHEYENNE
KWET, same as KETA Okla. City
EUFAULA
KOET, same as KETA Okla. City
OKLAHOMA CITY
KETA, Thu. 8 p.m. (TOH/Ask TOH); Sat. 12:30 p.m., Sun. 2 p.m.; Thu. 7 p.m. (TOH)
● KWTV
TULSA
KOED, same as KETA Okla. City
● KWBT

OREGON
BEND
KOAB, check local listings
CORVALLIS
KOAC, check local listings
EUGENE
KEPB, check local listings
● KMTR
KLAMATH FALLS
KFTS, check local listings
LA GRANDE
KTVR, check local listings
MEDFORD
KSYS, check local listings
● KOBI
PORTLAND
KOPB, Sat. 5 p.m. (Ask TOH); Sat. 5:30 p.m., Fri. 6 p.m. (TOH)
● KATU

PENNSYLVANIA
ALLENTOWN
WLVT, check local listings
ERIE
WQLN, check local listings
● WJET
● WSEE
HARRISBURG
WITF Sat. 6 p.m. (TOH/Ask TOH)
● WHTM
PHILADELPHIA
WHYY Thu. 8 p.m., Sat. 6 p.m. (TOH/Ask TOH); Sat. 10 a.m. (TOH)
WNJM, check local listings
● WGTW
PITTSBURGH
WQPT, check local listings
WQED, Thu. 8 p.m. (TOH/Ask TOH); Sat. 4 p.m. (TOH)
WQEX, check local listings
● KDKA/WNPA
PITTSTON
WVIA, check local listings
UNIVERSITY PARK
WPSX, check local listings
WILKES-BARRE
● WYLN

RHODE ISLAND
PROVIDENCE
WSBE, Sat. 4 p.m. (TOH)
● WLWC

SOUTH CAROLINA
ALLENDALE
WEBA, same as SCETV Columbia
BEAUFORT
WJWJ, same as SCETV Columbia
CHARLESTON
WITV, same as SCETV Columbia
COLUMBIA
SCETV, Thu. 8 p.m. (TOH/Ask TOH)
● WLTX
CONWAY
WHMC, same as SCETV Columbia
FLORENCE/MYRTLE BEACH
WJPM, same as SCETV Columbia
● WPDE/WWMB
GREENVILLE
WNTV, same as SCETV Columbia
WNEH, same as SCETV Columbia
ROCK HILL
WNSC, same as SCETV Columbia
SPARTANBURG
WRET, same as SCETV Columbia
SUMTER
WRJA, same as SCETV Columbia

SOUTH DAKOTA
EAGLE BUTTE
KZSD, check local listings
BROOKINGS/PIERRE
KESD, check local listings
LEAD
KZSD, check local listings
LOWRY/MARTIN/VERMILLION
KQSD, check local listings
PIERRE
KTSD, check local listings
RAPID CITY
KBHE, check local listings
KRNE, check local listings
● KEVN/KIVV
SIOUX FALLS
KCSD, check local listings
KUSD, check local listings
KSMN, check local listings
● KTTW
VERMILLION
KUSD, check local listings

TENNESSEE
CHATTANOOGA
WCLP, check local listings
WTCI, Sat. 1 p.m. (TOH/Ask TOH)
● WDSI
COOKEVILLE
WCTE, check local listings
JACKSON
● WJKT
KNOXVILLE
WKOP, check local listings
WSJK, check local listings
LEXINGTON-MARTIN
WLJT, check local listings
MEMPHIS
WKNO Sat. 9:30 a.m. (TOH/Ask TOH)
● WLMT
NASHVILLE
WNPT Sat. 4:30 p.m. (TOH/Ask TOH)
TRI-CITIES
● WEMT/WAPK

TEXAS
AMARILLO
KACV Thu. 7 p.m., Sat. 12:30 p.m. (TOH/Ask TOH)
● KAMR
ALPINE
KLRU, check local listings
● KNVA
BRYAN/COLLEGE STATION
KAMU, check local listings
CORPUS CHRISTI
KEDT, check local listings
● KTOV
DALLAS/FORT WORTH
KERA Sat. 7 a.m. (TOH/Ask TOH); Sat. 6:30 p.m. (TOH)
● KDAF
EL PASO
KCOS, check local listings
KRWG, check local listings
HARLINGEN
KMBH, check local listings
● KVEO
HOUSTON
KUHT Thu. 9 p.m. (TOH/Ask TOH); Sat. 1 p.m., Sun. 10 a.m. (Ask TOH); Sun. 11:30 a.m. (TOH)
● KTRK
KILLEEN
KNCT, check local listings
LAREDO
● KGNS
LUBBOCK
KTXT, check local listings
● KUPT
ODESSA
KOCV, check local listings
SAN ANTONIO
KLRN Sat. 1:30 p.m. (TOH/Ask TOH)
● KRRT
TYLER
● KLPN/KFXK
WACO
KCTF, check local listings
KWBU, check local listings
● KXXV/KRHD

UTAH
PROVO
KBYU, check local listings
SALT LAKE CITY
KUED, Sat. 5 p.m. (TOH/Ask TOH)
● KJZZ

VERMONT
BURLINGTON
WETK, Vermont Public TV, Thu. 6 p.m. (TOH/Ask TOH)
● WLAX
RUTLAND
WVER, same as WETK Burlington
ST. JOHNSBURY
WVTB, same as WETK Burlington
WINDSOR
WVTA, same as WETK Burlington

VIRGINIA
ARLINGTON
WETA, Sat. 2 p.m. (TOH/Ask TOH)
CHARLOTTESVILLE
WHTJ, check local listings
HARRISONBURG
WVPT Thu. 8 p.m. (TOH/Ask TOH); Sat. 1:30 p.m. (TOH)
WVPY, check local listings
NORFOLK
WHRO Thu. 8 p.m., Fri. 1:30 a.m. (TOH/Ask TOH); Sat. 8:30 a.m. and 11 a.m. (TOH)
● WVEC
ROANOKE
WSBN, check local listings
RICHMOND
WCVE, check local listings
WCVW, check local listings
● WTVR
ROANOKE
WBRA, check local listings
● WSLS

WASHINGTON
CENTRALIA
KCKA, check local listings
PULLMAN
KWSU, check local listings
RICHLAND
KTNW, check local listings
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KCTS, Sat. 5 p.m. (TOH/Ask TOH); Mon. 7:30 p.m. (Ask TOH)
● KING/KONG
SPOKANE
KSPS, Sat. 10 a.m. (TOH/Ask TOH)
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TACOMA
KBTC Sat. 12:30 p.m. and 5:30 p.m. (TOH); Thu. 7 p.m. (Ask TOH)
YAKIMA
KYVE, check local listings
● KAPP/KVEW

WASHINGTON, D.C.
WETA Sat. 2 p.m. (TOH/Ask TOH)
WHUT, check local listings
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WEST VIRGINIA
BECKLEY
WSWP, check local listings
CHARLESTON
WOUB, check local listings
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● WDJT/WMLW
PARK FALLS
WLEF, check local listings
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WHRM, check local listings
● WJFW

WYOMING
CASPER
● KFNB/KWYF
LARAMIE/RIVERTON
KCWC, check local listings
RIVERTON
KCWC, check local listings

"Saving Fallingwater," p. 84: From the terrace an exterior staircase leads to the third-floor master bedroom suite. Its stuccoed wall suggests the unseen steps

Glazing—
Triple-pane: Heat-Smart Plus Window Systems, Loewen Windows, Steinbach, Manitoba, Canada, 800-563-9367; www.loewen.com. **Heat Mirror:** Southwall Technologies, Palo Alto, CA; 650-962-9111, www.southwall.com. **Insulated:** Pozzi Windows, Bend, OR, 800-547-6850, www.pozzi.com. **Window ratings:** National Fenestration Rating Council, Silver Spring, MD, 301-589-1776; www.nfrc.org. **Energy Star Program:** U.S. Department of Energy and U.S. Environmental Protection Agency, Washington, DC; 888-782-7937, www.energystar.gov.

SAVING FALLINGWATER
pp. 84–90

Consulting engineer: Robert Silman Associates, PLLC, New York, NY, 212-620-7970. **Noninvasive structural analysis:** GZ Geotechnics, Swaffham Bulbeck, Cambridge, England. **Post-tensioning contractor:** VSL, Springfield, VA, 703-451-4300. **Roofing contractor:** J.L. Robinson Roofing, Inc., Pittsburgh, PA, 412-795-6767. **Fallingwater trustee:** Western Pennsylvania Conservancy, Pittsburgh, PA; 412-288-2773. **Books:** *Fallingwater: The House and Its History*, by Donald Hoffman (Dover Publications), *Fallingwater: A Frank Lloyd Wright Country House*, by Edgar Kaufmann, Jr. **Fallingwater information:** For Fallingwater hours, tour schedule, and admission fees, visit www.wpconline.org/fallingwaterhome.htm.

A LESSON IN BATHROOM LIGHTING
pp. 92–96

Lighting designer: Susan Arnold, Wolfers Lighting, Waltham, MA, 781-672-4200, www.wolferslighting.com. *Opener*—Eaton Single Sconces, Restoration Hardware, 800-762-1005; www.restorationhardware.com. *Page 94—(Top left)* Elongated sconces: Metro Neo Sconce, Ginger, Fort Mill, SC, 803-547-5786, www.gingerco.com. *(Top right)* Wall sconce: Cassandra Light #1481, Ginger. *(Bottom left)* Recessed lighting: Thomas Lighting, 800-825-5844, www.thomaslighting.com. *(Bottom right)* Wall sconces: Cassandra Light #1481, Ginger. *Fixtures page 96—* **Mirror:** Sina, Design Within Reach, 800-944-2233; www.dwr.com. **Pendant light:** Mr. Scott by Rejuvenation, 888-401-1900, www.rejuvenation.com. *Sconces—(left to right)* Synchro by Ginger; Snowshoe by Forcast; 800-959-3000, www.forcastllc.com. **Dimmers:** Lutron Electronics Co., Coppersburg, PA, 800-523-9466, www.lutron.com.

Our thanks to: American Lighting Association, Dallas, TX, 800-274-4484; www.americanlightingassoc.com.

SAVE THIS OLD HOUSE
p. 116

Our thanks to: Cass County administrator (and Dylan aficionada) Bonnie Johnson and the Cass County Commission. John Strand and Raul Gomez of the *High Plains Reader* (www.hpr1.com). Local architectural historian Ronald Ramsay.

"A Lesson in Bathroom Lighting," p. 92: When the sun goes down, a pair of recessed ceiling lights illuminates the tub area in this master bath

PHOTOS: ROBERT P. RUSHMAN (TOP); HERSHAN WHITLAW (BOTTOM)

PHOTOS: RICHARD HOWARD (LEFT)

This Old House CLASSICS

This Old House Classics: **A week-by-week synopsis of vintage episodes airing on HGTV and broadcast television**

For stations that carry *TOH Classics* in your area, check TV Listings, page 100

ABOVE: *Tom Silva hooks up the front-yard lamp post.* **BELOW:** *Mark Ferrante discusses tile installation.*

The crew of *This Old House* helped renovate this 1910 Colonial Revival in Lexington, Massachusetts, back in 1988.

Episode 17 (of 26)
(airs January 4–5)

- *TOH* general contractor Tom Silva installs a new front-yard lamp post.
- The home office gets sound-insulating carpet underlayment, burlap wall coverings, and acoustical ceiling tiles.
- *TOH* master carpenter Norm Abram hangs the master bedroom door.
- *TOH* landscape contractor Roger Cook discusses seed blending and soil preparation before the sod is rolled out.

Episode 18
(airs January 11–12)

- The crew installs metal railing around the granite patio.
- A side trip to Aurora, Illinois, features homes so energy efficient that their builders guarantee annual heating bills below $200.

Episode 19
(airs January 18–19)

- A permanent drainpipe and storm door are installed at the front of the house.
- Norm trims out the windows in the master bedroom and home owner Mary Van Slyck paints the sash.
- Tom levels out the basement floor where the washer/dryer units will be installed.
- Tiles are laid in an upstairs bathroom.

Episode 20
(airs January 25–26)

- Electrical contractor Buddy Bisnaw talks kitchen outlets.
- *TOH* plumbing and heating expert Richard Trethewey receives the one-piece toilet and pedestal sink.
- A visit to the American Standard factory shows how bathroom fixtures are made.
- The crew installs a wooden gutter to divert rain away from the deck.

Episode 21
(airs February 1–2)

- Mary Van and her husband Jim paint clapboards. Inside their children paint the ceilings.
- Tile contractor Joe Ferrante sets tiles in the handicapped-accessible bathroom and the master bath.
- Richard discusses the new baseboard heating system.

Episode 22
(airs February 8–9)

- Norm and Tom install a newel post for the central staircase.
- A tour of the Morgan Door company gives an inside glimpse of the making of true divided-light French doors.

Episode 23
(airs February 15–16)

- Flooring contractor Jeff Hosking discusses refinishing an 80-year-old fir floor.
- In the addition, new prefinished flooring goes down, while vinyl is laid in the kitchen.
- Mary Van unpacks the kitchen cabinets.
- Norm assembles the reading nook that he made earlier in his workshop.

Episode 24
(airs February 22–23)

- Tom installs the fireplace mantel and faces the surround with hall brick.
- A marble shower stall is fabricated at a Boston-based factory.
- The flooring crew matches the finish on the new and old flooring.
- Richard installs new fixtures in the wheelchair-friendly bathroom.
- Norm completes the reading nook.
- Tom installs a pull-down attic staircase.

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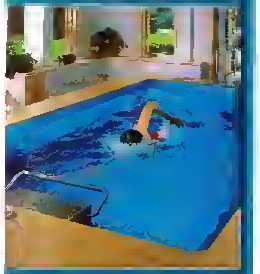

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For its first 73 years, this red sandstone-clad 1913 four square served as the official Fargo sheriff's residence—convenient since it was connected to the old Cass County Jail by way of a communal kitchen. Current sheriff Donald Rudnick was the last lawman to reside in the building, and he remembers his six year stay as "pleasant ... except for the fact that when I was there, I was always at work." His wife, Darla, would probably agree. "Mrs. Sheriff," as she is known, served as the jail's *chef de cuisine*, cooking meals for her "extended family"—the 140-odd inmates living next door. Even the post-dinner hours could get interesting. On occasion, while the family was relaxing in front of the TV, an unannounced visitor would wander into the living room, looking to turn himself in. "I'd just tell them to walk around to the jail entrance," says Sheriff Rudnick. "Then I'd call the desk to let them know someone was coming."

After the Rudnicks moved to the suburbs in the mid-1980s, the 3,200-square-foot structure was converted into the jail's administrative offices. The first floor contains a bathroom, a den, and the 15-by-30-foot living room, which features built-in Craftsman-style leaded-glass cabinets. A second bathroom and four corner bedrooms are located upstairs. There is also a partially finished attic above the bedrooms.

With the recent opening of the new 252-bed Cass County Jail, the old jail and the former sheriff's residence are set to be torn down. The slate-roofed house will most likely have to be moved stone by stone. The county would like it relocated in the next couple of months, preferably before the roads thaw and the spring load limits are set.

The sandstone-clad Cass County sheriff's residence (TOP) *features a 2½ inch thick copper-lined front door and sidelights* (ABOVE LEFT). *The centerpiece of the house's living room is a wide brick fireplace* (ABOVE RIGHT). *Craftsman-style carved oak newels* (LEFT) *punctuate the balustrade of the main staircase.*

CONTACT: Cass County Coordinator
sheriffsresidence@co.cass.nd.us

PHOTOS: JASON LINDSEY

If you know of a house that should be saved, please write to: Save This Old House, 1185 Avenue of the Americas, 27th floor, New York, NY 10036.

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