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KITCHENS & BATHS

ANNUAL ISSUE

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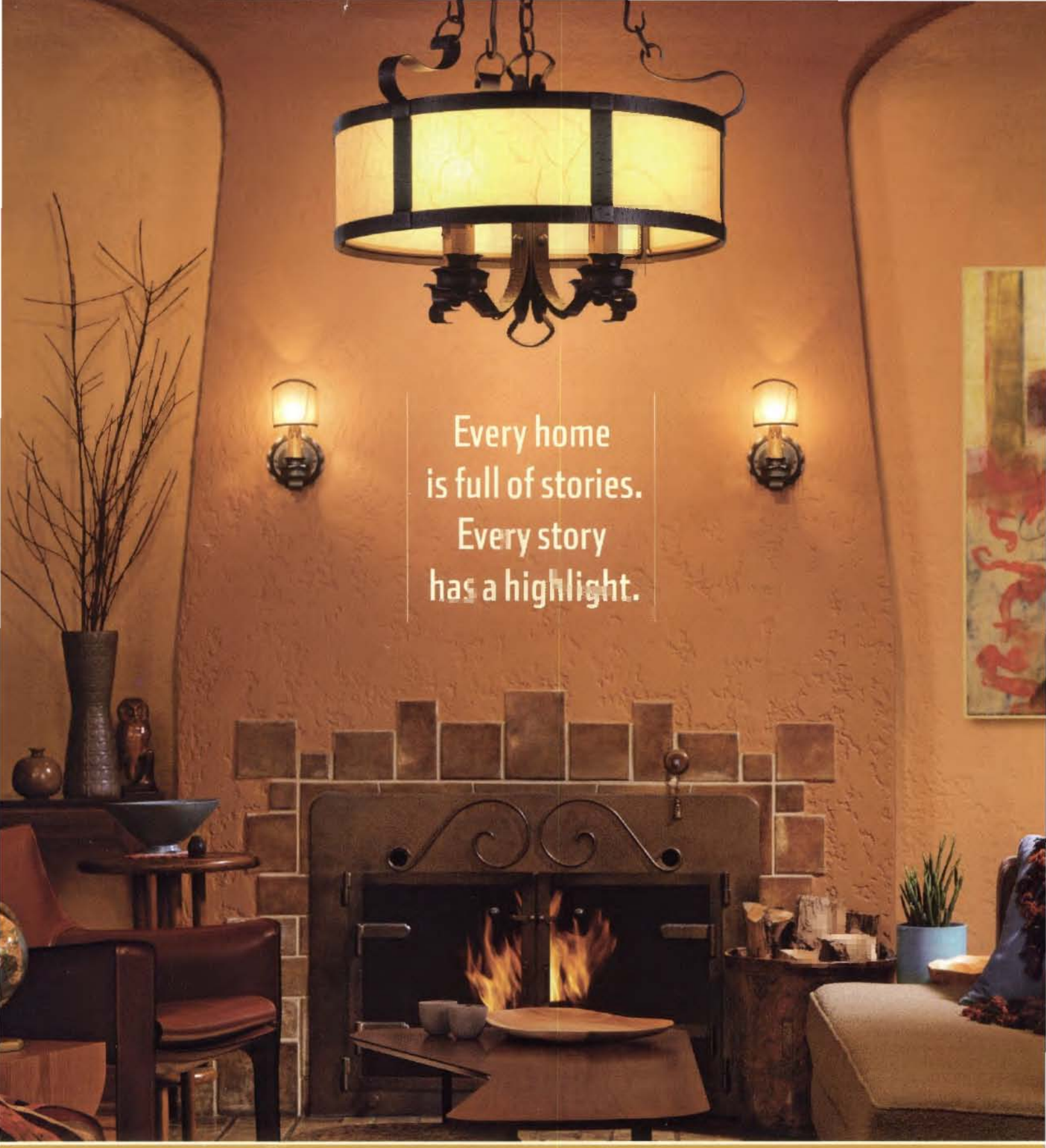

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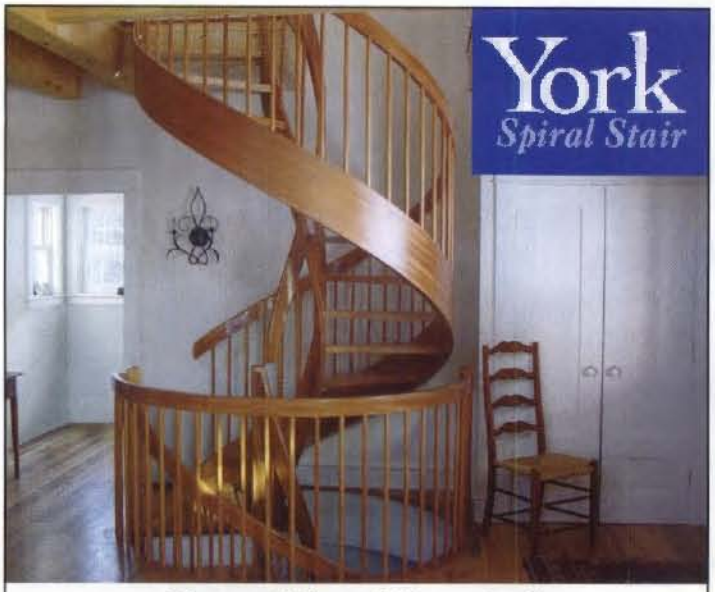

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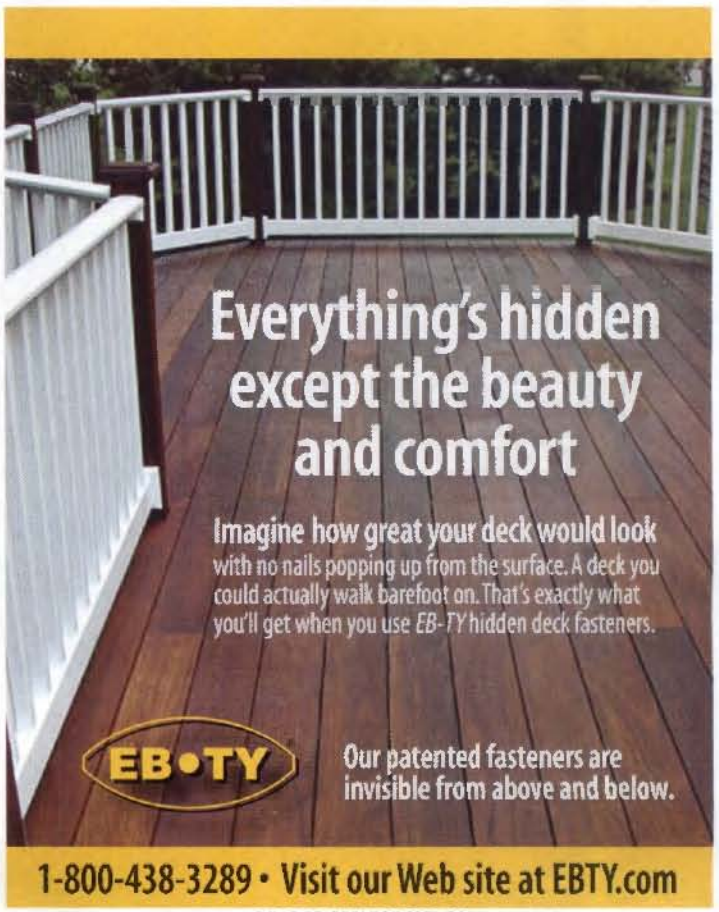

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KITCHENS & BATHS

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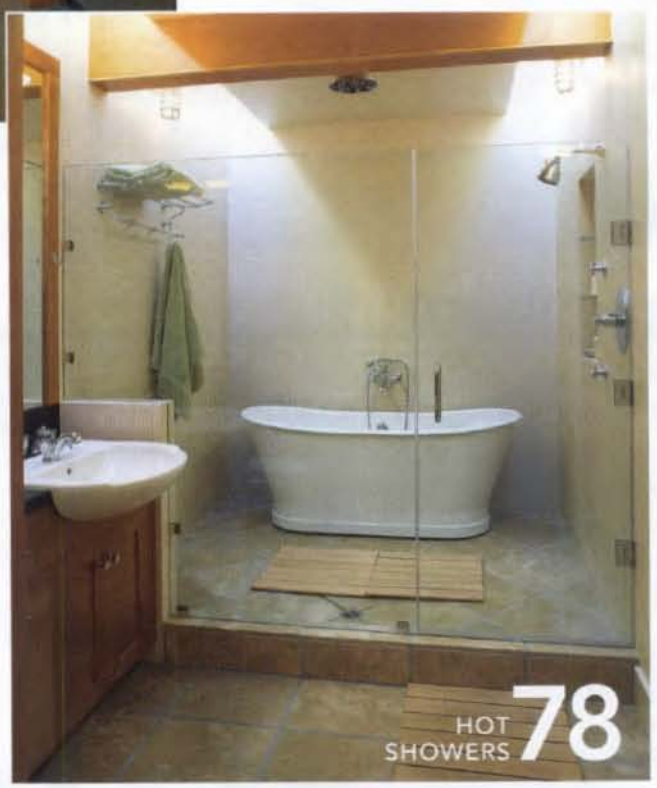

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AUDIO

Balancing the save/splurge equation

Architect Paul DeGroot believes that by focusing on key upgrades, an old kitchen can be transformed. He explains where he recommends savings and splurges in several different remodels, including Web exclusives.

ARTICLE

Frame-and-panel cabinet doors made easy

When *Fine Woodworking*'s art director, Michael Pekovich, remodeled his 1937 kitchen, of course he made all 31 frame-and-panel cabinet doors himself. Now he shares his five-step process, emphasizing speed and simplicity.

PHOTOS

Foot traffic goes out the door

See more before, during, and after photos illustrating architect Stefan Hampden's space-saving techniques for a compact kitchen remodel (pp. 74-77), which moved the location of the door and really flipped things around.

west coast green

REPORT FROM THE SHOW FLOOR

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breaktime

Advice from our online forum

If you haven't visited "Breaktime," our online discussion group, then you're missing out on a fascinating exchange of ideas, advice, and commentary. You'll find "Breaktime" on our Web site. Listed below are some recent highlights.

Dryer vent to the garage?

CREATED BY SILAS1804: The laundry room in the middle of my new house shares a wall with the garage. If I take the vent up to the attic and out to the soffit, the duct would be around 30 ft. long with many bends. I could also vent it into the garage. Bad idea?

Posted by BossHog: Definitely. Everything in the garage will feel damp, even car interiors. It adds moisture that would condense on the framing during cold weather. You're better off running 30 ft. of duct and using a booster fan.

Posted by DickRussell: You don't want to dump water vapor anywhere within the structure. A gable end wall should be your first choice. Up through the roof to a vent there is fine, although it's another roof penetration to flash.

Posted by Piffin: Add an in-line booster fan for long runs to increase flow rates, but be sure it's in an accessible location for maintenance. Soffit venting is usually not a great idea. Vapor gets sucked back into the attic and needs to be revented out the ridge. You do not want to vent it into the garage, but you can route it through the garage to an outside wall.

Overlay panels for kitchen appliances

CREATED BY SHAWNCAL: I've seen photos of fridges and dishwashers that have custom wood panels on the fronts. How are they attached?

Posted by John7G: Appliances are usually set up for the overlays. The production front is removed and the wood panel installed using the same channels that held the original.

Posted by Piffin: More manufacturers offer the option of using their standard front or adding an overlay that you make. Companies sell kits for adding faux faces, but the kits are not flawless and can double the cost of your appliance. A far better option is to design a built-in for your fridge and buy one with the option for adding your own front panel.

Photos, from top: Brian Pontolillo; Michael Pekovich; courtesy of the City of Portland Office of Sustainable Development.

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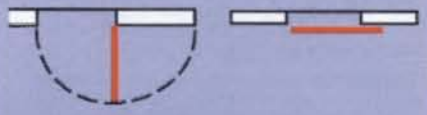

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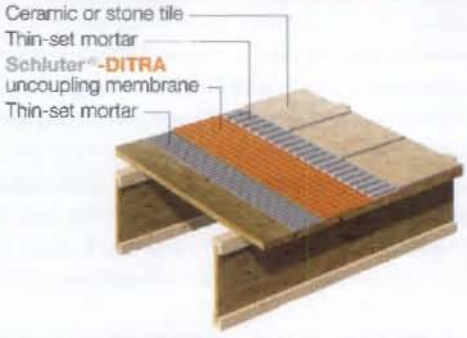

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contributors

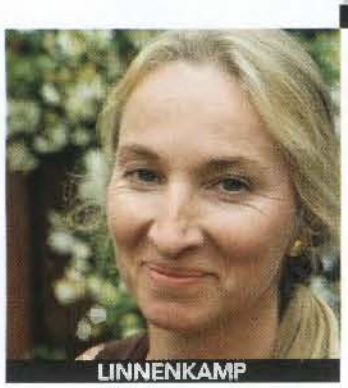
THE VOICES OF EXPERIENCE

DEGROOT

Architect and 22-year *FHB* subscriber **PAUL DEGROOT** hails from Austin, Texas, where his practice is dedicated to custom residential design. A graduate of Texas A&M University, he learned the ropes in Houston before starting his own business a decade ago. For the past nine years, Paul has been remodeling the home he shares with his wife, Stephanie. (Rumor has it the project is almost done.) Luckily for us, Paul had time to write "Kitchen Remodeling for Any Budget" (p. 32).

DONAHUE

SCOTT DONAHUE never thought he'd stray from the New York metro area. But in 1986, he moved to Berkeley, Calif., for graduate school and has hardly budged since; living on the sunny side of the bay in Oakland suits his temperament. An architect with Friedman Brueggemeyer (www.fbdesignbuild.com), Scott tinkers with homes ("A Skylight Cheers Up an Attic Bath," p. 40), does light commercial work, and enjoys keeping up with his two daughters.



LINNENKAMP

After a successful corporate career in Europe, **MAAIKE LINNENKAMP** came to the States in 1998 and decided to change careers. She studied interior design at West Valley College in Saratoga, Calif., and eventually established NBI Design (www.nbidesign.com), where she specializes in contemporary designs built with sustainable materials ("Brighten Up a Small Bath," p. 64). When she's at home in Los Gatos, Calif., you can find her harvesting nectarines and Santa Rosa plums in her garden.

MICHAEL PEKOVICH is *Fine Woodworking*'s art director. His kitchen remodel ("A Kitchen for Cooks and Kids," p. 48) is the culmination of 10 years' worth of home-improvement projects at his 1930s Connecticut residence, which he shares with his wife and two children. Michael is an avid furniture maker, and on weekends, he can be found rummaging through flea markets and tag sales, looking for old hand tools to round out his collection.

STEFAN HAMPDEN is an architect in Seattle, where he founded CAST architecture in 2007 (www.castarchitecture.com) and was a founding partner of CAST design-build in 1999. Stefan teaches a design studio at the University of Washington School of Architecture, and also enjoys biking and climbing. His article, "Making a Galley Kitchen Count," starts on p. 74.

Photos: Courtesy of Stephanie DeGroot (top); Charles Miller (center, bottom).

write an article

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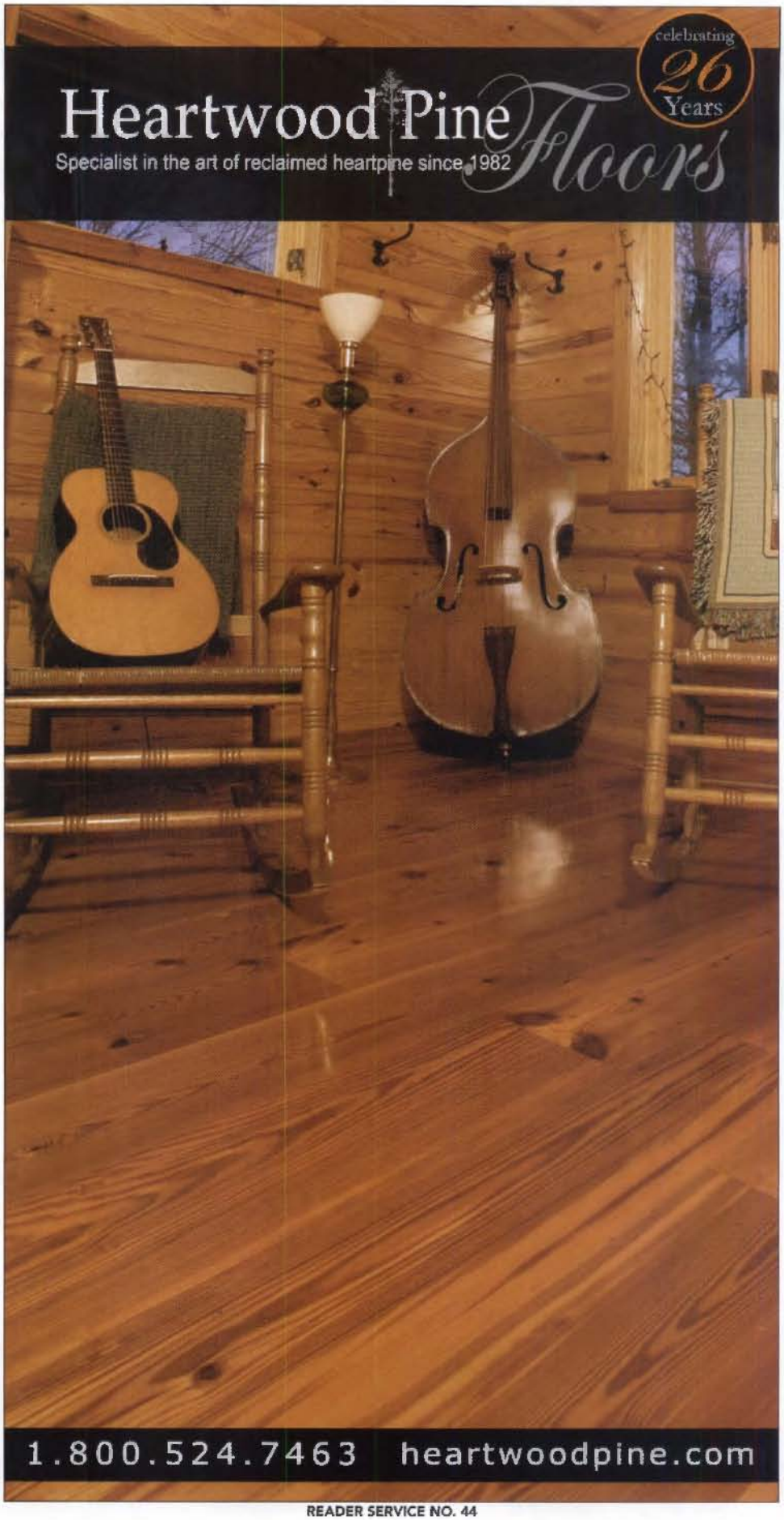

READER SERVICE NO. 44

Living better, but wasting less

BY ART LUDWIG

We're running out of water. The Ganges, Yellow, Yangtze, Indus, Brahmaputra, and Mekong rivers collectively irrigate the food crops for nearly a billion people. The glaciers that have fed them for eons are rapidly melting. Within my son's lifetime, if not my own, these rivers are projected to be seasonally dry.

A similar issue affects rivers fed by snowmelt in California, America's fruit basket. The Ogallala aquifer supplies 30% of the groundwater used for irrigation in the United States. But it is "fossil water" from the last ice age, and it's being extracted at 100 times the replacement rate.

Even places that don't have water-quantity issues have water-quality issues or are connected umbilically to places that have both. Meanwhile, we're living fat on the drawdown of this resource. And water isn't the only natural capital we're squandering. In our lifetimes, we will see not only peak oil and water, but also peak just about everything else, including clean air and topsoil. To deal with these emergent risks, we must learn to live on fewer resources, much better utilized.

> "People on yachts are happy with bathrooms barely bigger than a phone booth."

Why throw resources down the drain?

First and most important, we need to build smaller and for the long haul. A small home well crafted to last for centuries uses a fraction of the resources of a big house designed for a one-act play: the sale. And because the most concentrated flow of money, materials, energy, nutrients, and water is through our kitchens and baths, we should start there. Smaller kitchens and fewer bathrooms consume fewer resources in their construction, maintenance, heating, cooling, and lighting. Would this really be such a sacrifice? People who live on yachts are happy with bathrooms barely bigger than

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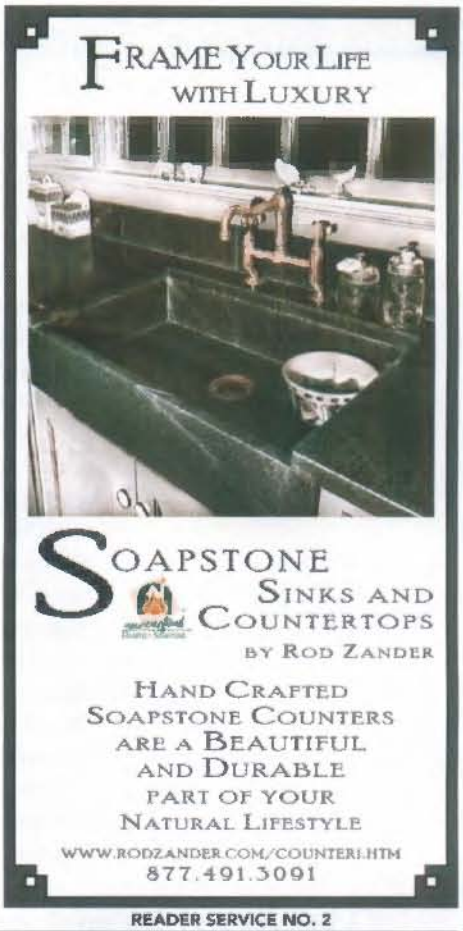

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a phone booth and galleys in which you can reach everything without taking a step. Good design matters more than size.

Size and number aside, what makes our kitchens and bathrooms so wasteful are the resources that we literally throw down the drain (or into the garbage). The nutrients and water flowing through a typical kitchen and bath are enough to fertilize a densely planted suburban lot and to irrigate a quarter of it. But instead of banking this natural capital in the soil outside our homes, we pollute waterways with it—and we spend money and even more resources to do so.

We need to rethink the flow of these resources through our homes. It is entirely possible to develop systems that yield a higher quality of life than the average American currently enjoys, with one- or two-tenths of the resource use. How might a kitchen and bath work that fulfill this goal?

"We need to get some of the efficiency motivated by carrying water, without carrying it."

Use less water

The first question about any human habitation is: Where does the water come from? In Santa Barbara, Calif. (where I'm writing this), our municipal water supply comes from fairly clean surface- and groundwater, but for various reasons, it makes sense to back this up with rooftop-harvested rainwater.

My ideal house would have a pair of attractive, urn-shaped ferrocement cisterns sitting under the lowest gutter. Ozone-purified rain from the roof fills them several times over, supplying enough water to meet a family's needs in the rainy season. (Drinking water, by the way, could still come from the city.)

In the dry season, the house switches to city water, but the cisterns remain for emergency needs after an earthquake or during a wildfire. In hot weather, one cistern even serves as a cold plunge, so residents can cool off without the cost and complexity of a swimming pool.

Worldwide, people with running water use an average of 100 gallons per day to accomplish the same tasks that people who carry water achieve with 10 gallons. We need to get some of the efficiency motivated by carrying water, without carrying it. Anything that increases awareness of consumption and makes conservation easy is a step in this direction. My ideal kitchen would have a water meter in the backsplash behind the kitchen sink (along with remote electricity and gas meters), which places resource-use information where it can be acted on (like the mpg dashboard readout on newer cars).

Foot-actuated valves in the kitchen and bathroom sinks let people start and stop the flow while their hands are busy, lowering water use and keeping chicken slime and other pathogens off the faucets. Over the kitchen sink, an attractive Tuscan-style dish rack stores and air-dries dishes so efficiently that there is no point in having a dishwasher. A capped chute by the sink leads to a compost bin outside.

A third tap at the kitchen sink, with a reverse-osmosis filter, provides tasty drinking water, eliminating the need for bottled water and its associated costs to the environment.

Water flows from solar panels on the roof to highly efficient bathroom fixtures, including a bathing chamber redesigned for comfort and efficiency. Bathers need only a small amount of water to get clean, but typically use a lot of hot water to keep from getting cold. Meanwhile, most of the energy ends up warming drainpipes and fogging windows. The redesigned bathing chamber is highly insulated and designed to reduce heat loss by convection, conduction, and radiation.

Bank nutrients in the soil

In my ideal house, there is no sewer connection. Water cascades between uses, starting inside with those requiring the clearest water and ending outside where topsoil organisms and plant roots filter pathogens and feed on nutrients. The drain beneath the kitchen's filtered third tap flows to a water feature before heading outside to help irrigate vegetables. Discharge from the washing machine directly irrigates fruit trees, which yield shade and privacy in addition to fruit.

Other gray water (from sinks and showers) discharges into mulch-filled basins before irrigating fruit and ornamental trees. Any excess irrigation recharges the groundwater.

Black water (from the toilet) flows to a green septic system, which disseminates effluent in a controlled way to fruit-tree roots. If the homeowners are really committed, I would substitute a composting toilet and eliminate the need for a septic system to reduce household water use further.

A house in which the water, waste-water, energy-, and food-production systems are designed simply and synergistically would

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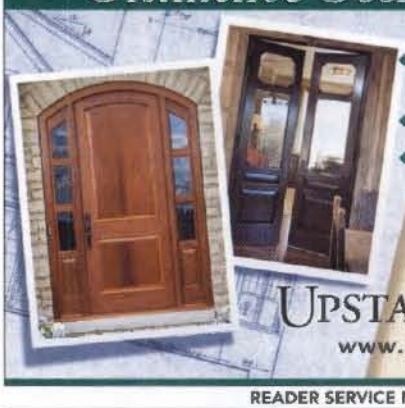

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cost less than conventional practice, especially over time, and even more so when external costs are accounted for. Waste is expensive. If your accounting is complete, the most ecological solution is always the most economical, too.

> **"The most ecological solution is always the most economical, too."**

Context is king

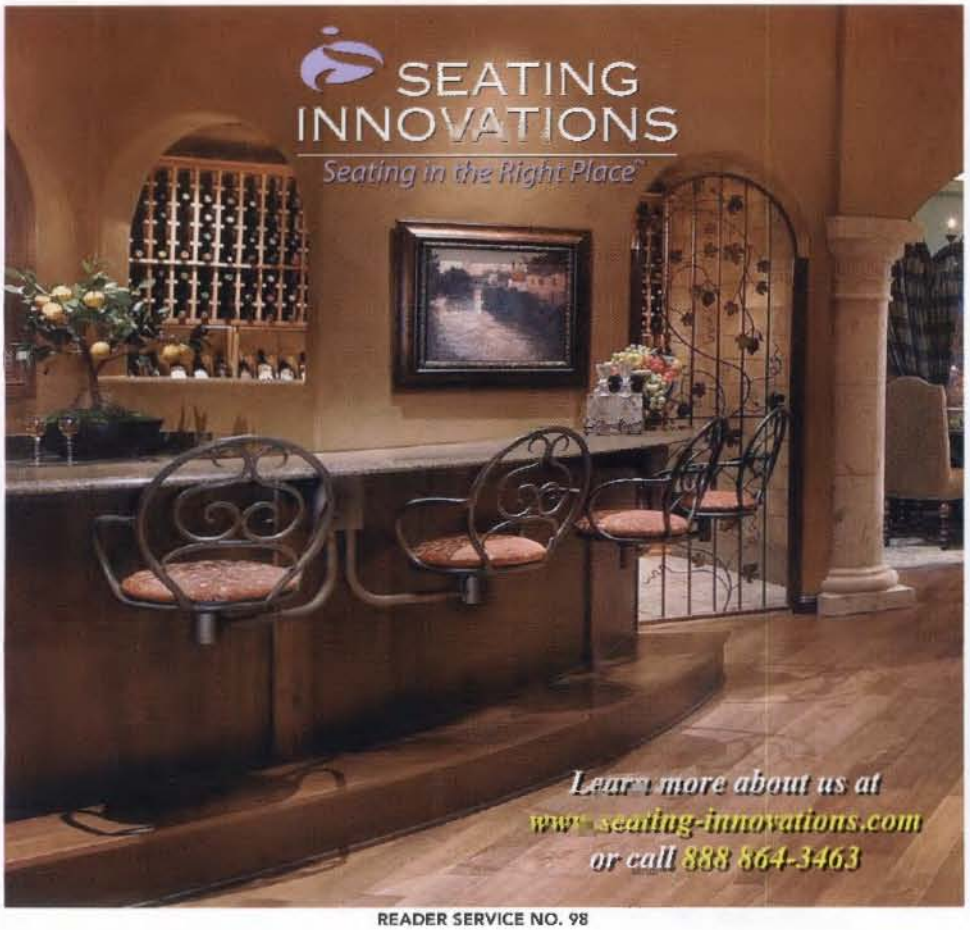
Those accustomed to uniform solutions may be quick to point out how these designs would not apply in other situations. Correct. None of these solutions are applicable across the board. We need a range of solutions that are matched to their contexts, using common sense. Standardized solutions (flush toilets, for instance) are more idiot-proof, but they're wasteful and dangerously unsustainable. Much of what makes designs ecological is careful attunement to the resources and limitations of the site and the users.

In Maine, for example, a house could have an attached passive-solar greenhouse. The cistern would be in the greenhouse to keep it and the greenhouse from freezing, and also to keep the greenhouse from frying in summer. Irrigated with warm gray water, soil organisms in a greenhouse can treat water year-round. Waste wood from pruning trees can heat a wood-burning bathtub in the greenhouse. Soak for hours in the tub, and then do laundry with the water before irrigating year-round greens. After percolating through greenhouse beds, the purified water can be released to natural waters or used for raising fish.

The greenhouse would likely pay for itself through reduced home-heating costs. It might also prove to be the most popular room in the house.

Legalize sustainability

Why aren't we all getting healthy on fruit from Eden-like gray-water gardens? Well, we're not allowed, at least in most parts of the United States. Even as all of humanity's life-support systems are threatened, the more ecologically you live, the more illegal it is. In Santa Barbara, 20,000-sq.-ft. mansions



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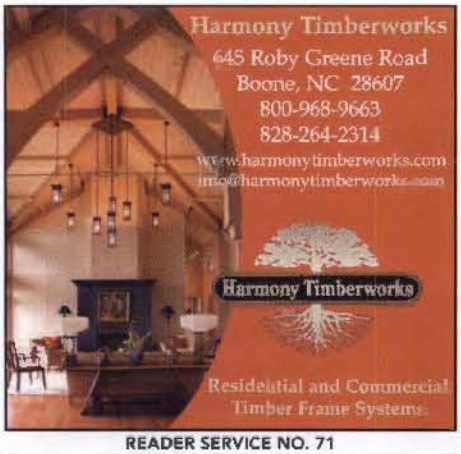

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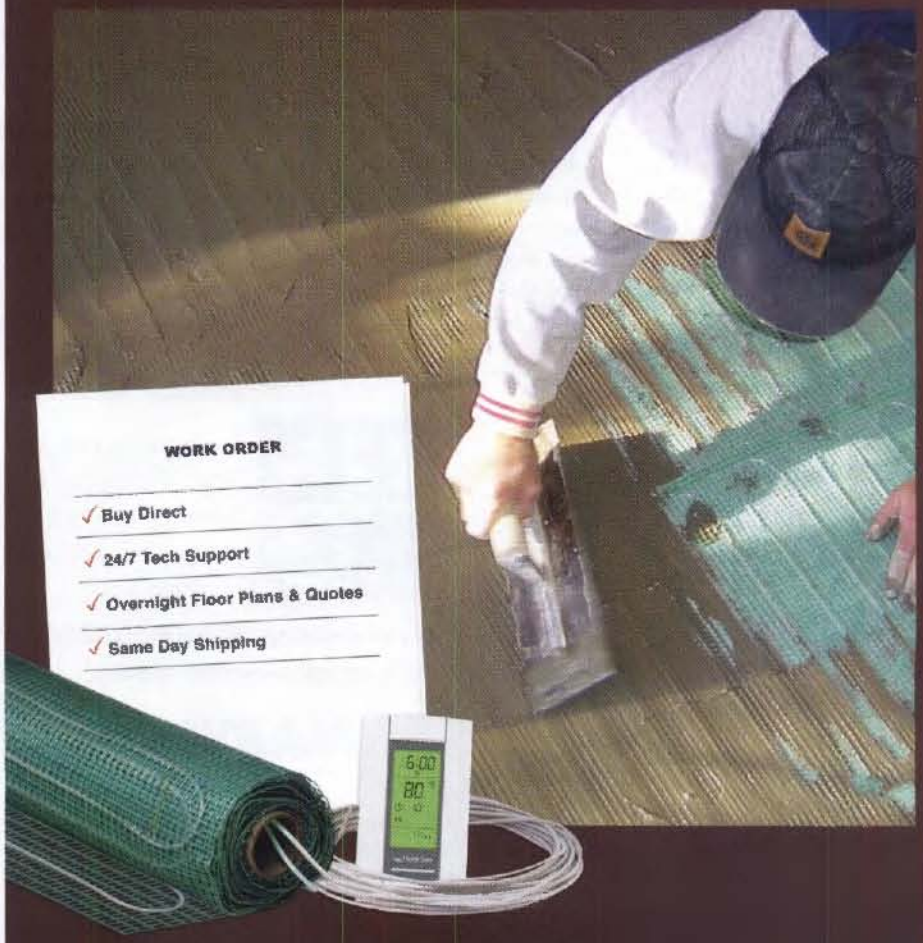

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are approved routinely, but living in a yurt is illegal. You can build an entirely passive-solar and wood-heated house, but the law also requires a fossil-fueled central-heating system. If a sewer passes the house, you must hook up to it, and pay for the privilege.

"The more ecologically you live, the more illegal it is."

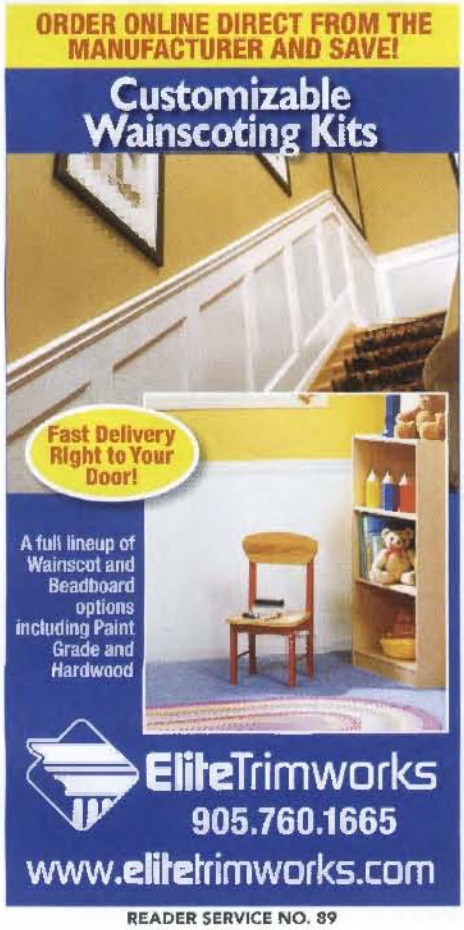
Our plumbing codes evolved to protect us from 19th-century risks. Certainly, we still need plumbing that won't spread cholera. But while codes work hard to reduce the risk of disease from minute to infinitesimal, they miss the big picture. If we do not change our built environment to address global warming, aquifer depletion, and groundwater contamination, cholera will seem welcome by comparison.

A good start would be for all states to emulate Arizona's three-tiered approach to regulating gray water. No permit application is required for systems under 400 gallons per day (GPD) that meet a list of reasonable requirements. Systems over 400 GPD, or that don't meet the requirements, need a permit. The third-tier systems, over 3000 GPD, are considered on an individual basis.

But gray-water approval is just one component. We also need experimental permits that allow people to develop unhindered the kind of "lifeboat" systems that I've described here. We need to encourage research and gain more experience with resource-efficient systems now.

Although I have focused here on our dwindling supply of water, the real problem runs deeper. It's a culture in which the looting of natural capital from ours and future generations is institutionalized, encouraged, even legally mandated. For an orderly transition to a post-peak world, we need to take actions that increase stores of groundwater, fertile soil, clean air, trees, and more. Our lifestyles have to change, but I'm confident that we can still enjoy our lives.

Art Ludwig is the author of Principles of Ecological Design, Water Storage, *and* Create an Oasis with Greywater. *His Web site is www.oasisdesign.net.*



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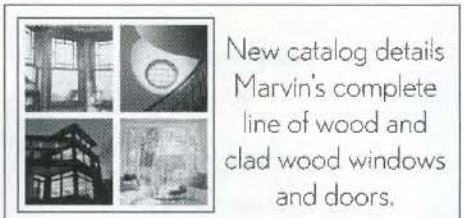
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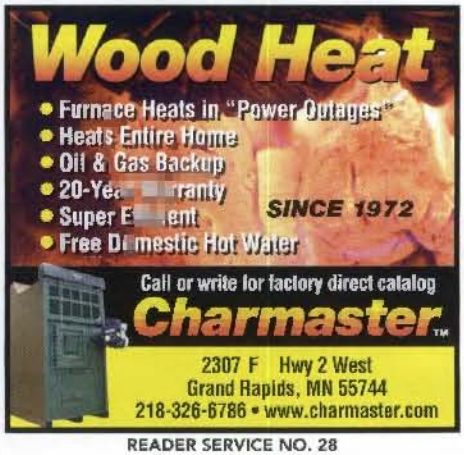

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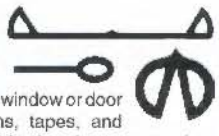

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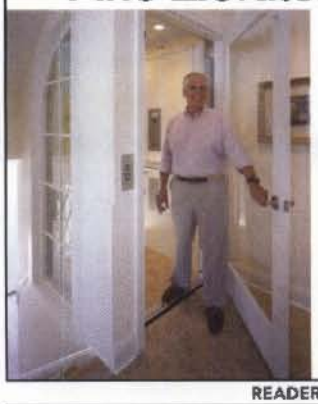

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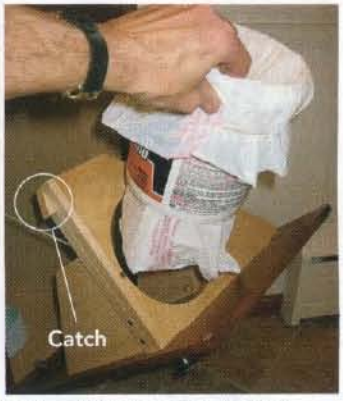
Great Ideas

INGENIOUS SOLUTIONS TO COMMON DESIGN PROBLEMS

Three bathroom refinements

1 My vanity cabinet intersects the end wall at 45°. I wanted to use the resulting space effectively and decided to hide a small trash can there. The available space was just the right fit for an empty 1-gal. drywall-mud container. With the bottom cut out, it acts as a support ring for a trash bag secured with a rubber band. I mounted a shelf inside the cabinet door and cut a hole in it for the container.

The cabinet door swings out from the bottom, which prevents the shelf from interfering with the door frame. The vanity doors all look the same from the outside, so a tug on this particular door's handle results in a slight surprise. A catch at the end of a thin oak strip lets the door fall open just enough to expose the trash can. Pressing this springy strip releases the catch, allowing the door to open wider for access to the cleaning supplies stored in the cabinet. A small brass plaque on the door identifies the trash location for guests.



Hidden in plain sight. *A catch lets the door fall open just enough to expose the trash can. It can be removed easily for emptying.*

2 If repairs are needed, access to the tub and shower valve hidden in the wall cavity is provided via a removable door camouflaged in the wainscot. I sized the door so that its vertical edges coincide with V-grooves in the tongue-and-groove wainscot. When I glued up the door, I applied a couple of reinforcing ribs behind it. The tongue edge of the door slips into the groove of the adjacent fixed wall panel. I machined off the inside half of the groove on the other edge so that it can lap over the mating wall-panel tongue.

The top and bottom of the door are concealed by the baseboard and by a rabbet underneath the chair rail. When the baseboard's trim-head screws are removed, the access door can be slipped down below the rabbet and swung out to expose the plumbing.

Now you see it, now you don't. *The plumbing access makes repairs painless. When closed, the door blends right in.*

3 My toilet-paper dispenser is handy for many reasons, not least of which is storage of extra rolls. Recessed into the wall cavity, the integrated chamber holds three rolls; when the bottom one is removed, another falls into place.

In the dispenser, a wooden spindle slips into grooves cut in the frame. Magnets epoxied into countersunk holes in the dispenser frame attract flathead wood screws in the spindle ends. A tug on the spindle releases it to remove and replace an empty roll. With the spindle removed, the hinged dispenser lid can be lifted to load additional rolls.

Dwayne Intveld is an engineering manager living in Hazel Green, Wis.

Never run out. *Flipping up the dispenser lid exposes the roll-storage chamber.*

Photos this page: Dwayne Intveld

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Baking on the go

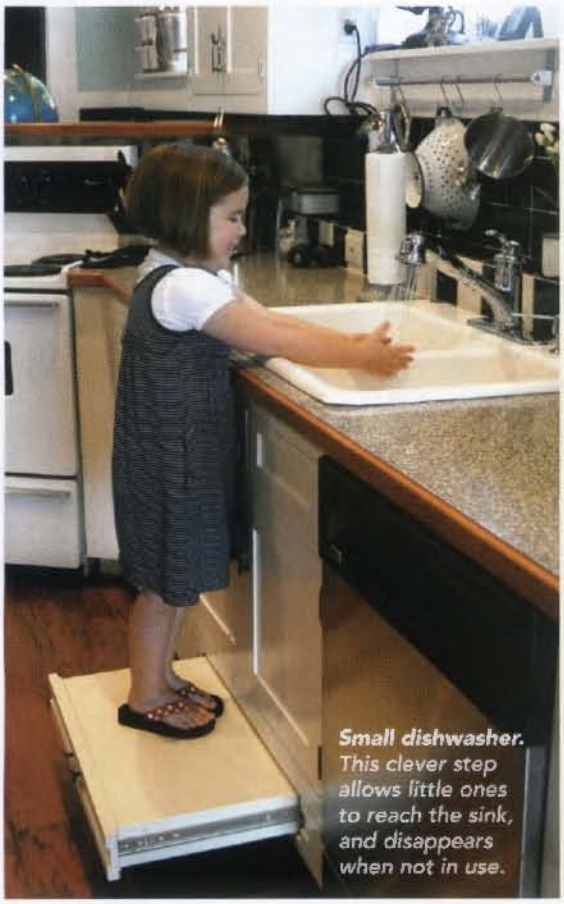
My clients asked me to design a multipurpose kitchen/family room flexible enough to accommodate many tasks, including baking. However, they didn't want a dedicated baking area that would interfere with other activities or overwhelm the rest of the kitchen. A rollout baking station offered the best of both worlds.

We had a freestanding maple cabinet constructed in the same style as the drawer fronts in the rest of the kitchen. It's about twice as large as the other drawers, though, so it provides plenty of storage for all baking necessities. The coolness of the marble top is perfect for working dough. With locking wheels attached to the bottom, the station rolls under the countertop so that it blends in with the rest of the kitchen when not in use and protects the marble from everyday activities.

The homeowners love the flexibility of this design. They can roll their baking station over to the breakfast nook to prepare breads in the morning, over to the stove for multiple batches, or even up to the sink for easy cleaning.

Architect Roc Caivano works on Mount Desert Island, Maine.

Have dough, will travel. *The baking station rolls out when needed, and rolls back into place when not in use.*



Small dishwasher. *This clever step allows little ones to reach the sink, and disappears when not in use.*

Step up to the sink

We remodeled our kitchen when my daughter was 3 years old. She needed to be able to reach the sink, but we decided that a footstool would constantly be in the way. Instead, we came up with the idea of a pullout step under the sink.

The contractor used poplar for all the cabinets. For the step, he installed a shallow drawer upside down on side-mounted drawer slides rated to carry 75 lb. When my daughter outgrows the step, we plan to turn it over and use it as a regular drawer. My one caution would be that little feet should wear shoes when using the step to avoid bumped toes if the drawer slides.

Carla Fuller is a family-law attorney who enjoys renovation projects as a hobby. Scott Coleman, the contractor, is a custom-home builder in Searcy, Ark.

Photos this page: Charles Miller (top); Jeff Montgomery (bottom).

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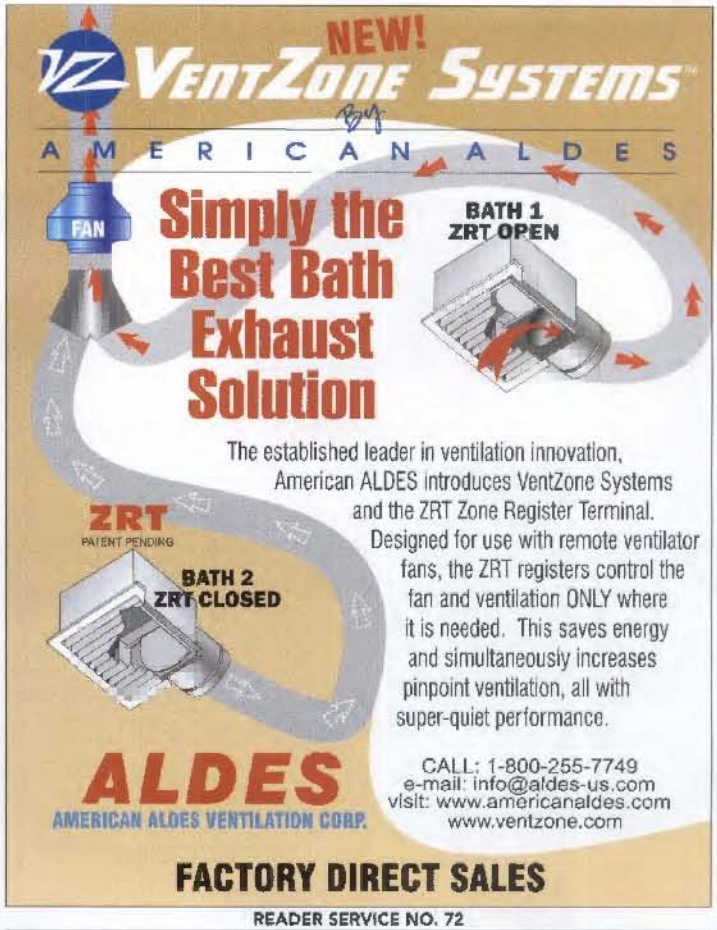

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Seamless look. *The same cabinet fronts were used for both the vanity and the front of the tub surround.*

Removable tub surround

Our original plan was to enclose the tub with travertine tiles to match the rest of the tub surround. As we thought about it, though, we realized there would be no way to access the pipes and motor underneath the tub. We had seen another tub with a wood enclosure instead of tile, and we liked the warmth it provided. From that sprang the idea of using the same door panels that we had used for the rest of the bathroom cabinetry. Ours came from the Master Bath Collection at The Home Depot. We ordered three extra door panels for the tub surround and attached them with magnets for easy installation and removal.

Dan and Sandi McMillan have been working on a complete home renovation in El Cajon, Calif.

Nice view. *When closed, the cabinet makes inventory simple. When the cabinet is opened, the spices glide out, unobstructed, at eye level.*

Smart spice storage

During a kitchen remodel, our clients requested a spice cabinet. We were not happy with the fit and finish of ready-made products, most of which are designed for use in lower cabinets. Bending down next to a hot stove to search for the paprika just isn't comfortable. Instead, we decided to construct our own cabinet.

We used Columbia's formaldehyde-free PureBond plywood. A small shelf unit mounts inside the cabinet on full-extension drawer glides. The shelves sit on adjustable pins, and small stainless rails prevent the spice jars from falling out. We installed a water-glass panel on the exposed side. Below the glass panel, four removable boxes contain the small, loose items common in today's kitchens. The maple boxes have mitered corners reinforced with purpleheart splines. Their faces are cherry, with a lip routed underneath for a finger pull. They're finished with an oil/wax combo.

Omar Zaouk is a custom green builder in Petaluma, Calif.

Photos this page: Sandi McMillan (top); Erika Clark (bottom).

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This LG has all the hallmarks you'd expect in a flagship dishwasher: an ultraquiet motor, large capacity, low water consumption, and excellent cleaning. In fact, the first thing I noticed was the number of water outlets: In addition to three rotating spray arms, two small steam nozzles set this dishwasher apart from most others. The steam jets offer a delicate steam-only cycle for crystal and fine china, or added steam-cleaning to loosen baked-on food during regular wash cycles.

With the sleek LCD touch-pad controls hidden on top of the door, you can choose different wash intensities for the bottom and top racks (pot-washing power on the bottom and delicate on the top, or vice versa) or a half-load option that cleans the top or bottom rack only. A sanitizing rinse finishes off wash cycles with 160°F water.

I especially like the well-designed, flexible rack system. The upper rack slides up and down to accommodate 14-in. plates on the bottom or 10-in. plates in the top rack. Folding and removable tines make room for pots and serving bowls. All told, the large stainless-steel washer tub holds 14 place settings. A nifty, shallow third rack at the top of the tub holds cutlery and other utensils—all the things that I've tried to cram into the single basket in my dishwasher, where they then nest together and are still dirty when they come out.

Although the LG is Energy Star rated, for a third of its price Bosch offers dishwashers that are 84% more efficient. If you run 262 loads a year, that's nearly a 100kwh difference. However, this dishwasher's water usage is pretty miserly, with cycles as low as 2.6 gal.

Available for around $1600, the LG dishwasher isn't going to win any best-buy awards, but with its gleaming stainless-steel countenance, blue LED indicator lights, and gee-whiz steam-cleaning options, it might grab a prize for "best bling."

Sean Groom is a former editor at Fine Homebuilding.

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The square knobs measure approximately 1¼ in. square; the long knobs are approximately 2 in. by 1 in.; and the full-size pulls are 5 in. long by 1⅛ in. wide. All have a projection of about 1 in. Custom sizes are also available.

Justin Fink is an associate editor.

Top photo: Courtesy of LG Electronics. Bottom photos: Krysta S. Doerfler.

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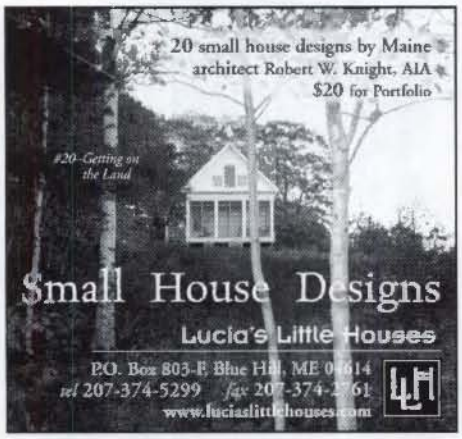

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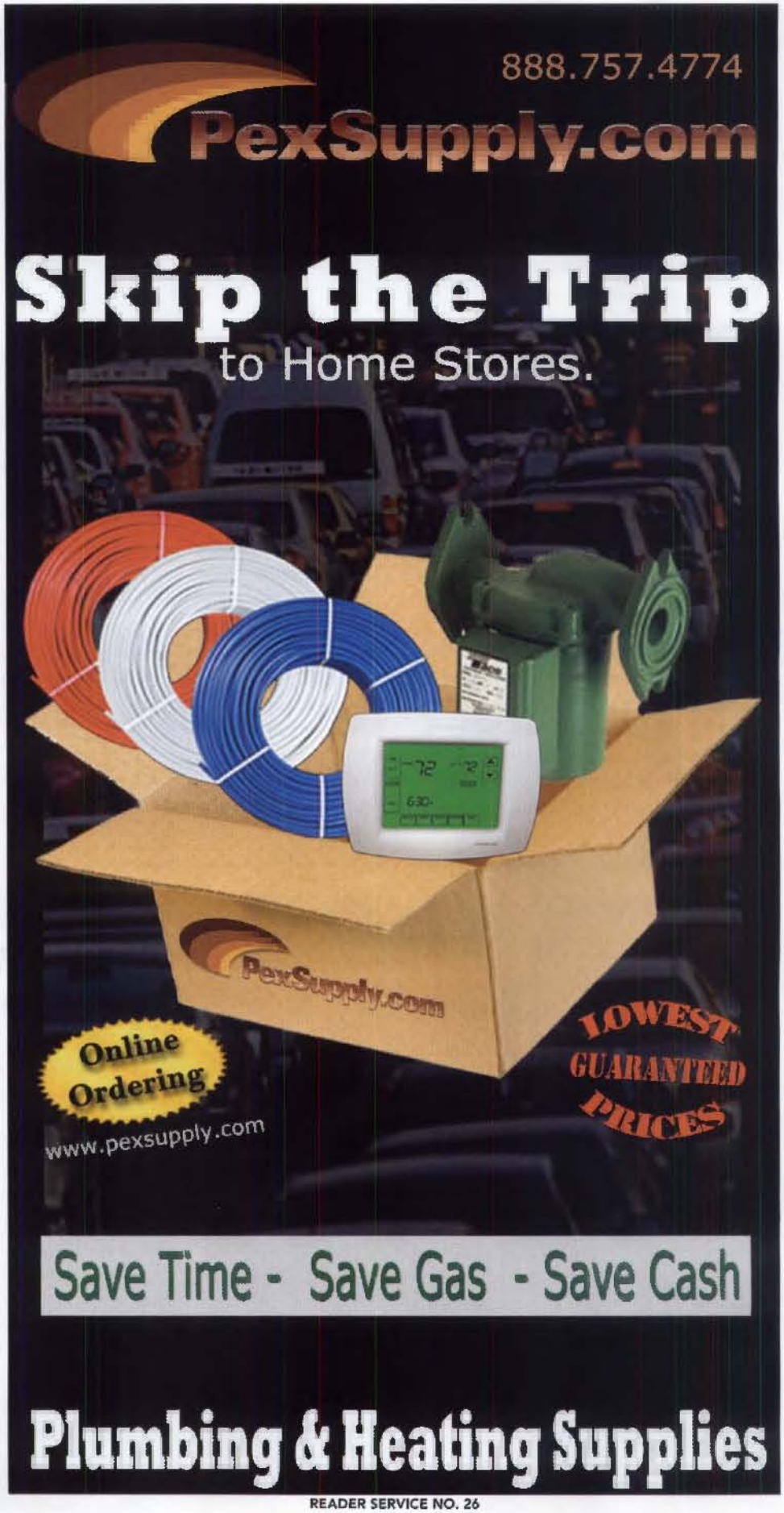

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DUAL-FLUSH RETROFIT KIT

PERFECT FLUSH

- Manufactured by Brondell
- 888-542-3355; www.brondell.com
- Cost: About $130

According to the U.S. Environmental Protection Agency, 2 billion gallons of water a day could be saved if everyone replaced their water-guzzling toilets with WaterSense-labeled models. (WaterSense products are certified by independent, third-party testers to meet stringent water-saving specs.) That is a savings of about 4000 gallons per person, per year. But what if you don't want to switch out your existing fixtures?

Perfect Flush is a retrofit kit that turns conventional commodes into water-saving, dual-flush models. Company founder and CEO Scott Pinizzotto says the product fits 98% of the 220 million residential toilets in the United States, and installation takes 15 minutes if you're handy. Just remove the existing fill valve from the toilet tank and install the Perfect Flush components (shown in green, at right). A fill valve connects to the dual-flush system and half/full flush selector.

Water use in dual-flush toilets depends on the type of waste. The user chooses the water volume by pressing a large or small button mounted atop the tank. People who keep track of these phenomena claim that 80% of one day's flushes are typically for liquid waste, which can be successfully flushed using 0.8 gpf (gallons per flush). Compare that to 3.5 gpf in a traditional toilet, and the water-saving math is persuasive.

Nena Donovan Levine is a kitchen and bath designer in West Hartford, Conn.

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- Manufactured by Rev-A-Shelf
- 800-626-1126; www.rev-a-shelf.com
- Cost: About $255 for a 24-in. unit

A kitchen full of beautiful cabinets soaring to the ceiling makes a striking statement but isn't always practical. Items stored on upper shelves often languish unused because they are not easily accessible. Rev-A-Shelf's pull-down shelving systems make dragging out the step stool a thing of the past. Using gas-assisted pistons to provide stability, the chrome-plated pull-down system brings items stored on two-tiered shelves down 10 in. and out 14¾ in. from the cabinet. Shelves are sized to fit either 24-in.- or 36-in.-wide framed or frameless cabinetry, and can support 18 lb. and 27 lb., respectively. Cabinets 42 in. tall or more can be fitted with two pull-down systems, allowing access to even the uppermost areas of the cabinet.

Maureen Friedman is an editorial assistant.

Top illustration: Courtesy of Brondell. Bottom photos: Courtesy of Rev-A-Shelf.

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PLASTIC WATER HEATER WITH A LIFETIME WARRANTY

MARATHON WATER HEATER

- Manufactured by Water Heater Innovations Inc.
- 800-321-6718; www.marathonheaters.com
- Cost: $625 to $700 for a 50-gal. heater

When two metals are physically connected in water, the more reactive of the two corrodes. To protect traditional steel water heaters from rusting from the inside out, manufacturers include an aluminum or magnesium anode rod in the tank. The rod is more reactive than the steel tank, and thus takes the corrosion. Trouble is, these sacrificial rods typically last only as long as a tank's warranty period, and then electrolysis begins to attack the steel tank. Water Heater Innovations, a subsidiary of Rheem, has eliminated this worry by eliminating the metal.

Marathon electric water heaters have one-piece, blow-molded polybutene inner tanks that never leak and never rust. These inner tanks are wound with fiberglass for strength, insulated with spray foam that is completely free of CFC and HCFC ozone-depleting chemicals (typical heat loss is 5°F over 24 hours), and then covered with a hard polyethylene shell that won't dent during shipping and after installation. In fact, Marathon claims that its manufacturing process yields a finished product that is 4 times more durable than a traditional steel water-heater tank.

Marathon water heaters do cost 2 to 3 times as much as a conventional steel heater of the same size, but they carry a no-leak lifetime warranty for as long as you own your home. If ownership is transferred, the coverage converts to a straight 15-year warranty, still longer than most of the competition. Tank sizes range from 15 gal. to 105 gal.

J.F.

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- Manufactured by California Faucets
- 800-822-8855; www.calfaucets.com
- Cost: About $270 to $350, depending on finish

An elegant alternative to traditional shower drains, StyleDrain fuses form and function. The 5¼-in. square-grid drain is available in a contemporary or traditional design and has no visible installation screws to mar its sleek appearance. (Angled hex screws are hidden under the grid.) With more than 25 finishes to choose from, StyleDrain coordinates beautifully with any bathroom motif.

M.F.

Top photos: Courtesy of Water Heater Innovations Inc.
Bottom photos: Courtesy of California Faucets.

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ELEGANT BATHROOM GRAB BARS

LUXURY GRAB BARS

- Manufactured by Jaclo
- 800-852-3906; www.jaclo.com
- Cost: Starts at $233

Designing for the future is smart, but unfortunately, it isn't always fashionable. Choosing universal-design accessories like grab bars and door pulls often means settling for mismatched finishes and utilitarian design. But Jaclo's line of luxury grab bars offers something you'll want to hold on to.

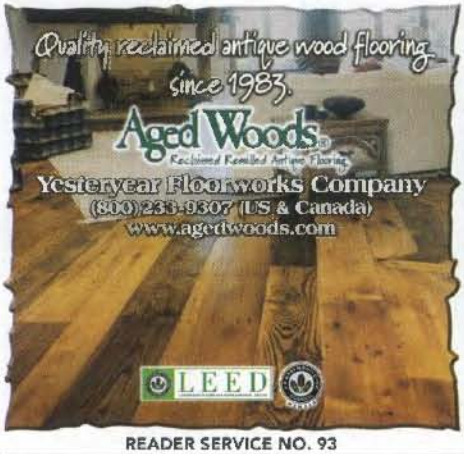
These brass grab bars come in a range of sizes from 12 in. to 60 in., in straight, T-, or L-shaped configurations. Each of the hefty models (the 12-in. bar weighs about 5 lb.) is available in 18 finishes; the finish also can be customized to match existing hardware.

Handheld showerheads can be attached to the grab bars in adjustable positions, making it easy for handicapped or elderly homeowners and guests to shower in a seated position. When not needed, the grab bar can be passed off as a classy towel hanger.

The bars attach to the wall with stainless-steel screws fastened to studs or solid blocking. New grab bars can be ordered with enlarged flanges to replace existing fixtures without tile or wall touch-ups. When installed correctly, Jaclo's grab bars support up to 400 lb. and meet ADA and ANSI guidelines.

Tory Marlin is an editorial intern.

Photos: Krysta S. Doerfler



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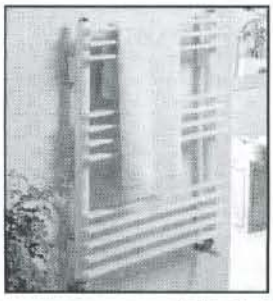

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Kitchen Remodeling for Any Budget

Know when to splurge, where to save, and what not to do: Six case studies show you how

BY PAUL DEGROOT

Most kitchen remodels that I design turn out to be major affairs. The homeowners have lived with cramped, outdated kitchens for so long that cosmetic updates just aren't enough. Your kitchen may be a better starting point. If you have enough storage and counter space, a functional cleanup area, and sensible traffic flow, gutting your kitchen may not be necessary. By focusing on key upgrades, an old kitchen can come to back life with a smaller investment.

Either way, kitchens are the most expensive room to remodel, so it's easy for even a modest wish list to outpace funds. Because it's my job to help homeowners make remodeling decisions, I've put a lot of thought into when you should splurge, how you can save, and what you should never do.

Cabinets are the heart of a kitchen

Unlike the standard dimensions of stock cabinets, custom cabinets make the most of every inch of a kitchen. Made of cherry, mahogany, oak, maple, or Douglas fir, custom cabinets are typically built with furniture-grade details by a local cabinetmaker. When splurging on stain-grade (clear-finished wood) cabinets, make sure the cabinetmaker uses clear lumber culled of knots, mineral streaks, and sapwood, and insist on color and grain direction that are consistent throughout. In this price range ($500+ per linear ft.), you should expect durable, solid-wood drawer boxes with dovetail joints, solid-wood door and drawer fronts, full-extension undermount slides, and top-quality hinges.

You can save by ordering painted, semi-custom cabinets from a national manufacturer. These cabinets are more affordable ($300 to $400 per linear ft.) because the wood doesn't have to meet the higher standards of appearance that stain-grade cabinets do. Drawers are more expensive than doors with shelves behind them, so ask for fewer drawers if your budget is tight. And skip the dovetail joints for drawer boxes. An interlocking pinned or dowelled joint can last for decades. If you can't afford undermount drawer slides, choose side-mounted ball-bearing drawer slides. You'll appreciate their fair cost and smooth operation.

SAVINGS

- Painted cabinets: **$300 per linear ft.**
- Plastic-laminate countertops: **$10 per sq. ft.**
- Ceramic subway-tile backsplash: **$10 per sq. ft.**
- Mexican Saltillo floor tile: **$5 per sq. ft.**

BIG SAVINGS AFFORD BIGGER APPLIANCES

Budget: $30,000

The homeowners splurged to create a better floor plan with a walk-in pantry. Part of a bigger remodel, the kitchen budget was limited, so the homeowners chose to save money on finishes and countertops, knowing these items can be upgraded easily later. They also saved on fixtures and plumbing with an inexpensive drop-in sink in the same location as the old sink. Splurges beyond construction were mostly for professional-style appliances.

SPLURGES

- Stainless-steel vent hood: **$1500**
- Pro-style dual-fuel stainless-steel range: **$5000**
- Sub-Zero refrigerator/freezer, complete with wood panels to match the cabinets: **$6000**

Before

After

STRETCHING THE BUDGET (4 FEET)

Budget: $50,000

These homeowners earned a tax deduction by donating their old kitchen to Habitat for Humanity. Since they wanted to add on to the house anyway, they decided to splurge on stretching the kitchen 4 ft. Stainless-steel appliances were another splurge, but a combination microwave/convection oven speed cooker served up some savings. Keeping the sink location and matching (instead of replacing) the existing sink window also saved the budget.

SPLURGES

- Deep-bowl undermount stainless-steel sink: **$900**
- Granite countertops: **$65 per sq. ft.**
- Oak flooring to match original floors in house: **$12 per sq. ft.**

SAVINGS

- Matched instead of replaced existing kitchen window
- Painted drywall above 4-in.-high granite backsplashes: **$20 per linear ft.**

Before

After

Don't buy the cheapest cabinets you can find ($150 to $200 per linear ft.) to save money. Cabinets are the heart of a kitchen, and entry-level cabinets are likely to have components made from particleboard, which can lead to sagging shelves and hinge screws that pull out. They're also apt to have poorly made door hinges, drawer boxes, and drawer slides that cannot be expected to hold up to years of use. If your budget's tight, you will be better off saving in other areas.

Durability rules the countertop

Although they can cost well over $65 per sq. ft., natural stone, quartz composites, and recycled glass are the most sought-after countertop materials today because they are durable, are available in large slabs, and are pretty enough to be a kitchen's centerpiece. If you have to have stone counters but don't have thousands to spend, look for slabs used by high-volume builders in your area. These slabs are less expensive due to limited color choices, but they are widely available. Choosing simple edge profiles can save money, too. If you're looking to upgrade your counters, contact a company that resurfaces existing counters, such as Granite Transformations (www.granitetransformations.com).

For an artistic effect, you can splurge on concrete countertops. Their shape, color, and finish are limited only by your imagination. Stainless-steel tops can add a modern look to your kitchen, and maple butcher block is a beautiful way to contrast painted cabinetry.

Available for under $60 per sq. ft., solid-surface countertops from manufacturers like Corian and Avonite are a more affordable option. These counters are nonporous, heat tolerant, and scratch resistant, with consistent color all the way through. Even more reasonably priced are tile and plastic laminate ($7 to $20 per sq. ft.). Tile is available in a range of sizes, colors, patterns, and finishes, but my recommendation is to stick with dense ceramic or porcelain, which are impervious to moisture. Plastic laminate is nonabsorptive and heat and stain resistant, but can be scratched. Because countertops are an easy upgrade and because plastic laminate is so inexpensive, it is a great entry point if you need to save now but will have more to spend later.

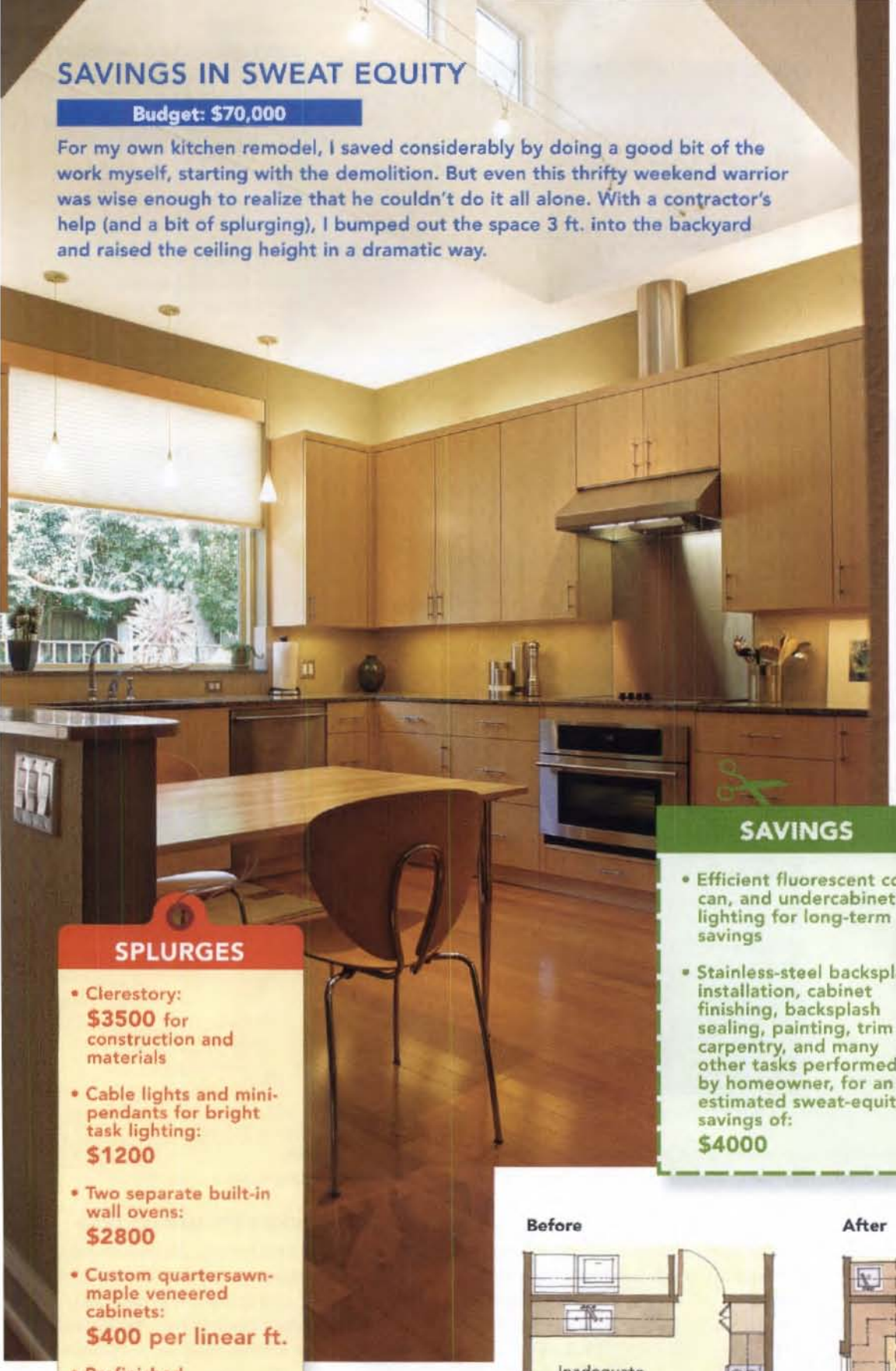
In general, you should avoid wood countertops around sinks unless you're meticulous about wiping up splashes. Messy folks should shy away from marble, travertine, and limestone slabs. They can be stained easily by

Drawings: Martha Gunstang Hill

SAVINGS IN SWEAT EQUITY

Budget: $70,000

For my own kitchen remodel, I saved considerably by doing a good bit of the work myself, starting with the demolition. But even this thrifty weekend warrior was wise enough to realize that he couldn't do it all alone. With a contractor's help (and a bit of splurging), I bumped out the space 3 ft. into the backyard and raised the ceiling height in a dramatic way.



SPLURGES

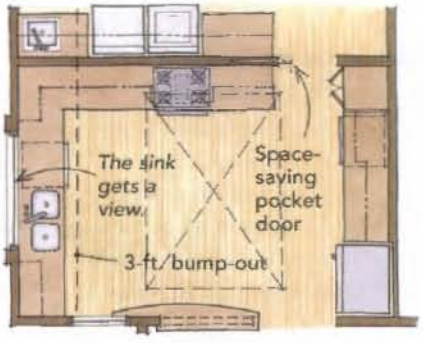
- Clerestory: **$3500** for construction and materials
- Cable lights and mini-pendants for bright task lighting: **$1200**
- Two separate built-in wall ovens: **$2800**
- Custom quartersawn-maple veneered cabinets: **$400 per linear ft.**
- Prefinished, engineered pecan flooring: **$15 per sq. ft.**

SAVINGS

- Efficient fluorescent cove, can, and undercabinet lighting for long-term savings
- Stainless-steel backsplash installation, cabinet finishing, backsplash sealing, painting, trim carpentry, and many other tasks performed by homeowner, for an estimated sweat-equity savings of: **$4000**

Before

After



My top 10 kitchen-remodeling don'ts

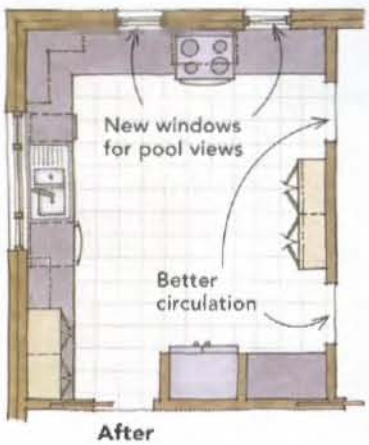
1. Don't choose tile for countertops unless you are willing to scrub grout joints often.
2. Don't settle for cheap drawer slides. They're noisy and flimsy.
3. Don't install a light-gauge stainless-steel sink. It will flex, dent, and scratch easily.
4. Don't buy cheap cabinets to save a penny. They won't last.
5. Don't skimp on lighting. A dim kitchen is dreary and can be unsafe.
6. Don't install wood floors in an active family kitchen unless you won't mind refinishing them occasionally.
7. Don't be stingy with counter space next to the sink, cooktop, or refrigerator.
8. Don't buy a cheap dishwasher. Most likely, it will clean poorly and loudly.
9. Don't use halogen undercabinet lights. They're too hot.
10. Don't install hard-to-clean backsplash materials such as porous stone, brick, or stucco.

FEWER CABINETS, BETTER VIEWS

Budget: $75,000

This family had too many cabinets in their kitchen and no views of the backyard pool. The remedy? Swap out wall cabinets for windows. With plenty of space on the interior walls for cabinets, the loss of upper cabinets on the exterior walls was not a deal-breaker. Along with reusing their existing appliances, it was one of the ways this family saved.

Before



After

SAVINGS

- Drop-in sink, kept in the original sink location: **$500**
- Ceramic subway-tile backsplash: **$10 per sq. ft.**
- Painted cabinets: **$300 per linear ft.**
- Porcelain floor tile in a simple pattern, without borders: **$7 per sq. ft.**

SPLURGES

- Electric hot-water dispenser at the sink: **$400**
- Low-voltage mini-pendant lights flanking the range: **$800**
- Quartz-composite engineered slab countertops: **$60 per sq. ft.**

wine, lemon juice, and the like. Think twice about tiles with tumbled or otherwise uneven edges that require wide grout joints. And don't use cheap glazed wall tile on a countertop. Heavy metal pots and pans can scratch it.

Stretch your backsplash bucks

Backsplashes can cost a lot (up to $50+ per sq. ft. for slab materials) or next to nothing (the price of a quart of paint). Splurge on durable, easy-to-clean, and decorative materials, including stainless steel, stone, tile, and glass mosaics. Remember, grout should be kept to a minimum and must be well sealed. You can avoid grout joints altogether by choosing the same stone slab used for the counters.

Save backsplash bucks by choosing larger mass-produced tiles. If tile is not the look you're after, a simple 4-in.- or 6-in.-high backsplash made from the countertop material is cost effective and practical, especially if it's laminate. Or simply paint the wall with a durable finish. Avoid rough or porous backsplashes that will be difficult to clean where you most anticipate splatters. Wood backsplashes eventually show moisture damage. Keep in mind that shiny materials below upper cabinets show reflections of undercabinet lights. I prefer honed, matte, or satin finishes.

Flooring choices are hard (or soft)

When it comes to flooring, you can spend a lot of your budget on a kitchen floor by laying down oak, maple, cherry, pecan, Douglas fir, or reclaimed longleaf pine. Traditional wood flooring is ¾ in. thick and is sanded, stained, and finished after installation ($10+ per sq. ft.). Durability varies among species, but a professional floor finisher should be able to make even the softest wood species look good for a long time.

Premium-grade engineered wood is a more immediate alternative; you can walk on it as soon as it is installed ($8 to $20 per sq. ft.). And forget the rumors that you can't sand and refinish these floors. They can be lightly sanded (called screening) and refinished when they begin to show wear. For flooring without water worries, consider porcelain tile. If porcelain is too austere, try tiles cut from slate, limestone, granite, or marble.

Save without sacrificing character or durability by using stained and sealed concrete ($8 to $15 per sq. ft.). Where concrete slabs are common, this can be an economical route because the slab is simply given an attractive finish. A multitude of affordable ceramic floor tiles ($3 to $7 per sq. ft.) are available as well.

If you want to save on flooring but prefer a softer surface, consider cork, linoleum, or vinyl. An added benefit is that not everything you drop will break. Floating laminate and inexpensive engineered floors such as bamboo rest on a thin foam underlayment, so you can keep standing in the kitchen longer.

Before buying a wood floor, know that a water leak in the kitchen can cause the boards to swell and buckle. If you are prone to dropping things, check to see how easily the wood dents. (Try this test with a sample board: Drop a can of tuna or tomato paste from 3 ft. up, and see what happens.) If you have dogs, their nails can scratch the finish. (Try scratching the sample with the tip of a ballpoint pen.) In high-traffic kitchens, avoid using light grout colors on a tile floor, and avoid highly polished floors that are slippery when wet.

Put some coin into convenience

Well-designed fixtures can make cleanup less of a chore, they can add style to a kitchen, and they should last as long as any other material. I don't advise buying the least expensive faucets and sinks you can find, but you won't have to spend a lot to get a lot, either.

Splurging on a faucet means paying for improved functionality, stylish design, and top-quality materials and finishes ($400+). Acknowledging the trend for pro-style fix-

NEW BLACK APPLIANCES MATCH THE OLD DISHWASHER

Budget: $80,000

Splurging on a breakfast-nook bump-out and raising the ceiling by 1 ft. added much-needed space to this remodel, which required stripping the kitchen down to the studs and starting over. With more floor space, the remodeled kitchen has room for a center island that doubles as a prep and serving station.

SAVINGS

- Efficient, fluorescent cove, can, and undercabinet lighting for long-term savings
- Countertop microwave oven in a cabinet cubby rather than an expensive built-in model: **$100**
- Black appliances and reuse of the existing black dishwasher
- Porcelain floor tile that looks like stone: **$8 per sq. ft.**

SPLURGES

- Custom white-oak cabinets: **$400 per linear ft.**
- Stainless-steel vent hood: **$1200**
- French-limestone backsplash tile with matte finish: **$15 per sq. ft.**
- Polished-granite countertops: **$70 per sq. ft.**

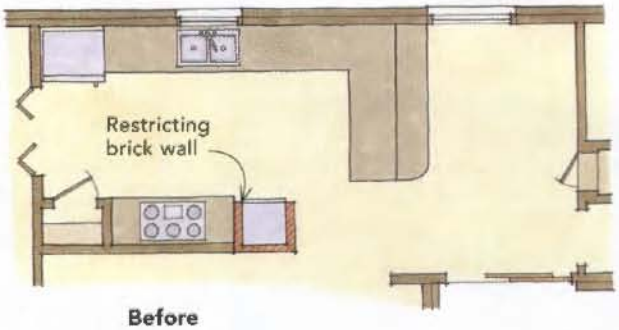
GETTING IT ALL INTO A GALLEY

Budget: $55,000

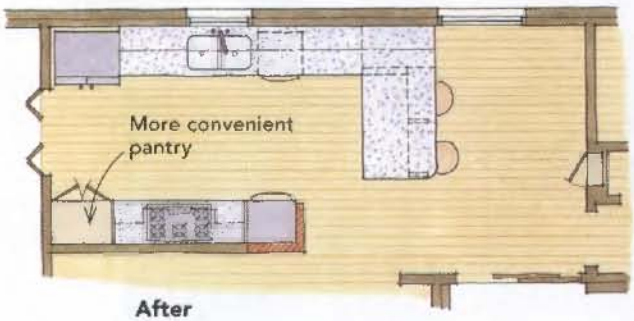
Only the window above the sink is original to this kitchen. Even the pantry closet, with its 2x4 walls, was removed and rebuilt as a pantry cabinet, gaining a few inches of precious storage space. Likewise, a brick wall next to the old 24-in.-wide wall ovens was removed to allow room for 27-in.-wide ovens. These homeowners splurged considerably, but made sure to stay within the existing footprint to tame already-high construction costs.

SAVINGS

- Refinished rather than replaced oak flooring **$800**
- Worked within the existing footprint to minimize construction costs



Before



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tures, manufacturers offer tall faucets with pull-down sprayers that share the solid brass or stainless-steel body materials that make up the core of all premium faucets.

You can save money by opting for a faucet with tubular-brass construction (starting around $150). Basic finishes and standard designs cost less, too, as do fixtures bought online (kitchensource.com, sinksgallery.com, faucet.com, faucetdirect.com) or at a home center. Don't buy a faucet online without seeing it in person first, though. Visit showrooms and home centers to do your homework.

High-end sinks are made from several sturdy materials and come in many sizes and configurations other than the common one- and two-basin models ($250+). Add convenience to cleanup with an oversize single-basin sink, or a three-bowl model with different basin depths for different functions. An integral drain board keeps counters drier. If you want to make a statement with your sink, order one carved from granite or soapstone ($1000+), or integrate a custom-designed concrete sink into the countertop. If you're sticking with stainless steel, you'll appreciate the stiff, quiet feel of 16-ga. metal.

Save on sink installation by choosing a drop-in sink. You can find plenty of attractive, durable drop-in sinks that don't cost a bundle (under $250), from 18-ga. stainless steel to solid surface. And don't overlook the venerable workhorses made from vitreous china (aka fireclay) and enameled cast iron.

Avoid thin stainless-steel sinks (22 ga. is very thin) because they are noisy and dent easily. Be aware that a heavy pot can chip enameled and vitreous-china sinks. If your back is sensitive, make sure you're comfortable washing dishes in a deep sink before purchasing one. Finally, make sure the size, shape, and configuration of an undermount sink are completely to your liking before the installers cut a big hole in your countertop.

Appliances cost money and space

If you have a big kitchen and you cook a lot, it might make sense to splurge on appliances. But when you choose new appliances, keep in mind that this is a good place to save both money and space. In fact, many of my clients save by sticking with their existing kitchen appliances.

If you decide to splurge, consider restaurant-style models that boast high-Btu cooking power, extra burners, and extra oven capacity ($2000+ per appliance). Keep in mind that these models consume a lot of space with gas cooktops and convection ovens as wide as 48 in. and 30 in., respectively. High-Btu

SPLURGES

- Terrazzo countertops with recycled-glass chips: **$100 per sq. ft.**
- Deep-bowl, undermount, heavy-gauge stainless-steel sink: **$1200**
- Custom, quartersawn-maple cabinets: **$425 per linear ft.**
- Pot filler next to the cooktop: **$600**
- Glass-tile backsplash: **$25 per sq. ft.**

cooking also requires the installation of a powerful hood fan ($1800+).

Save space and money with a slide-in range ($250+). Use a "microhood" ($150+), which is a vent hood and microwave oven in one (make sure it vents outside the house). Another combo is a speed cooker that can function as a baking oven and a microwave ($1500+). Appliances with white or black enamel finishes cost considerably less than stainless steel.

You can save over time by choosing energy-efficient dishwashers, refrigerators, and freezers certified by Energy Star. And remember, smaller ovens heat up faster, which also saves energy.

Avoid bargain-priced dishwashers. They are likely to be noisy and probably won't clean well. Also be aware that most counter-depth refrigerators cost more but have less storage volume than full-depth models. Resist the temptation of hip stainless-steel finishes if there are little sticky fingers about.

Don't underlight your kitchen

The goal of lighting a kitchen is to integrate layers of adjustable light so that you can see well enough to dice an onion or dial in the right mood for a party (see "Kitchen Lighting Design," pp. 67-73). Decent kitchen lighting can be achieved with nothing more than well-placed recessed lights and dimmers. Including trim and baffle, these lights range from $25 to $125 per fixture.

Two areas where can lights fall short, however, are countertop illumination and style. So consider splurging on undercabinet lighting ($45+ for 24-in. fixtures), and choose at least one decorative fixture to add style. You can also save by choosing energy-efficient fixtures and bulbs.

The most important mistake to avoid is underlighting the kitchen. A poorly lit kitchen is impractical and potentially dangerous. If you use recessed cans, skip the budget-grade white plastic trim and baffles; they will yellow over time. Know that halogen undercabinet lights can heat up the cabinet above. Opt for cooler LED, fluorescent, or xenon instead.

A note on prices

Are you wondering why this article says that custom, stain-grade cabinets cost $500+ per linear ft. while two of the case studies show these cabinets for about $100 less? Because they're frameless versions with slab doors and drawer fronts of veneered MDF. Nailing down prices is hard. In every instance, a range of variables from construction style to geographic region affects price considerably. With that in mind, a few comments: Cabinet prices include uppers and lowers; most materials, excluding fixtures, appliances, and lighting, reflect installed costs; and the case studies show rounded numbers. Finally, it's important to realize that spending $20 per sq. ft. on a backsplash might be a splurge for one homeowner and a savings for another. □

Architect Paul DeGroot (pdegroot@austin.rr.com) designs custom homes and additions in Austin, Texas. Photos by Brian Pontolilo.

Good design is worth the money

Before you tear out those old cabinets, start with a design prepared by a professional specializing in kitchen remodels. A good designer can help you arrange space, organize functions, and make good choices according to your unique needs, wants, and budget. He or she will document the multitude of decisions that you make together during the design process, culminating in drawings, written specifications, and material lists used by contractors to prepare bids, obtain permits, and execute construction.

Finding the right kitchen designer is important. Look for a certified NKBA designer, architect, or interior designer with a portfolio that you like. Talk to design-build companies that have a designer in-house. You might even be able to find qualified design help on the staff of a large cabinet shop or home center. Set up interviews with prospective designers, check their references, and visit projects to see examples of their work.

Fees for design services vary widely depending on experience, services offered, design complexity, and regional markets. Some designers charge an hourly rate, while others charge a percentage of the construction cost or a lump-sum amount. Hourly rates can range from $40 to $150. For a percentage of the construction cost, the range can be 5% to 15% or higher.

FineHomebuilding.com

Visit the Magazine Extras section on our home page to hear the author discuss the decisions that make these and other kitchen remodels successful.

A Skylight Cheers

Popping a skylight into a low roof made room for a bath alcove with brilliant sunrise views

BY SCOTT DONAHUE

Of all the rooms in this old house, built in 1916, the third-floor bath had the worst layout. The room measured less than 5 ft. wide by 11 ft. long, and the tub was tucked between floor-to-ceiling sidewalls. Getting to the toilet required squeezing through a 14-in.-wide passageway between the tub and the sink.

I wanted to improve circulation and bring some light into this dark, cramped shooting gallery of a bath. The partition walls flanking the bathtub had to go, and I considered replacing the built-in tub with a freestanding claw-foot model. But no one was wild about having a shower curtain as the centerpiece of the bathroom. The only alternative was tucking the tub into the adjacent attic.

I took some measurements and discovered there was just enough headroom under the roof for a tub where a person of average height could shower comfortably (drawing facing page). Compared to the cast-iron alternative, the lightweight acrylic tub chosen for the bath alcove (Ultra Baths, jetless Meridian 55; www.bainultra.com) was considerably easier to carry up three flights of narrow stairs.

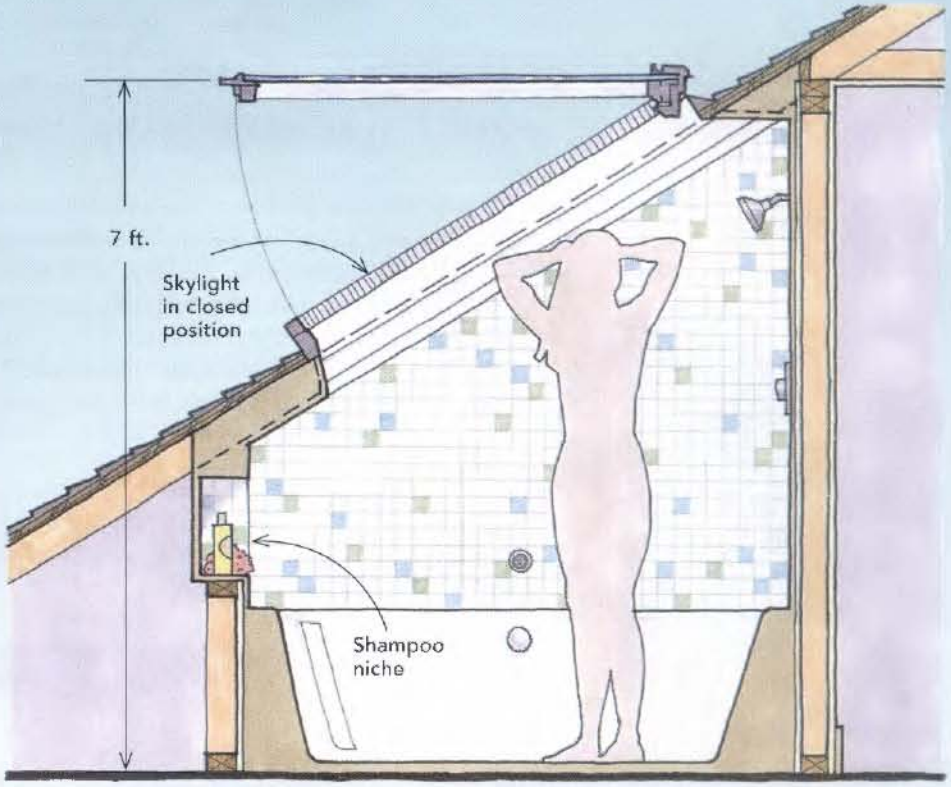
Capping the alcove with a skylight went a long way toward brightening the room. Almost as an afterthought, I decided to make the skylight operable, which added more headroom (Velux GPL roof window; www.veluxusa.com). When it's fully open, whoever is in the shower has an unimpeded view of the sunrise over the Oakland Hills. □

Scott Donahue is an architect based in Oakland, Calif. Photos by Charles Miller.

A narrow space gains breathing room. *A tapered sink counter and a low privacy wall screening the toilet help to counteract the room's long, narrow plan. The original medicine cabinet and Douglas-fir floors are ready for another 100 years of service.*

Up an Attic Bath

Small expansion, big payoff. *Centered between the existing rafters, a 30-in. by 55-in. operable skylight provides ventilation, daylight, and adjustable headroom in this tub/shower alcove tucked into unused attic space. Shelves for towels and a narrow bench made of cedar 2x4s on edge occupy the space between the rim of the tub and the original wall plane. The 2x4s are supported by L-brackets screwed to the wall framing.*



BATHED IN LIGHT

Floor-to-ceiling walls flanking the built-in tub made this narrow bathroom seem even smaller, and getting to the loo meant squeezing past the sink. Tucked into the adjacent attic, the new bathtub frees up space for a sink with a wedge-shaped counter that contributes to the room's open feeling. An operable skylight above the tub maximizes headroom and natural light. Access to attic storage is maintained via a new hatch on a bedroom wall.

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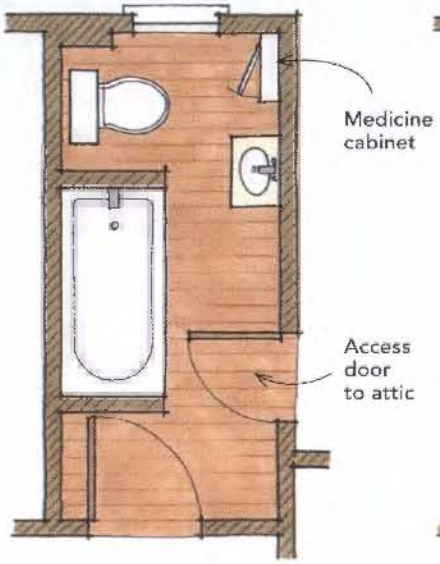

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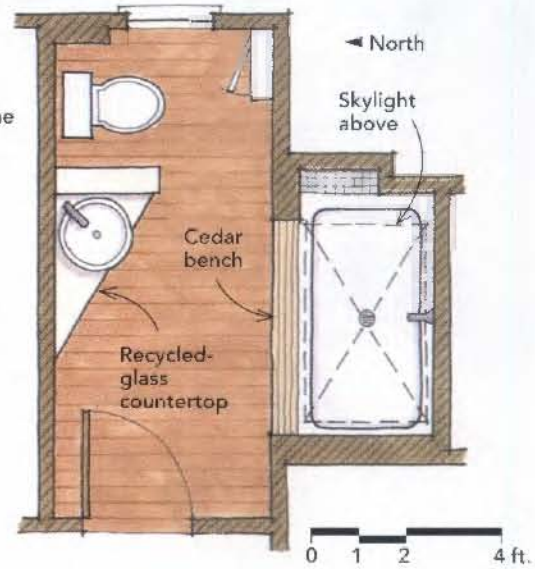


Drawings: Martha Garstang Hill

Cheaper Hot Water

From wrapping your tank to tapping the sun: ***6 ways*** to put your water heater on an ***energy diet***

BY DAVE YATES

As a mechanical contractor, I've been responding to homeowners' concerns about high energy bills for a long time. And now, with fuel costs escalating at an alarming rate, these calls are becoming more frequent, and more urgent.

Heating water for domestic purposes—showers, laundry, dishes, and the rest—accounts for 12% to 26% of a home's energy use. That's between $240 and $520 for an average U.S. household. But you can put your hot-water system on an energy diet without sacrificing comfort. The six strategies that follow range widely in cost and complexity, but all will reduce your energy bills and your carbon footprint.

Dave Yates owns and operates F.W. Behler Inc., a mechanical-contracting firm in York, Pa. Photos courtesy of manufacturers, except where noted. Technical drawings by John Hartman; illustrations by Jackie Rogers.

1. INSULATE YOUR WATER HEATER

The facts: If your tank-style water heater predates the 2004 federally mandated increase in tank insulation, it's costing you money every day in standby heat losses.

The fix: Adding an insulating jacket costs less than $30 and takes less than an hour. If you have a gas- or oil-fired water heater, follow the jacket's instructions carefully to avoid cutting off combustion air or interfering with exhaust. All appliances using fossil fuels produce deadly carbon monoxide (CO) during combustion. The combustion-air intake and exhaust draft are two components that keep CO in check. If either is compromised, dangerous levels of CO can leak into the home.

When insulating electric water heaters, be sure to allow access to the elements and the wiring inlet for future service. The inlet/outlet should be accessible for routine inspection (leaks), and the temperature and pressure (T&P) relief valve should remain exposed with its drip leg extended within 6 in. of the floor for annual testing and for observation of any water discharge.

The savings: Wrapping an older water heater with an insulation kit can cut standby heat losses by 25% to 45%, saving you 5% to 10% on your water-heating costs.

This insulation jacket *from Energy Efficient Solutions (www.energyefficientsolutions.com) has an R-6 value and fits most tanks up to 80 gal.*

Photo this page: Brian Pontolilo

2. INSULATE YOUR HOME'S HOT-WATER PIPES

The facts: Every foot of bare ½-in. copper tubing carrying 120°F water around a 70°F home loses 14.1 Btu an hour; ¾-in. tubing loses 19.1 Btu per hour (1 Btu is the amount of energy needed to raise the temperature of 1 lb. of water by 1°F). You can substantially reduce this loss by insulating the hot-water supply lines.

The fix: Pipe insulation comes in 6-ft. strips and is typically fiberglass or foam-based material. Choose the best you can afford; fiberglass or elastomeric foam will save you more than cheaper foam tubing.

Insulation should fit snugly over the tubing to prevent condensation, and all joints and slits should be firmly sealed. Foam pipe insulation is often available with a preglued slit; you can use contact cement to seal butt ends or mitered joints. Some cements require adequate ventilation, so read and follow all instructions. Fiberglass insulation should be handled according to manufacturers' instructions. (Always wear safety glasses when working with fiberglass.) Costs range from under $2 per 6-ft. length for R-2 insulation to $12 per length for R-8 UV-resistant Armaflex, used to insulate exterior piping in solar systems.

In a retrofit, the amount of piping accessible for insulating depends on the home's style. The main distribution lines in most houses are accessible through the basement; only the risers in the walls can't be accessed. In one-story homes, then, this means you can insulate all but a few final feet of piping.

The savings: If three family members shower for 20 minutes a day each, with hot water traveling 50 ft. through uninsulated ¾-in. pipe from the heater to the shower, the daily energy loss adds up to 975 Btu. Insulate that same run of piping with 1-in. fiberglass, and the energy loss is reduced to just 233 Btu. (That's like not having to heat almost 542 gal. of water a year.) By insulating the pipes, the family above saves about $12 a year if their water heater is gas-fired and $23 a year if it burns oil.

Choose the BEST INSULATION

All pipe insulation is not equal. The chart at right shows the varying effectiveness of insulation types applied to a 50-ft. run of ¾-in. copper hot-water pipe. The effectiveness is measured in Btu lost over one hour, the total amount of time the shower was used by the family cited in the example above.

Insulation type	Btu lost
No insulation (bare copper)	975
⅜-in. foam	425
½-in. foam	366
½-in. fiberglass	325
¾-in. foam	301
1-in. fiberglass	233

Source: Based on data from www.engineeringtoolbox.com

Diving into dollars

Whenever there's waste in a home, it's only natural to want to know the cost of that waste in real dollars. That's not too hard to calculate on a specific job when I have all the facts: the type of fuel used, the efficiency of the water-heating system, the length and other characteristics of the pipe runs, and the amount of temperature rise required (the difference between the temperature of the water when it enters the home and the temperature at which the water heater is set). Likewise, when I'm examining a specific house, I can fill in the blank on another big variable: the price the homeowners pay for fuel, which varies nationally and fluctuates constantly.

With so many variables, though, it's tough to make generalizations about exactly how much savings will result from a given water-system improvement. In most cases in this article, I offer potential savings as a percentage of energy conserved. In some cases, I use specific examples where I spell out the variables to arrive at a meaningful dollar-savings figure. But as they say in the car business, your individual mileage may vary.

Your local mechanical-systems specialist, plumber, or energy consultant can help you determine more specifically the savings you can expect from any water-system improvements in your home.

3. FIND AND REPAIR LEAKS AND DRIPS

The facts: Leaky plumbing that's not causing damage—such as a faucet dripping into a sink—is often ignored. But a single hot-water faucet that drips once a second (60 drips per minute) costs a homeowner with a gas-fired water heater $22 a year in wasted Btu alone. Depending on where you live, you might also pay for water and its disposal; at my house, that adds about $24. Not bad? If that leak is actually a dribble that fills one 8-oz. cup a minute, it'll cost $348 annually—plus $230 for the water and its disposal. If your water heater runs on electricity or oil, these numbers will be even higher.

The fix: Most leak repairs are manageable for any handy homeowner and can be done with little expense. Leaks in more remote areas can easily go undetected, but many can be found with a little investigation.

If you have municipal water, the meter probably has a tattletale spinner; if the faucets are all shut off and it's spinning, you've got a leak. If the meter doesn't have a tattletale gauge, record the reading in the evening after your last use and again in the morning before using any water. If there's a difference, then you have a leak.

Well-water systems present a different challenge for detecting leaks. In this case, a pressure gauge like the Watts IWTG can be screwed onto any available hose-thread faucet. Open the faucet, return to the well tank, and close the outlet valve. This isolates the home's piping from the well tank. Water is essentially noncompressible, so even a minute leak—like a slow drip—will show up on the gauge as a decrease in pressure.

Other areas to check visually for leaking hot water include the water heater's inlet, outlet, boiler drain, and relief-valve ports, where leaks can be wicked into surrounding insulation and evaporated quickly by the heated storage tank. Other common leakage sites include pinholes in piping; joints that weep where solder has cracked or where threads are not adequately tightened; and joints between different types of piping.

Once you've found the leak, the first step—whether you tackle the repairs yourself or call in a pro—is shutting off the water (something everyone in your household should know in case of a plumbing emergency). Next, you have to determine what you need to repair the leak. Pipe and joint leaks can be sealed with do-it-yourself kits sold at home centers; the kits contain a wide variety of push-on self-sealing fittings or compression fittings that adapt to virtually any type of piping. You might want to call in a pro if soldering or special tools (PEX crimp ring or expander tools) are required.

If a faucet or toilet is leaking and you're tackling the repairs yourself, I suggest you first search the Internet for your toilet or faucet model. You're likely to find an exploded parts view along with details about repairs or parts to order. Armed with this information, a trip to your local big-box retailer won't be half as frustrating as it would be if you were to stare blindly at a wall lined with thousands of parts. Once you have the parts, complete the replacement according to the manufacturer's directions.

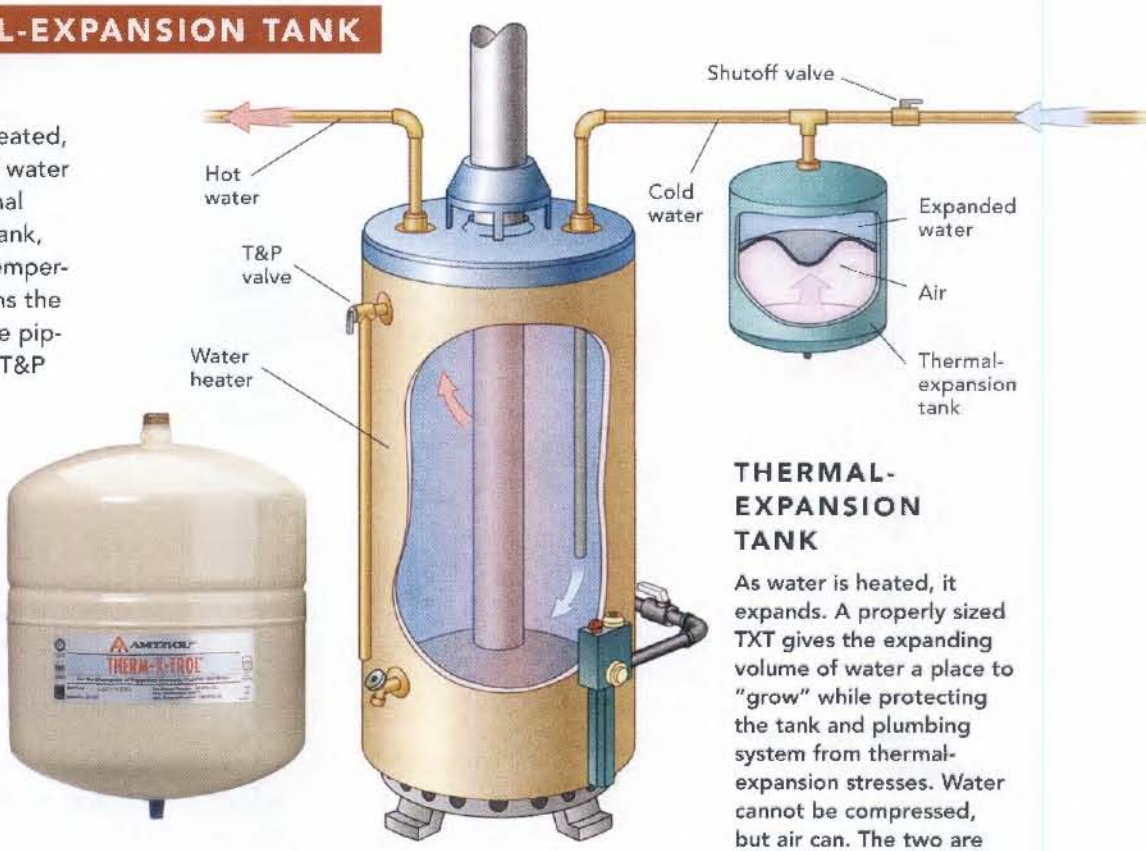
A Watts gauge helps to detect leaks in well systems. *For testing, screw it onto a laundry spigot or any hose-thread faucet.*

The savings: Let's say you've discovered several drippy faucets. You check the water-meter reading over an eight-hour period and find you've lost 4 gal. (that's 126 drips per minute). Is it worth your time and effort to fix the faucets? Repair parts might cost $5 to $50 and a few hours of your time. If the leaks are on the hot side and you heat with oil, those drips cost about $185 a year. Chances are the repairs will last for 10 years (or longer), saving you $1845 over the long run.

The small red triangle on this water meter is a tattletale gauge. *If it's spinning when all faucets are shut off, you have a leak.*

Photos left this page: Brian Leavitt

4. ADD A THERMAL-EXPANSION TANK



THERMAL-EXPANSION TANK

As water is heated, it expands. A properly sized TXT gives the expanding volume of water a place to "grow" while protecting the tank and plumbing system from thermal-expansion stresses. Water cannot be compressed, but air can. The two are separated by the rubber diaphragm inside the expansion tank.

The facts: When water is heated, it expands. Heating 40 gal. of 40°F water to 140°F generates ¾ gal. of thermal expansion. Without an expansion tank, this water leaks out of the tank's temperature and pressure (T&P) valve, ruins the water heater, or causes a leak in the piping—the weakest link in the chain. T&P relief valves discharge under three conditions: pressure that is 150 psi (pounds per square inch) or above; temperatures above 210°F; or when the valve is worn out or fouled with debris. A badly leaking relief valve can double or triple your water-heating bill.

The fix: A properly sized thermal-expansion tank (TXT) should be installed to accommodate the increase in volume as water is heated. You'll find TXTs in home centers next to the water heaters. Installation instructions come with each tank.

Grip fittings available today have virtually eliminated the need to solder piping, so the trickiest part of installing a TXT is providing proper support. Because water weighs 8.34 lb. per gal., good support is essential to prevent stressing newly installed joints. Provide that support with metal hanger strapping; don't use the cheap plastic stuff. Most thermal-expansion tanks for residential use come in two sizes: 2-gal. and 4.5-gal. For an extra $15, your system will be better protected by the larger one.

The savings: Adding a properly sized TXT can save money by reducing wear and tear on your home's plumbing. The water heater will last longer; the faucets won't wear out as quickly; and piping and fittings won't break, split, or develop leaks caused by high pressure. It's a wise investment.

5. ADD A GRAVITY-FED RECIRCULATION SYSTEM

The facts: A family of four wastes as much as 12,000 gal. of water every year waiting for hot water to travel from the heater to the tap. That wait wastes water and energy, and puts an unnecessary burden on sewage-treatment systems.

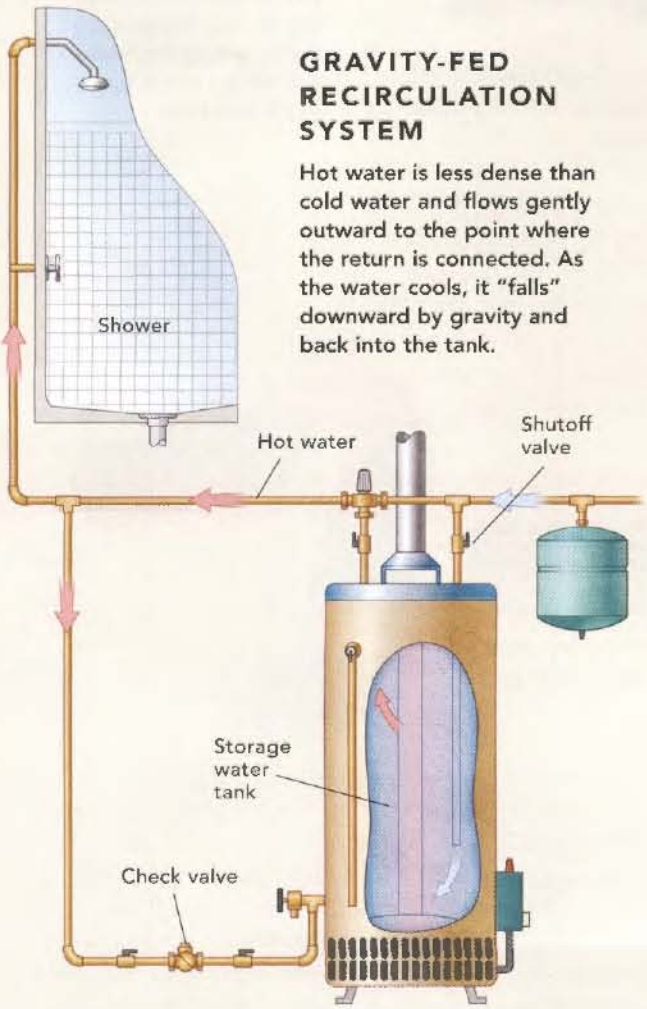
The fix: Recirculating systems eliminate the wait by delivering instant hot water to all the fixtures in your house. Most systems use an electric pump, but even energy-efficient pumps cost money to run. You can put the pump on a switch, timer, or motion sensor for efficiency, but you sacrifice the convenience of hot water on demand.

If you really want to save energy dollars and always have hot water at the tap, ask your plumber about a gravity-fed recirculation system. If you want to reduce your water-heating bill to $0, consider combining gravity-fed recirculation with a solar water heater, as I did in my home.

This is how gravity-fed recirculation works: When water is heated, its molecules expand and become less dense. Gravity causes the denser, and therefore heavier, cold-water molecules to sink to the lowest point in the system. All that's needed to set up circulation between the hotter water at the

top and the colder water at the bottom is a loop that returns from wherever the desire for instant hot water is located to the lower connection of the water heater. This generates a thermal circulation flow that gently moves hot water out to the end of the loop and back through the return. The entire loop must be well insulated to prevent wasting energy and short-cycling. With no moving parts to wear out, this system supplies instant hot water throughout the house 24 hours a day.

The savings: At between $600 and $1400, the initial cost of a recirculation system might seem like a deal breaker, but if you consider the return on investment (rather than payback), you'll see the real value a recirculation system can offer. Let's say you're wasting 12,000 gal. a year waiting for hot water to come through. Eliminating that waste with a gravity-fed recirculation system saves you $265 in water, sewage, and water-heating costs (in my case, roughly half that expense was for heating the water). Now, if you're saving a total of $265 annually and the system costs $1200, the annual ROI is an attractive 22%. A hefty tax-free return and no waiting for hot water—it doesn't get better than that. A recirculation system powered by a pump will save you somewhat less.



GRAVITY-FED RECIRCULATION SYSTEM

Hot water is less dense than cold water and flows gently outward to the point where the return is connected. As the water cools, it "falls" downward by gravity and back into the tank.

6. TOSS YOUR OLD TANK AND TRY

The facts: Efficiencies for water-heating systems range from 63% to 99%, and savings rise markedly with these efficiencies. Because upgrading your water heater can save significantly on energy costs, start by evaluating its efficiency. This chart lists household water-heating systems from least to most efficient based on the energy factor (EF), a measure of overall efficiency. *Energy* efficiency is not the same as *cost* efficiency, however. Electric storage-tank heaters have a high EF, yet typically cost more to operate; the wiser economic choice would be an appliance with a lower fuel cost, even if it's a bit less efficient. Also, while all indirect water heaters are highly efficient, their actual efficiency depends on the boiler they're connected to.

LEAST EFFICIENCY MOST

- Oil storage tank
- Propane-gas storage tank; natural-gas storage tank
- Propane-gas tankless; natural-gas tankless
- Electric storage tank
- Electric tankless
- Indirect water heaters attached to electric, oil, or gas boilers
- Solar

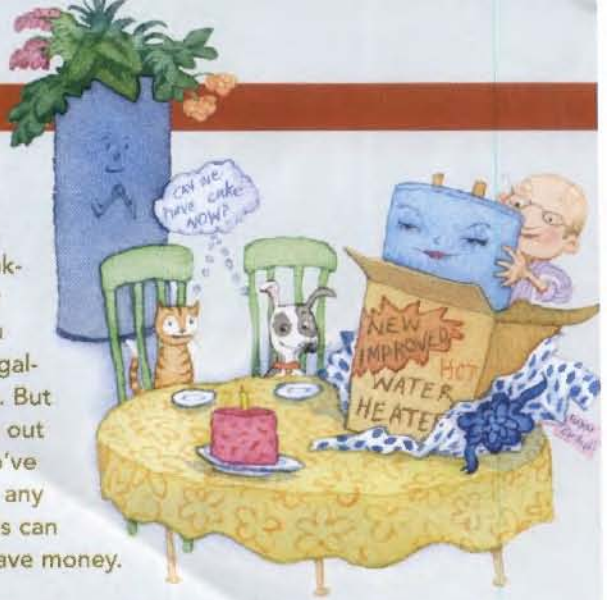
The fix: **TRY A NEW TANK** Replacing a tank-style water heater is a relatively straightforward task. Due to federally mandated changes, today's models are safer and more efficient than those from just a few years ago. One change is beefier insulation (making them slightly bigger, so measure the space first). The feds have also lowered the Btu input, which, while boosting efficiency, also lowers the water heater's gallon-per-hour recovery rate. As a result, you might need to increase storage volume by installing, for example, a 50-gal. model in place of a 40-gal. one.

You can expect to spend $500 to $1900 for a good-quality water heater. The range is due to the variety of gas and oil tank-style water heaters available today: atmospheric chimney-vented, where exhaust exits unassisted through a chimney (the least expensive to purchase, but the most expensive to operate); indirect-vented, where an electric blower exhausts combustion gases through horizontal piping (moderately more expensive to purchase and more demanding to install correctly); and high-efficiency sealed-combustion models with direct vents, in which both exhaust and combustion air are hard-piped to and from the home's exterior (the most expensive, but the least costly to operate). Sealed combustion also eliminates combustion-related outdoor-air infiltration, which adds to a home's heating load.

The savings: Switching out an old tank style with 63% efficiency for another with 67% efficiency won't save you much, but upgrading to a 90% efficient, sealed-combustion model is a step in the right direction.

Bottom photo facing page: John Morrison

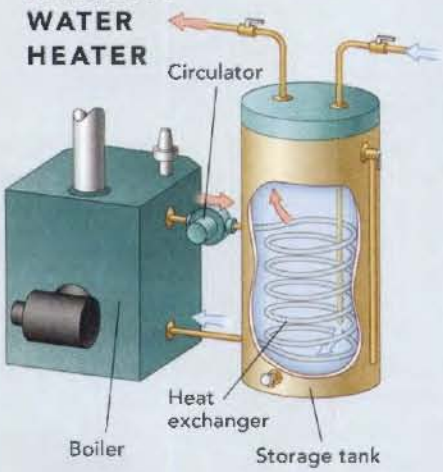
The Takagi T-K3 tankless water heater has an overall efficiency of 86%.



***The fix:* GO TANKLESS** Although tankless and tank-style water heaters both operate at roughly 82% thermal efficiency when their burners are on, tank-style water heaters lose so much heat during standby mode that their actual efficiency averages 63%. If you install a tankless model and use the same number of gallons of hot water, you could save that 19% difference. But here's the catch: Because there's no threat of running out of hot water with a tankless heater, some people who've installed them start using more hot water, wiping out any savings. Used with restraint, however, tankless models can be more efficient than tank-style water heaters and save money.

The savings: Many of my customers switch from tank to tankless for the endless supply of hot water, rather than the cost savings. The cost of replacing a tank-style water heater with a tankless model ranges from $1500 to $2900. If you control your hot-water use and get the maximum 19% savings, you'll save about $76 on a typical annual water-heating bill of $400.

INDIRECT WATER HEATER



***The fix:* USE YOUR BOILER** If you have a boiler for hydronic (water-based) heating, you can add an indirect water heater, essentially a tank that stores potable water heated through the boiler. Installed properly, an indirect water heater's operating efficiency will closely match the boiler's; when used with a high-efficiency modulating condensing boiler, the overall efficiency can range well above 90%. Because the boiler's full Btu output is devoted to making domestic hot water, these models can meet the output of tankless water heaters. With no need for fuel lines or flues, highly insulated indirect water tanks can be located remotely from their energy source (the boiler) and closer to the points of use, reducing the wait for hot water. Adding an indirect water heater to a hydronic-heating system costs $1600 to $2800. These units last up to 30 years, and in life-cycle cost comparisons offer one of the lowest-overall costs for domestic hot water.

The savings: An indirect water heater is as efficient as the boiler to which it's connected, from 78% to 98%. The range of savings is just as broad: Depending on water usage, fuel type, and other factors, you could save from about $50 to $400 a year.

Liquid sunshine. *The author assembles the Viessmann vacuum-tube solar array that produces 80% of the hot water for his home.*

***The fix:* GET STOKED BY THE SUN** Solar hot-water systems provide free hot water, but at an up-front cost that might seem too steep: $6000 to $12,000, on average. Maybe that's why the minute solar is mentioned, everyone asks about the payback. Federal and local incentives can help offset the cost. (Visit the North Carolina Solar Center's database at www.dsireusa.org for incentives in your area.) Currently, the federal residential tax incentive for solar installations equals 30% of the system's cost or $2000. Solar hot-water systems fall into two categories: flat panel and vacuum tube. Both systems work well when properly installed and can last 30 years or longer.

The savings: My home's Viessmann 30-vacuum-tube system produces about 80% of our hot-water needs (typical savings are 70% to 80%). My payback is expected to be 12 years, but my ROI at today's energy costs is 5%—better than current CD rates. As fuel costs increase, so does my ROI, which also shortens the payback time. Showering in liquid sunshine feels better, too.

A Kitchen for Cooks and Kids

This remodeled kitchen with a 1930s look finds room for sit-down meals, cooking lessons, and homework sessions, all at the same time

BY MICHAEL PEKOVICH

We used to have a love/hate relationship with our kitchen. Our house was built in 1937, and a mid-1970s remodel added 75 sq. ft., a bank of windows, and a skylight adjacent to the kitchen. This effort created a large, light-filled space, which sold us on the house; but like many poorly planned renovations, the added space lacked purpose and efficiency. It had a small work area along one wall, with some sagging bookshelves inset between the studs over a radiator.

We filled the open space with a table and some chairs, adding an obstacle to traffic flow into and out of the house. In a display of useless redundancy, our seldom-used dining room a few feet away held another table and a set of chairs (floor plan p. 50).

When our second child arrived, we felt our house begin to shrink. We had to find a way to open the rooms to one another and create a sense of spaciousness. And we needed to make better use of the spaces we already had, especially the sunny, underused corner by the kitchen.

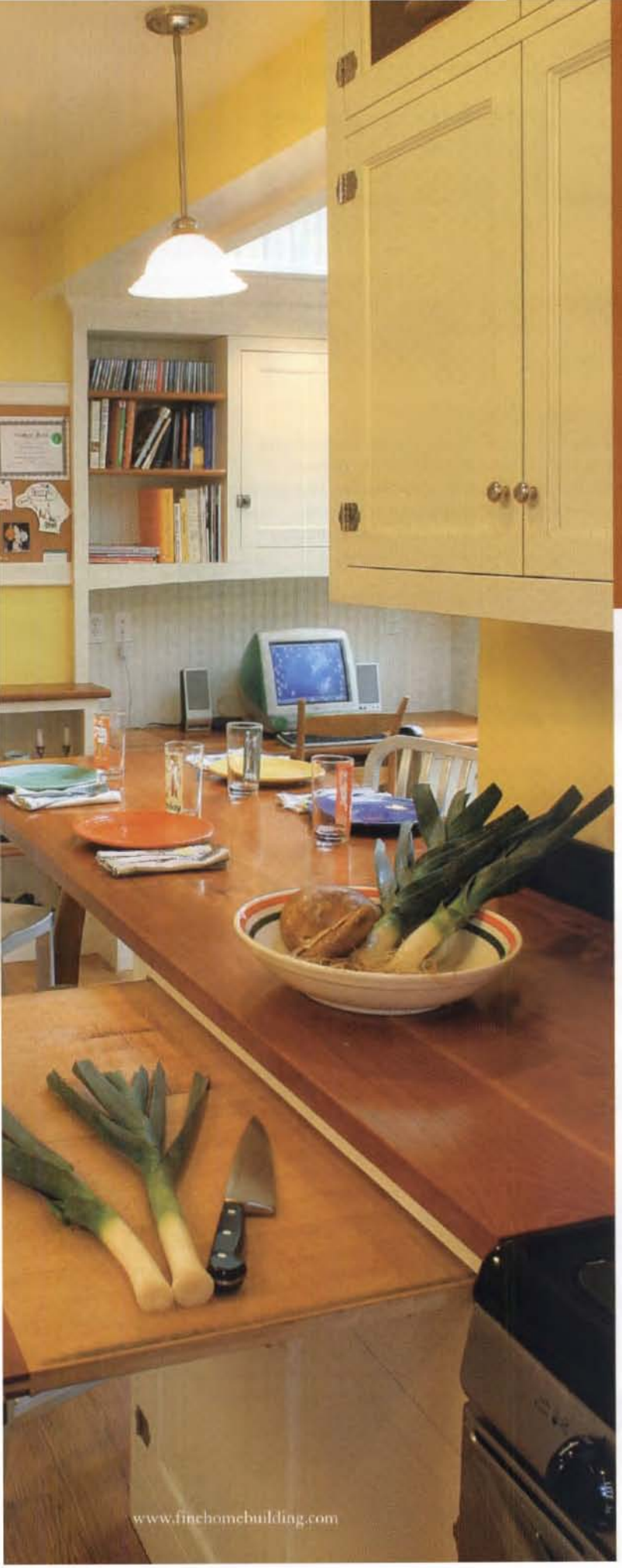
Long sightlines add space without adding more room

Our first move was to open the kitchen to the dining room (photo right), creating a view that extends across the house. The once-lonely and underused dining table is now visually connected to the kitchen and serves frequently as a homework, craft, or sewing table where someone can have a little more space to work yet still partake in kitchen banter.

A new peninsula extends partway across the opening to the dining room. Its cherry counter acts as a built-in sideboard for the dining area. The cabinet below houses table linens, place settings, napkins, and other paraphernalia, along with all of the kids' art supplies.

The peninsula countertop wraps around the opening into the kitchen and steps down to create a desk above the radiator. The family computer

The kitchen/dining connection. *Opening up the wall between the kitchen and the dining room extended the views from one to the other. The countertop between the two rooms serves as a buffet for dinner parties. Like the views, the cabinet drawers open into both the kitchen and the dining room. Photos taken at A and B on floor plan.*



From just OK to Internet café. *A computer workstation tucked into the corner and a bar-height dining counter turned inefficient spaces into hardworking places. Photo taken at C on floor plan.*

is stationed here, serving as a homework and gaming center for the kids and as handy Internet access for anyone in need of a recipe. I took out the sagging shelves, which spanned more than 5 ft., and replaced them with a combination of open shelves for cookbooks and a cabinet for enclosed storage.

Our little kitchen table was now a bigger obstacle than ever. It had to go, but we still wanted a place to sit in the kitchen for breakfast, snacks, and weeknight dinners. So we extended the kitchen counter beyond the cabinets, into the previously open territory, creating a dining area. This move also extended the work area of the kitchen to almost its entire length, and made a rational pathway from the back door to the rest of the house (floor plan p. 50).

In addition to being a place for meals, the dining counter is a prime homework location where student and cook can keep each other company. The barstools are also a favorite gathering spot for guests when we entertain.

Simple refinements for cabinets and countertops

In designing the kitchen, my aesthetic goal was to keep it consistent with the house's vintage and modest sensibility. I kept things simple, with white-painted cabinets and nickel-plated hardware. I built the cabinets myself and couldn't resist adding a few details to distinguish them from the factory-made variety. For example, I wanted the upper cabinets to extend to the ceiling, but I was worried about the tall, skinny doors that would result. To solve that problem, I added small, glass-paneled doors along the tops of the cabinets. The glass fronts also let us display our collection of '30s California pottery.

To keep the cabinets consistent with the period, I eliminated the toe kick, bringing the face frames to the floor. The excep-

tion to this detail is the arched cutout at the sink, where toe space is most appreciated.

When it came to counters, we dallied. We had intended to use manufactured stone because of the low maintenance, but it was too artificial looking. Granite and marble seemed too extravagant for our dwindling budget, so we chose soapstone, which is softer than granite yet denser and more stain resistant. Because soapstone can be worked with woodworking tools, I was able to fabricate and install the counters myself, saving a lot of money.

As much as we liked soapstone, we thought it would be too cold and uninviting for a dining surface. We used cherry for that portion of the counter instead. To protect the wood surface, I brushed on three coats of Waterlox, a tung-oil-based varnish. After extended use, the finish is holding up well.

The hate is gone from the kitchen relationship

Our kitchen is not just good-looking; it's hardworking, too. Relocating the refrigerator rewarded us with another 3 ft. of counter space and created a more efficient work triangle. Two slide-out cutting boards flanking the stove add utility and the unexpected advantage of providing a lower worksurface for the kids. There is plenty of room for multiple cooks.

My biggest regret was not insisting on a vent routed to the outside for the stove's exhaust fan. Instead, we're stuck with a recirculating fan that practically rules out any serious grilling action on the stove. Other than that, the love/hate relationship we used to have with our kitchen is history. □

Michael Pekovich is the art director at *Fine Woodworking*. Photos by Charles Miller, except where noted.

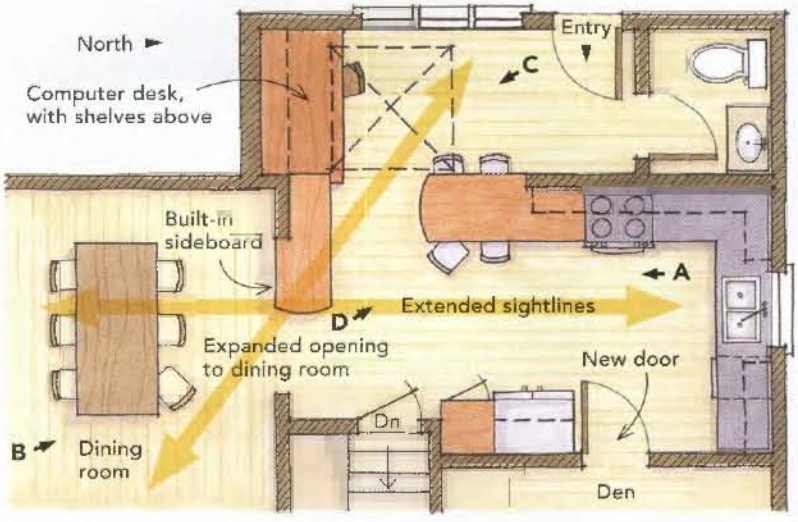
NEW EDITION OF AN OLD ADDITION

BEFORE Lost opportunity, but plenty of daylight

A long, narrow 1970s-era addition to the back of the house included a powder room, a back door leading to the garage, and a big skylight over an open space. Unfortunately, though, the space lacked purpose.

AFTER A kitchen an efficiency expert could love

Enlarging the opening between the kitchen and the dining room created long sightlines along two axes and provided room for a sideboard with drawers accessible from both sides. To streamline traffic flow, kitchen seating changed from a table to a counter; a door added to the den passageway also cut down on through-kitchen traffic. And the new storage cabinet and computer station are much more useful than the original set of sagging shelves.



Photos taken at lettered positions.

0 2 4 8 ft.

Cool stone counter, warm wood table. *Soapstone counters to the right of the stove are the primary food-prep surfaces. Because of its soft, talc-based composition, soapstone can be shaped with woodworking tools. The author sealed this counter with boiled linseed oil for a hard, lustrous finish that isn't oily to the touch. To the left of the stove, a cherry counter extends beyond the cabinets into a tabletop that's warm to the touch. Photo right taken at D on floor plan.*

FineHomebuilding.com

Look for the Magazine Extras section on our home page to learn how the author made the cabinet doors.

Drawings: Martha Garstang Hill. Bottom photo: Michael Pekovich.

SOURCES **Flooring:** Adura vinyl planks; Mannington, www.mannington.com **Hardware:** House of Antique Hardware, www.houseofantiquehardware.com **Pendant light:** Antique pewter; Hampton Bay, www.hamptonbay.com **Stools:** 1006 Navy Counter Stool; Design Within Reach, www.dwr.com **Waterlox:** www.waterlox.com

FEEDBACK
FAUX OAK FLOORING

As much as I would have loved a hardwood floor in the kitchen, it was beyond our means. Our main priority, then, was finding a floor covering that looked reasonably like hardwood and was extremely durable. We chose Adura, a vinyl plank flooring by Mannington. At $3 per sq. ft., the 3/16-in.-thick planks have a fairly random pattern and a satin finish. We chose Essex Oak Honeytone, but a variety of wood patterns are available in multiple color options. The 5-in.-wide by 48-in.-long planks are glued to the subfloor, so seams aren't an issue. We use a damp mop to keep the floor clean. It's holding up well, and more than a few people have mistaken it for the real thing.

Nickel-plated accessories. *Cupboard latches, bin pulls, and hinges are right in keeping with the style of the house ("Sources" above).*

Fridges move forward

1 Retro cool
Elmira Stove Works' Northstar 1952 refrigerator.

2 Pot filler
Whirlpool's rotating dispenser fills big pots twice as fast.

3 Hidden hinges
Thermador's Freedom Hinge lets doors sit flush with cabinetry.

4 Light touch
Kenmore's Elite features exterior LED controls.

5 Another level
GE's pull-down shelf increases usable space.

6 Double depth
GE Profile's armoire-style fridge improves on the popular French-door concept with two freezer drawers (detail below).

New Frontiers

They come in more shapes and sizes than ever, and do

Once upon a time, the kitchen was a place to cook, and the refrigerator was a place to keep food cold and reasonably fresh until you cooked it. But just as we demand more of our kitchens—not only for food preparation, but also for entertaining guests and organizing our lives—we're demanding a lot more from our refrigerators.

With features ranging from LED lighting to advanced temperature-control systems and easy-access designs, today's refrigerators bring food storage to a new level. Fridges have an average life expectancy of about 15 years, so chances are a lot of these changes have occurred since you last bought one.

Above all, the refrigerator you buy today is far more energy efficient than the old model in your kitchen. According to Energy Star (www.energystar.gov), the federal program whose label identifies the most-efficient appliances on the market, today's Energy Star-qualified refrigerators use half the electricity of those manufactured before 1993, and 65% less than those built before 1980. Replace a model made in 1990, Energy Star says, and

you'll save the equivalent of what it costs to light an average home for four months.

Watching the watts

Last April, Energy Star nudged the bar a bit higher. Until then, full-size fridges that used 15% less energy than the federal minimum qualified for the sticker; in April, that margin increased to 20%. Refrigerators manufactured under the old standard can still be sold with the Energy Star label, but they can't be promoted as Energy Star-rated appliances.

It's not a big difference—this year's Energy Star model will save you less than $10 annually over last year's—but on a national scale, the savings are impressive, estimated at $23.5 million a year. Still, a bigger priority for the folks at Energy Star is persuading Americans to unplug and recycle the 47 million refrigerators out there that are more than 10 years old and costing a collective $5 billion a year to keep on the grid (see sidebar, p. 54).

To meet the new criteria, manufacturers say they've added more-efficient compressors, better insulation, and more-precise temperature controls. European brands like Liebherr,

for Refrigerators

their job with less energy and greater precision

BY DEBRA JUDGE SILBER

New focus on old fridges

Refrigerators become incrementally more energy-efficient every few years, but the big savings, both energy- and dollar-wise, come from switching off appliances that are more than 10 years old. This year, Energy Star (a joint program of the U.S. Department of Energy and the Environmental Protection Agency) launched a campaign focused on convincing consumers that they should unplug their old fridges and recycle them.

The program's Web site, www.RecycleMyOldFridge.com, offers a calculator that compares the cost of operating your current refrigerator to that of a new one. It also features a database of manufacturers' rebates for qualified appliances and links to state and local refrigerator-recycling programs.

Before you buy a new fridge, be sure to check with your utility company for rebate programs. Some offer a cash incentive for recycling the old one; others offer rebates on the purchase of a new Energy Star model. Although many dealers remove an old fridge when they deliver a new one, not all are committed to recycling. Many municipalities will also pick up your old refrigerator or freezer and are required by law to dispose of refrigerants and other environmental contaminants properly. Contact them directly for more information.

Bright idea. *Interior LED lighting saves space and provides better illumination. (Shown: Bosch Linea 800 Series with CoolGlow interior LED lights)*

Siemens, Bosch, and Vestfrost, whose North American products are targeted at high-end consumers, employ some of the most sophisticated energy-saving technologies and, in a few cases, can boast of slightly higher energy savings. But you can buy an Energy Star-rated fridge at almost any price point. A no-frills, $800 top-freezer unit might lack the fancy gizmos of a French-door, LED-lit, variable-speed compressor-equipped luxury model, but still match it on the energy-use scale.

Compressors account for 83% of the energy used by refrigerators, so more efficient compressors generally translate to more efficient refrigerators. Variable-speed compressors save energy by operating at low speed during low-usage periods (such as overnight) and then compensate by running faster during periods of high usage—for example, when the door is repeatedly opened and shut as a family prepares breakfast. Still mostly limited to European brands and professional-style built-ins, variable-speed compressors are now showing up in some GE Profile and GE Monogram products, as well as Whirlpool's high-end built-in lines. Officials at Energy Star say more manufacturers have indicated they might follow suit.

Fresh air means fresh food. *High-end brands offer air filtering as well as filtered water. (Shown at left: Liebherr model CS2062)*

Like better compressors, improved insulation helps refrigerators to run more efficiently and more quietly. Most manufacturers use foam, but at least one, KitchenAid, uses vacuum insulation panels. Improvements to software that governs cooling and defrosting, as well as additional temperature sensors, also help fridges to boost efficiency.

Custom cooling means fresher food

These days, most mid- to high-end refrigerators come with automatic or user-adjustable controls that manipulate temperatures in specific areas of the refrigerator or freezer, enabling it to cool warm leftovers quickly or freeze items rapidly after they are home from the supermarket. Bosch's Integra and Linea models, for example, offer SuperFreeze and SuperCool functions that sense the presence of warm food and automatically drop the interior temperature to the lowest-possible setting, returning to the original setting once the food has chilled. Others, such as the Cus-

Seemingly seamless. *Specialty hinges opening to 115° allow newer built-in models (such as this one from Liebherr) to be installed flush with surrounding cabinetry.*

tomCool drawer on GE's Profile line, allow consumers to activate temperature features at will. Activating its Express Thaw function, for example, turns on a heater that quickly defrosts items, then switches to cooling to keep food from spoiling.

Better temperature sensors and improved airflow, manufacturers say, are the keys to precise temperature control. GE, Bosch, and Thermador all point to their airflow systems as fundamental to performance; Thermador claims the FreeFlow air system in its Freedom Collection refrigerators keeps the interior temperature consistent to within 1.5°F. Airflow is also used to keep specific areas of the refrigerator compartment colder than others. In-door beverage centers on some GE Profile, Whirlpool, and Amana models channel air from the freezer to keep milk or soda in these compartments 2°F to 3°F colder than the rest of the fridge.

Improved by degrees. *Fisher & Paykel's 36-in. CoolDrawer has a wide range of temperature settings, from deep freeze to merely cool.*

Promising precise temperatures is one thing; delivering them is another. Maryland-based kitchen designer Steven Bullock says that units that let the user set temperatures, rather than adjust automatically, deliver fresher results.

A breakthrough in refrigerator lighting

Flat-panel LED lighting is a new feature that's changing the way we look at refrigerators. Mounted on the sides, top, or back of the cabinet, or in some cases within drawers, LEDs provide sharper illumination while using less energy and giving off less heat than incandescents. Despite their watt-saving reputation, though, LEDs don't figure into energy ratings: Government efficiency tests are done with the refrigerator door closed. And since the lights come on only when the fridge is opened, their contribution to energy savings is negligible. Instead, manufacturers promote LED lighting as a space saver that also aids in organization and food preservation. The better you see the back of the fridge, the less likely you are to miss something growing there.

Healthy fridge, healthy food

Consumer interest in healthy eating has not been lost on refrigerator manufacturers. Along with smart temperature controls and better lighting, most mid- to high-end appliances offer water filtration (in those units equipped with ice and water dispensers), and some add air filtration to minimize transfer of odors from refrigerator to freezer. Refrigerator water filters typically consist of carbon filters that reduce chlorine and sediment, though some do more. Sub-Zero's advanced water filtration, for example, is designed to remove chemical pollutants, viruses, and bacteria. Forgetful about filter changing? Manufacturers have added indicator lights to remind you.

High-end refrigerators also filter the air. Sub-Zero's redesigned built-in line uses a process borrowed from commercial refrigeration in which the entire volume of air in the refrigerator is "scrubbed" once every 20 minutes to eliminate odors, viruses, and bacteria as well as the ethylene gases that promote food spoilage.

Not to be outdone, Kenmore this year unveiled refrigerator crisper drawers infused with Microban. This antimicrobial additive won't stop forgotten fruit from sprouting fuzz, but it inhibits bacterial growth on the drawers themselves and purportedly lasts the lifetime of the refrigerator ($1099 to $1399, depending on the color and model).

Styling opens new doors

There's still a lot to be said for the standard top-freezer, single-door refrigerator models: They're the cheapest to buy, they require the fewest repairs (those through-the-door ice maker/water dispensers are notoriously glitchy), and they perform the best energy-wise. So if

Corralling the brands

Don't be surprised if the features on competing refrigerator brands sound familiar. Although there are dozens of brands, there are but a handful of large manufacturers in the residential-refrigerator business. With multiple brands under single ownership and competitors regularly building specific models marketed under each other's brand names, the lines are blurry and constantly in flux. Add in the manufacturers' tendency to play down the connections, and it's almost impossible for a consumer to keep track.

LG, Liebherr, and Samsung are three manufacturers that make their own brands. Others manage several brands under one corporate umbrella.

Whirlpool Corporation, for example, developed the Whirlpool and KitchenAid brands, but also owns Admiral, Amana, Jenn-Air, and Maytag. General Electric sells its appliances under five brand names along a wide range of price points: Hotpoint, GE, GE Café, GE Profile, and GE Monogram.

German company BSH Home Appliances owns the Thermador, Gaggenau, Siemens, and Bosch brands. But Bosch's side-by-side refrigerators have been made by Korean manufacturer Daewoo Electronics, and a number of Thermador refrigerators have been manufactured by Whirlpool.

Kenmore, the Sears brand that ranks second in U.S. sales after GE, doesn't make any of its appliances. Kenmore-branded fridges are built to the company's specifications by Whirlpool, LG, Electrolux, and other manufacturers.

What you get for . . .

$799

Maytag
Top mount

Capacity:
18 cu. ft.

Features: Spill-proof glass shelves, up-front controls, vegetable crispers with humidity control, automatic ice maker with bin, wire freezer shelf, gallon door bins

$2000

Kenmore Elite
Side-by-side

Capacity:
23.1 cu. ft.

Features: Energy Star rating, counter-depth dimension, enhanced water filtration, advanced ice production, door beverage chiller

$9000

Sub-Zero
48-in.
Side-by-side
built-in

Capacity:
28.3 cu. ft.

Features: Dual refrigeration, air and water filtration, flush hinges (optional), automatic ice maker, easy-access condenser

economy and reliability matter, they're a good choice, and they still account for half of all refrigerator sales.

Refrigerators with bottom-mount freezers, however, are the current favorite, with sales increasing 330% industry-wide, from 360,000 in 2000 to 1.5 million last year, according to GE spokeswoman Allison Eckelkamp. "It's what people want now," she says, adding that the company has added bottom-mounts to its lower-priced GE brand.

French-door models—with a freezer drawer below two refrigerator doors—make up the most rapidly growing category. But already it's been improved upon by GE Profile, LG, and Liebherr, all of whom offer French-door models with not one but two freezer drawers. Prices range from $2300 to $5000.

Stainless steel still reigns as the most popular finish among fridge buyers. But buyers concerned with smudging can choose among several brands that offer coated stainless or laminate surfaces, many of which can hold magnets (unlike plain stainless steel).

If you'd rather ditch the magnets but still value your refrigerator door as a communication hub, GE offers the Family Media Center, an LCD screen that serves up preloaded nutrition facts, recipe substitutions, and metric conversions along with family photos. If your tastes (and budget) are more low-tech, check out Amana's Jot Dry-Erase refrigerator ($649), with its whiteboardlike surface.

Among built-in models, a significant design element emerged recently with the introduction of heavy-duty specialty hinges that allow the units to sit flush with kitchen cabinetry. They appear under various names on models such as Siemens avantGarde (accessHinge; $6439–$6739), Bosch Integra (Optiflex; $2749–$6749), and Thermador Freedom series (Freedom Hinge; $3099–$7449).

Expect more specialized refrigerators in the future

Those three lines, along with Northland, exemplify a continuing trend among high-end brands toward the decentralization of food storage by distributing refrigerators and freezers throughout the kitchen— and even throughout the house in master-suite "morning bars" and indoor "grottoes" designed for wine storage and serving.

Separate built-in components have long been a staple in pro-style kitchens, but new "tower" components (some as narrow as 18 in.) make it easier to put refrigeration where it's most convenient. They're also useful in urban apartments where access is limited, or in small kitchens where a single unit can be overwhelming.

Refrigerator drawers, like tower-style components, put fresh food where it's convenient. But on a dollar-per-cubic-foot basis, they are also very expensive. Like new refrigerators, new drawers offer more temperature control and more-adaptable configurations. Fisher & Paykel's 36-in.-wide CoolDrawer offers refrigerator/freezer settings ranging from -13°F (deep freeze) to 59°F (for serving red wine). In April, KitchenAid unveiled a 24-in.-wide double-drawer refrigerator/freezer that's tall enough to store 2-liter bottles. Jenn-Air also offers a combination drawer unit, with a pantry mode that keeps vegetables and fruits at a cool-but-not-cold 40°F to 60°F. And for very small spaces, Perlick makes a drawer that's just 15 in. wide. □

Debra Judge Silber is a senior editor at *Fine Homebuilding*.
Photos courtesy of the manufacturers.

SOURCES

Refrigerator brands mentioned in this article include:

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GE
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Whirlpool
www.whirlpool.com

A Modern Master Bath, Built to Last

Mold problems prompted the remodel of a not-so-old master bath. Contemporary sensibilities yielded great results.

BY JOANNE PALMISANO

When you decide not to sleep in your bedroom in the summer because of a mystery smell emanating from the bathroom, you know it is time to look into what's wrong. This was just one of the reasons why our clients contacted us. They also wanted our firm to address other issues, which were no less important to them: clumsy storage, an awkward layout, and worn finishes. But when they described that odor, we knew right away that a moisture problem was our top concern.

No matter how big or small, fancy or basic a bathroom is, one thing should remain the same: good ventilation for moisture control. In this case, the dormer had no venting through the valley rafters to the ridge vent, and no airspace between the fiberglass insulation and the roof sheathing. This combination allowed condensation to form on the bottom of the plywood roof sheathing—and the plywood, the insulation, and some of the framing lumber above the master suite started to grow mold. The homeowners decided to remove the entire affected area instead of having

Top photo: Susan Teare. "Before" photos: Courtesy of Peregrine Design/Build.

EVERYTHING GOT BETTER WHEN THE CLOSET GOT SMALLER

Although this full-scale remodel required gutting the bath and the closet to the extent that the dormer above had to be demolished and rebuilt, the new plan uses no more space than the original. Instead of a large closet and a small bath, the homeowners opted for smaller, more useful storage in the vestibule and a larger master bath with a double vanity, a walk-in shower, a freestanding tub, and a water closet for the toilet.

Photos taken at lettered positions.

A modern standard, set in concrete. *These days, a double vanity is a master-bath must-have. Here, each side of the cabinet features equal amounts of storage under sleek concrete sinks. The butcher-block counter can be removed for cleaning. Photo taken at B on floor plan.*

the mold abated. Once we knew that we'd be gutting the bath and tearing off the roof, we made a plan to tackle their other concerns.

The master suite, which included a bathroom, a bedroom, and a walk-in closet, had a poor layout with lots of wasted space. By combining the closet and bathroom entrances in a small vestibule, we increased the usable master-bedroom wall space and improved traffic flow into the bath (floor plans, facing page). The original closet suffered from odd roof angles, unusable shelving configurations, and a lack of hanging space. Relocated and reconfigured, the master closet is now smaller but much more efficient. To make up for the lost closet space, we designed a built-in dresser that occupies the low space under the roof outside the bathroom door.

The annexed closet space afforded us more room for the master bath, which includes a freestanding tub, a water closet for the toilet, and a large walk-in shower (top photo, p. 57, taken at A on floor plan). The centerpiece is the double vanity. Designed with equal amounts of storage on each side, the maple cabinet is built to support concrete sinks.

The modern look of the vanity inspired the bathroom's style. Concrete details carry over to the shower threshold, sills, and shelves, and the hardware, lights, faucets, and tub all share clean lines. Large, rectangular porcelain tiles installed vertically draw attention to the shower's high ceiling. To soften the concrete and tile, we chose wood for the vanity, built-ins, and floor. Lots of windows bring warm natural light into the entire bath.

Never forgetting the moisture issue while rebuilding the bathroom, we insulated it with closed-cell spray foam, which requires no venting and acts as a vapor barrier. We attached drywall with 5/4 furring strips to the rafters. Sheathing, #30 felt paper, and architectural shingles complete the roof assembly. To help ensure that all moisture is evacuated, two 110-cfm Panasonic WhisperCeiling fans (one outside the shower and one in the water closet) are on 10-, 20-, or 30-minute timers. (For more on bathroom fans, see pp. 60-63.) These behind-the-scenes efforts will allow this beautiful new bathroom to last a lifetime. □

This bathroom was designed by Shawn Sweeney of Peregrine Design/Build in South Burlington, Vt. (www.peregrinecontracting.com). Joanne Palmisano was part of the design team. Photos by Brian Pontolilo, except where noted.

Tile with style. *The large shower is accentuated with vertical 12-in. by 24-in. wall tile and a mosaic-tile floor. Cast-concrete sills, shelves, and threshold complement the vanity sinks. Photo taken at C on floor plan.*

SOURCES

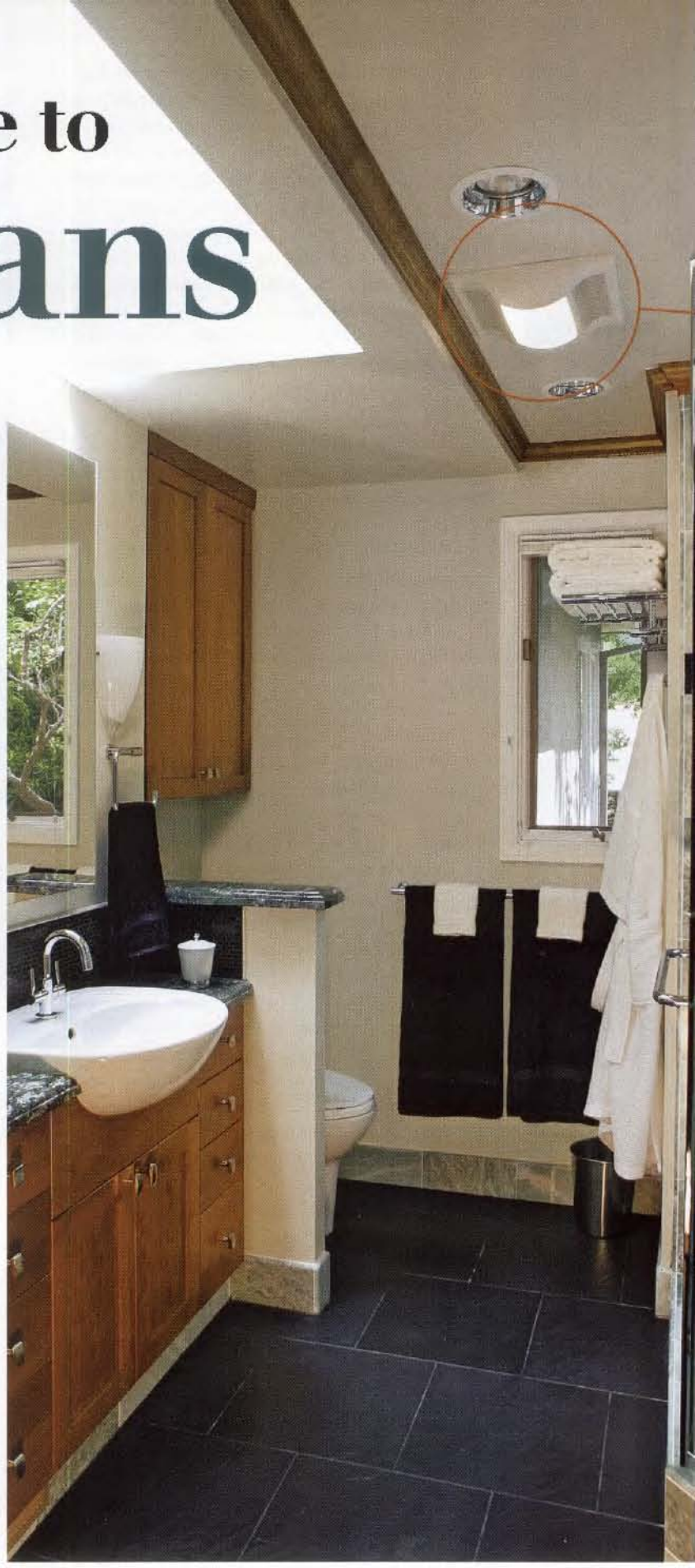
Bath fans Panasonic WhisperCeiling, model No. FV-11VQ3, www.panasonic.com • **Concrete sink** Red Concrete, www.redconcrete.com • **Freestanding tub** Wet Style Ove Collection, www.wetstyle.com • **Light fixtures** City Lights Artemide, www.artemide.com • **Shower tile** Artistic Tile Ironworks Collection, 12-in. by 24-in. porcelain wall tiles with mocha-colored sanded grout, www.artistictile.com; Walker Zanger Titanium Mosaic floor tile with mocha-colored sanded grout, www.walkerzanger.com • **Sink and tub faucets** AquaBrass, Hey Joe! models 28029 and 28085, www.aquabrass.com

Drawings: Martha Garstang Hill

A Buyer's Guide to Bath Fans

Today's exhaust fans quietly mitigate moisture, promote health, and save energy with smart switches

BY JEFFERSON KOLLE



My father was cheap, or maybe he was just ahead of his time. During the 1970s energy crisis, when my brothers and I were teenagers and liked to take 20-minute showers, he'd pound on the door and say, "Hot water doesn't grow on trees. And turn on the fan in there," knowing that when one of us finally emerged, a hot, foggy mist would billow out and make the hall's walls glisten.

Then, 15 minutes later, he'd storm back upstairs, having heard the roar of the fan from the living room. He'd knock on the bedroom door this time, saying, "You left the fan on. Again." Seems like he wanted it both ways.

And today he could have had it. While he would have choked on the current gas prices, my father would have loved the bathroom-ventilation systems now available. Quieter motors and a variety of controls—including timers, motion detectors, and humidity sensors—work together as a set-it-and-forget-it appliance that even a grungy teen can't misuse.

Quiet-fan technology can improve your old fan, too

Roaring bathroom fans, like the one we could hear in our living room, are a thing of the past. Fan noise is measured in sones, an indication of perceived loudness. A 1-sone sound is likened to the sound made by a quiet refrigerator, while calm breathing is approximately 0.2 sones. The new fans from NuTone and Panasonic are in the 0.3 to 0.4 range. In general, bigger fans make more noise than smaller ones, and larger ducts make less wind noise than smaller ones. Blow through a straw, then blow through a toilet-paper roll, and it's apparent.

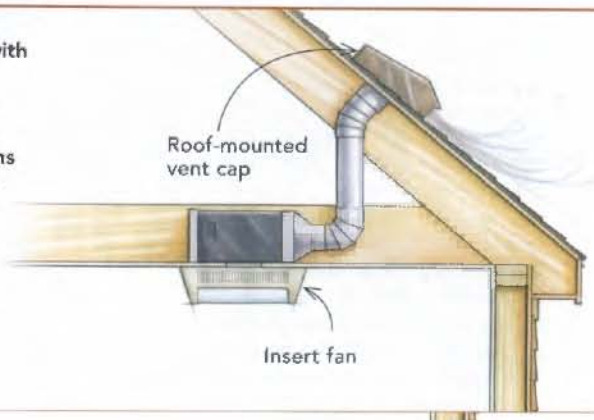
Photos: Brian Pontolilo. Drawings: Bob La Pointe.

What **TYPE OF FAN** is right for my bathroom?

Panasonic
FV-08VKML1
$280

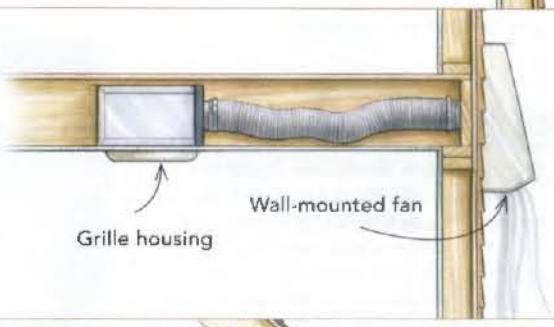
Broan
757SN
$160

CEILING INSERT A single fan with a housing that mounts between ceiling joists is called a ceiling insert. Panasonic's Energy Star-rated WhisperGreen fans are available with compact-fluorescent bulbs (far left). Broan's decorative models include metal trims in oil-rubbed brass, satin nickel (near left), or pewter. They can be vented out the roof, as shown here, or a sidewall.



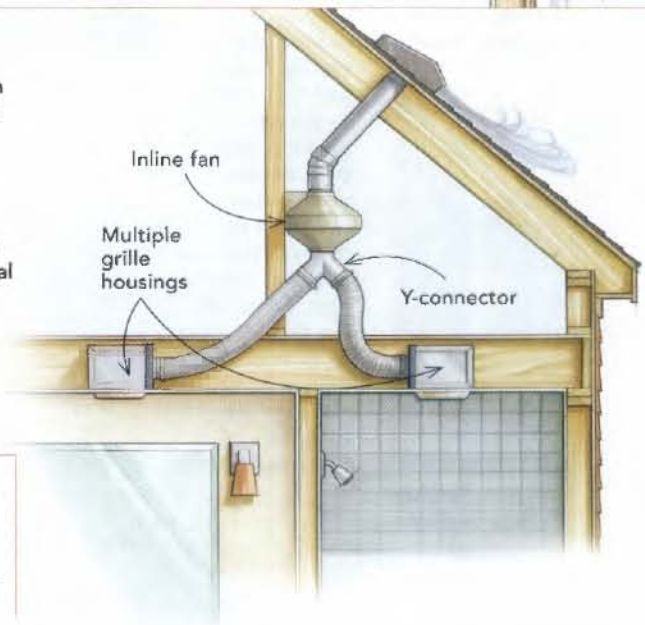
Fantech
PBW110
$160

WALL-MOUNTED If framing or accessibility constraints keep you from mounting a fan on the ceiling and venting it through the roof, consider a wall-mounted unit instead. This version by Fantech puts the fan and the motor outside, connected to a plenum called a grille housing.



Fantech
PB230FV2
$260

INLINE An alternative to mounting a fan on the bathroom ceiling is to install only the grille there and to locate the fan assembly in an attic or crawlspace. An inline fan can serve multiple grille housings in a large bathroom that has several moisture-producing fixtures. It can also be hooked up to ventilate multiple bathrooms.



SOURCES

FANS **American Aldes** www.americanaldes.com • **Broan** www.broan.com **Continental Fan** www.continentalfan.com • **Fantech** www.fantech.net **NuTone** www.nutone.com • **Panasonic** www.panasonic.com

SWITCHES **Energy Federation Inc.** www.energyfederation.org/consumer **Leviton** www.leviton.com • **Lutron** www.lutron.com

Improvements in noise reduction have reached the upgrade market, too. If your fan makes a racket, several companies, including Broan, Fantech, and Continental Fan, sell quiet-fan retrofit kits that use existing housings and ductwork (see p. 62).

Smart features enhance performance

The important part of the fan is what's behind the grille. Not surprisingly, bath-fan makers have jumped into the green scene and acquired Energy Star ratings for many models. Fan/light combos with compact-fluorescent bulbs are among the Energy Star offerings, although fans with electric-resistance heaters don't make the grade.

Bathroom fans that are never turned on allow mold-inducing moisture to build up, and fans left on too long waste energy. Broan surmounts these problems with an adjustable behind-the-grille humidity sensor and timer that turn on the fan when moisture levels rise and shut it off after 5 to 60 minutes.

One of Panasonic's WhisperGreen models has a built-in motion detector that keeps the fan going for 30 seconds to 60 minutes after it switches on. For better or worse, that means the fan turns on whenever someone enters the bathroom, whether to take a long, hot shower or just to get a Band-Aid from the medicine cabinet.

RETROFIT KIT Some manufacturers sell quiet fans that replace their older, noisy ones. Once you determine the make and model number of your current bath fan, go to the manufacturer's Web site to see if a retrofit kit is available. Broan's Model 690, which pulls 60 cfm, has a 3.0-sone rating; the company claims it reduces the sound of the original fan by 50%. The kit costs about $40, requires no new wiring or ductwork, and can be installed in 10 minutes, according to the company.

Broan 690 retrofit kit $40

SMART SWITCHES For fans without onboard sensors, switches with programmable timers are available. The Leviton 6260M timer switch can be set to keep the fan on for 10, 20, 30, or 60 minutes and costs about $25. The Lutron MA-L3T251-WH is a combination dimmer/timer switch that can be adjusted for a 5- to 60-minute fan run-time; it costs about $55. Flip the Marktime 42507's switch to the on position, and both the fan and the light will come on. Flip it down to the timer position, and the light will go off, but the fan will stay on to the user-set time of up to 60 minutes. The switch costs about $35 ("Sources," p. 61).

Marktime 42507 $35

Leviton 6260M $25

Lutron MA-L3T251-WH $55

For bath fans without onboard sensors, many companies, including fan manufacturers and electrical suppliers, sell wall switches with programmable timers (photos left).

Inline fans can serve multiple bathrooms

Because hot, moist air rises, it's best to install a fan directly over the moisture source. That would be in a shower stall or over a tub. But what if there are multiple moisture sources in the bath? That's where inline fans come in. An inline fan, which locates the fan assembly in an attic or a crawlspace, can serve multiple grilles in a large bath that has several moisture-producing fixtures. It can also be hooked up to ventilate several bathrooms.

A past disadvantage of multibath inline systems was that when the switch was turned on in one room, all the rooms were ventilated. Today, the American Aldes VentZone system can ventilate up to eight bathrooms individually. Ceiling grilles have a damper that opens when called upon by any switch, timer, dehumidistat, or occupancy sensor.

Architects and designers like multibath inline fans for aesthetic reasons. In contrast to the large plastic rectangle overhead that's common to ceiling-insert fans, inline-fan grilles are discreet. Also, multiroom inline-fan systems require only one exterior vent, which keeps a roof plane cleaner-looking and more weathertight by reducing the number of penetrations.

A new role for bathroom fans

The once-lowly bath fan's job of removing odors and moisture has been elevated to a major role in whole-house ventilation. Some state codes—Minnesota's, for example—now require a mechanical whole-house ventilation system. When a building is remarkably free of air leaks and drafts, the indoor-air quality can, well, stink, and dangerous levels of carbon monoxide and other pollutants can accumulate.

Some inline- and ceiling-insert fans can play a part in an engineered whole-house ventilation system. One requirement for whole-house ventilation is that the fan has a constant-use rating, meaning it can be powered on all the time. Panasonic's WhisperGreen fans are designed to run constantly at a level of 30 cfm to 70 cfm as part of a whole-house ventilation system, and then kick up to a higher level when called upon. □

Jefferson Kolle is a former editor at *Fine Homebuilding*.
Photos by Krysta S. Doerfler, except where noted.

Bath-fan installation tips

In spite of good intentions, bath-fan installations can go awry due to faulty planning or bad detailing. A friend once asked me what I thought was causing the black mold on his bathroom ceiling. When we crawled up into the attic and peeled back the fiberglass insulation over the bath fan, we saw that the duct had been poorly secured to the exhaust port and had come loose. A condensation puddle spread across the ceiling, feeding the mold. To help you avoid mistakes like this, we've gathered a list of tips from bath-fan installers.

- **Use duct mastic** or foil tape to secure duct connections. Despite its name, don't use duct tape. It deteriorates over time.
- **Insulate any fan ductwork** that goes into an unheated attic. Otherwise, you risk water dripping out of the ceiling vent as hot, moist air from the shower condenses in the cold duct in the attic.
- **Increase the diameter of the ducts** to reduce the resistance from a long duct run.
- **Make sure any roof or sidewall wall vent has a screen** to keep out critters. Also, if the dryer duct and the bath-fan duct look similar, prominently mark which is which. You don't want a screened dryer vent plugging up with lint and starting a fire.
- **Ventilate all bath fans outside the house.** Don't dump them into the attic,

Broan kit and Marktime switch photos: Courtesy of the manufacturers.

Choosing **THE RIGHT FAN** is not exactly cut-and-dried

The Home Ventilating Institute (HVI) standardizes performance ratings for, among other products, bathroom fans. It also establishes guidelines for ventilation requirements, expressed as air changes per hour (ach), of different rooms in a house. Bathrooms require 8 ach. At the risk of acronym overload, you should know that the amount of air a fan can move is expressed in cubic feet per minute, or cfm.

HVI bath-fan sizing guidelines say that a fan should pull 1 cfm for every square foot of floor space in bathrooms up to 100 sq. ft. Above that, HVI recommends a ventilation rate based on the number and type of fixtures. For a toilet, shower, and tub, add 50 cfm each. For a jetted tub, add 100 cfm. In this example, you would need a 250-cfm fan.

That all sounds pretty straightforward, but these are under ideal, laboratory-grade conditions, which means the fan is hooked up to a short length of smooth-wall duct. In the real world, where ducts snake around obstacles and change material on their way to a distant roof cap, it gets more complicated. Static pressure, a measure of air resistance, comes into play, reducing a fan's cfm rating. As shown in the chart (courtesy of Panasonic), just one 4-in.-dia. adjustable elbow has the equivalent resistance of 15 ft. of smooth metal duct. A roof cap is equivalent to 30 ft. of smooth duct. And if you use insulated flex duct, you have to multiply its length by 1.5 to find the smooth-duct-length equivalent.

Sizing a fan, then, can be more complex than relying on HVI's recommendation of figuring 1 cfm per sq. ft. of floor area. And the seemingly simple solution of just buying a bigger fan than what the floor-area calculations indicate you need has its own pitfalls. Exhausting more air from a room than necessary sucks expensive conditioned air from your home and can pull in unconditioned air. In a relatively tight house, a fan that's too big can create negative pressure and suck flue gases from the chimney of the furnace or gas-fired water heater into the home. Bottom line: If you have a complex duct run, consult a professional at a plumbing-supply house to determine the correct size of the fan you need.

SMOOTH-DUCT-LENGTH EQUIVALENTS
Airflow resistance of duct materials and components, compared to 1 ft. of smooth metal duct

Material/component	4 in. dia.	6 in. dia.
1 ft. of flexible aluminum duct	1.25 ft.	1.5 ft.
1 ft. of insulated flexible duct	1.5 ft.	2 ft.
Adjustable elbow	15 ft.	20 ft.
Roof or wall vent cap	30 ft.	40 ft.

basement, or garage. This might seem obvious, but it happens all the time.

- **Don't choose a fan that's too powerful**, or you'll risk pulling all the air-conditioned or heated air out of the house.
- **Check that the bathroom door** has at least a ¾-in. clearance above the finished floor to allow proper entry of makeup air, as recommended by the Home Ventilating Institute (HVI). Insufficient make-up air can diminish a fan's air-moving capacity.
- **Do not connect multi-bath inline fans with a three-way switch**, which would allow someone to turn off the fan in another bathroom.
- **Connect a fan over a tub or shower to a branch circuit** protected by a ground-fault circuit interrupter (GFCI).
- **Don't exhaust a bath fan near a vented soffit**, or next to a window or skylight, which can draw the moist air the fan has evacuated right back into the house. Roof vents are a better option, but require diligent flashing and waterproofing.
- **Consider a sidewall vent** (away from a window). This might be the best option because it allows the ductwork to be sloped downward, directing potential condensation out of the building.

Brighten Up a Small Bath

Eight ways to fashion a bathroom that will put a smile on your face every morning

BY MAAIKE LINNENKAMP

The only bathroom in this small ranch-style house was cluttered, dark, and uninspiring. Besides changing the aesthetics, the main challenges were bringing in more daylight, increasing storage, and giving the bath a much-needed sense of spaciousness. The bold stroke is a 2-ft.-deep bay that extends beyond the original exterior wall. The bay created space for a shower bench, room for a towel rack out of the spray pattern, and a place for a generous frosted-acrylic window that offers privacy, light, and ventilation. Storage is provided by a custom cabinet recessed into the bay. A totemic floor-to-ceiling glass-tile inlay surrounded by alabaster floor and wall tile injects a prominent centerpiece.

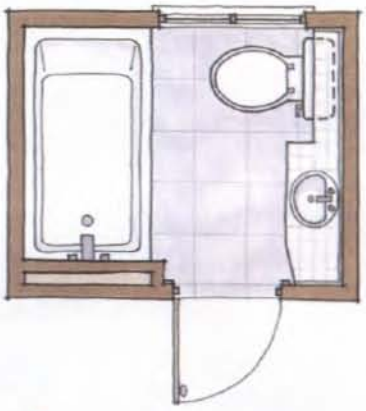
These elements are the most obvious changes that transformed this bath. But they are only part of the story. A supporting cast of less obvious details and principles is making quieter contributions. Here are the lessons, both large and small, of this little bath.

Maaike Linnenkamp is president of NBI Design Inc. (www.nbidesign.com) in Los Gatos, Calif. Photos by Charles Miller, except where noted.

1 MAXIMIZE DAYLIGHT WHILE MAINTAINING PRIVACY

Acrylic-block windows are lightweight and unbreakable; this awning-style version lets in fresh air. Tubular skylights are another great way to bring daylight inside. They are less expensive than conventional skylights, are less prone to leakage, and can eliminate the need for electric light during the day. Both options maintain a high level of privacy.

Before



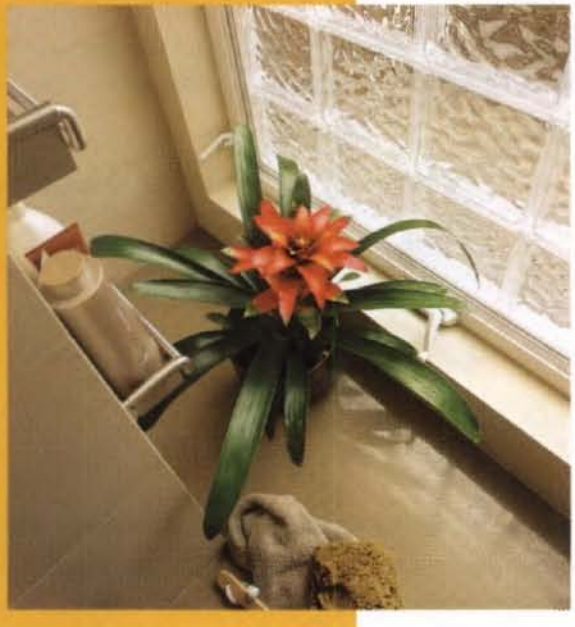
After

3 REPLACE THE CRAMMED TUB-SHOWER COMBINATION

Bathing has become less popular, so the argument that you need a tub for resale value doesn't wash anymore. Compared to a bathtub that visually divides the room, glass shower doors make the space seem larger and more inclusive. A code-compliant shower also uses less water than a tub.

2 CREATE MULTI-PURPOSE FEATURES

Besides accommodating a seating area and storage space, the bay provides ventilation, natural light, and extended sightlines during the day. The storage built-in is a focal point upon entry, especially at night.



Push outside the box

In the bay bump-out, an **awning-style window** glazed with acrylic mimics the look of glass blocks, without the weight. The window's wavy pattern preserves privacy.

Support brackets bear on the original foundation, a feature that simplified construction and made it easier to get a permit. The foundation didn't have to be extended into the side-yard setback.

Drawings: Martha Garstang Hill. Photos top: Maaike Linnenkamp.

4 INSTALL A DUAL-FLUSH TOILET

The amount of water that goes through in a regular flush is significant. A dual-flush option is available on many models now, so efficiency doesn't have to entail a design compromise.

5 USE LARGE TILES

In small baths, large tiles with very thin grout lines make the room look bigger. Plus, the tile is easier to clean.

6 HANG THE CABINETRY AND THE TOILET

Elevating the cabinets and the commode makes everything easier to clean and saves space. The room looks larger if the floor tile is undisturbed throughout the footprint of the bathroom.

7 GET CREATIVE WITH CABINETRY

Stereotypical kitchen cabinetry doesn't have a place in the bathroom. Instead, the cabinetry can be a distinctive feature, both functional and good-looking.

8 PAIR A HARMONIOUS, NATURAL COLOR PALETTE WITH SOPHISTICATED ACCENTS

This design approach will make the bathroom personal, timeless, and comfortable, and will reduce the chances that you'll become annoyed at some point by either blandness or an overpowering color choice.

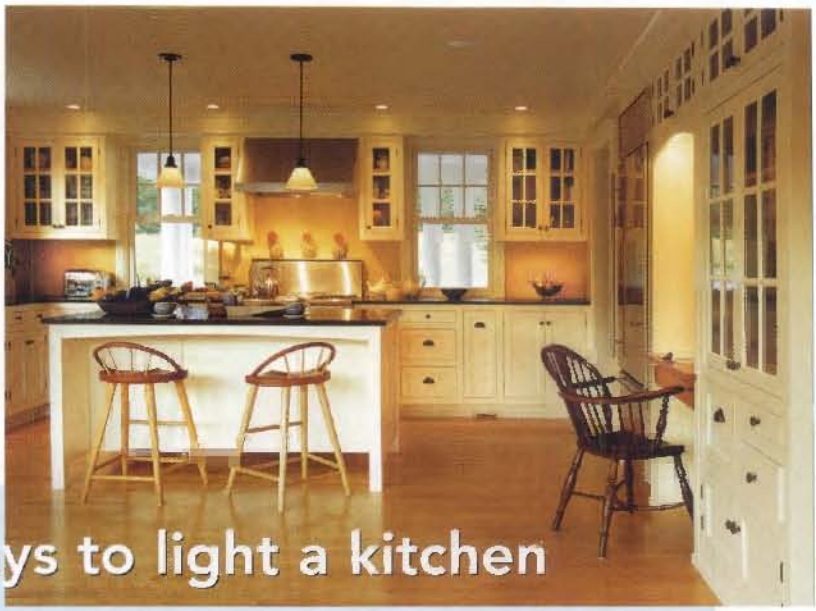
SOURCES

Fixtures Hansgrohe Axor Series faucet, model No. 38117821; shower valve, model No. 35375801; shower bar, model No. 27941800, www.hansgrohe-usa.com • **Toilet** Duravit bowl, Starck 3, www.duravit.com; Geberit tank, www.chicagofaucets.com • **Tubular skylight** Solatube, www.solatube.com • **Window** Hy-Lite's acrylic-block awning style, www.hy-lite.com

Kitchen Lighting Design

With the right fixtures in the right places, you can create anything from a soft glow to clear task lighting

BY MATTHEW TEAGUE



With open floor plans, personalized storage and appliance options, designated workstations and social areas, even offices and kid zones, the kitchen has evolved. As such, a single, surface-mount light fixture centered in the kitchen ceiling is no longer sufficient. The truth is, it never was.

Fortunately, there has been progress in kitchen lighting as well, in both fixtures and design. Because no one fixture can provide the light necessary to create a kitchen that is both functional and comfortable, designers opt instead for a variety of light sources—some direct, some indirect—that work together to create layers and balance.

Layers are the secret to effective kitchen lighting

Like the single fixture that lit your grandmother's kitchen, the most common mistake today is to rely on recessed lights alone. Every designer has his or her own approach to lighting, but most agree that it takes layers to light a kitchen effectively.

At a minimum, you should have ambient and task lighting (sidebar right). In a simple kitchen plan, dimmable recessed fixtures can provide both. Aimed at art or an architectural fixture, a recessed light can even qualify as accent lighting. But it is the addition of decorative and hidden fixtures that make the difference between a functional space and a well-lit kitchen. To achieve this goal, you need to mix direct and indirect

Four ways to light a kitchen

AMBIENT ***Often referred to as "fill" light,*** ambient light is the general lighting in the room. It is used to soften shadows and to create a warm feeling. The goal is to use well-diffused light that illuminates the room throughout the day. Because natural light changes often, all ambient lighting should be dimmable. Chandeliers, recessed lights, and track and monorail systems all can be used to create ambient light. But you shouldn't rely on a single overhead fixture, which can produce objectionable shadows on walls and ceilings. Instead, choose properly spaced recessed lights, track or monorail fixtures with multiple bulbs, or a combination of ambient-light sources.

TASK ***When it comes to workstations,*** the best spot for light is somewhere between your eyes and what you're looking at (the vegetables you're chopping or the bills you're paying). At a minimum, you'll want task lights shining on countertops, over the range, and above the sink. Depending on the kitchen, you also could need to light a dining table, an island, or a small desk. Many different types of fixtures can provide task lighting. The most common—and useful—are undercabinet lights, but pendants as well as track systems can be used to provide task lighting. In general, a bright, white light is best.

DECORATIVE ***While decorative fixtures can provide task,*** ambient, and accent lighting, they are also important for the presence of the fixture itself. Decorative, or architectural, lighting provides a focus for the room. Chandeliers over a dining table are a common use of decorative lighting. Keep in mind, however, that a fixed chandelier hanging over a dining table makes rearranging difficult. Also, any light above a reflective surface has the potential to cause glare. Pendants paired with a track system allow for flexible decorative lighting; wall sconces can also be used to define a space and set an elegant mood.

ACCENT ***Also called feature lighting*** or highlighting, accent lighting is intended to draw your attention to a particular detail. You can wash a plastered or textured wall with soft light from a sconce, or highlight a painting or a fireplace with focused recessed lights or track lights aimed at the object. If you have a green thumb, consider lighting a favorite houseplant.

Photo: Susan Teare

RECESSED LIGHTS ARE VERSATILE

Recessed lights can serve as ambient, task, or accent lighting. For ambient light, set recessed cans about 30 in. from the wall and 4 ft. to 6 ft. apart, depending on the can diameter and the ceiling height (light should overlap). For task lighting, cans need to be located directly above the worksurface. Choose a trim kit that allows you to focus the light in a specific direction to showcase a detail and to create accent lighting. A variety of trim and baffle styles are available (see examples below from Halo). The color and style of the baffle affect the color quality of the light produced.

The sink deserves its own source of light. *To keep this fundamental workstation well lit, you need to place a light as close to directly above the sink as possible. A recessed light works well. If your cabinet design includes a fascia that bridges the open space between the tops of wall cabinets, consider hiding an undercabinet fixture there.*

Retrofit options. *In a kitchen remodel, you can install recessed cans without tearing out the ceiling. Unlike new-construction housings that nail between joists, special remodel housings slip through a hole in the ceiling and clip to the drywall. Below, Halo 6-in. housings (www.haloltg.com).*

Black trim and directional black baffle

Square antique copper trim with black baffle

Satin nickel trim with pinhole black baffle

Remodel housing

New-construction housing

lighting. Sconces, pendants, and chandeliers are examples of direct lighting: The fixture is visible. Undercabinet and cove lights cast a glow without a visible fixture to create indirect lighting.

According to Joseph A. Rey-Barreau, AIA, director of education for the American Lighting Association, "The key to kitchen lighting is to start with the sink." The sink is a kitchen's most fundamental workstation, so Rey-Barreau likes to install a dedicated light for cleanup tasks. He often incorporates undercabinet fixtures and recessed lights next. With undercabinet lights illuminating the countertops and recessed fixtures around the kitchen's perimeter (about 30 in. from the walls, not the cabinet fronts), he covers task and ambient lighting for most of the kitchen. Finally, he chooses an overhead light for the center of the room, such as track lights or a trio of pendants over an island. With these fixtures, Rey-Barreau adds decorative lighting to the equation.

Dimmers control the mood

In some areas, like the kitchen table, you might want soft ambient light while eating meals and brighter task lighting while helping your kids with their homework. You also might want bright

Kitchen photo above: Randy O'Rourke. Fixture photos, facing page: Krysta S. Doerfler.

INVISIBLE FIXTURES
FOR COUNTERTOP TASKS

If you're considering undercabinet task lighting, first make sure the face frames of the upper cabinets hang down low enough to conceal the fixtures and to prevent glare. For the same reason, and because it's closer to where you work, undercabinet fixtures should be installed toward the front of the cabinets. Although undercabinet fixtures come in a variety of configurations, there are four common lamp types to choose from, each with its own set of pros and cons. (Photo above courtesy of Sea Gull Lighting.)

1. Fluorescent. *Low-cost, long-lasting, and energy-efficient, fluorescents cast light that is bright and even; but unfortunately, most cannot be dimmed. Choose quieter fixtures with electronic ballasts.*

2. Halogen. *These gas-filled incandescent bulbs product high-quality, bright-white light and a lot of heat. So while they offer excellent task lighting, they might melt the chocolate in the cabinet above. Their life span is longer than that of regular incandescent lights.*

3. Xenon. *These bulbs run cooler and last much longer than halogen bulbs. Some models offer high and low switching, eliminating the need for a dimmer. However, xenon fixtures may require the installation of a remote transformer, and light quality may diminish when the bulb is dimmed.*

4. LED. *Light-emitting diodes are the most expensive, but they use little energy and likely will outlast your kitchen. Some models let you adjust the color of the light produced, from warm gold to cool white.*

PENDANTS HANG OUT IN STYLE

Easy to install, pendants can provide ambient, task, and decorative lighting while lending style to the kitchen. The most popular application for pendants in today's kitchens is over an island. Allow at least 30 in. of clearance between pendants and a work-surface or table. Pendants can be as decorative or as subtle as you wish. Some come with flashy glass globes that grab your attention immediately. The smallest are quite inconspicuous, only 2 in. to 3 in. in diameter, and hang on nearly invisible cords.

1

2

3

4

Pick a pendant. These days, it seems like a trio of pendant lights is an integral part of island design. However, there are many uses for pendants, and even more styles of this popular lamp. 1. A blue glass globe from Bruck (www.brucklightingsystems.com) is a sure attention grabber. 2. A single pendant from Rejuvenation (www.rejuvenation.com) has three lamps to provide enough light for a dining table. 3. A pair of Atoll pendants from Translite Sonoma (www.sonomalighting.com) hangs from ceiling beams to light an island (kitchen design by Rick Proppe). 4. Project designer Leslie Sager used Hubbardton Forge pendants (www.vtforge.com) as the primary light source to enhance the Japanese aesthetic in this kitchen.

undercabinet lighting while you're chopping vegetables, but a softer glow on the backsplash while entertaining. All it takes is a dimmable fixture. Dimming not only makes the room more functional, but also adds dimension to the space. "If there are no dimmed zones, you're left with no accents and no contrast," says Doug Stewart, a certified lighting designer at Hermitage Lighting Gallery in Nashville, Tenn. "The kitchen will appear flat and less dimensional."

As you can see, one fixture used effectively can cover multiple types of lighting. Aesthetically, the fixtures you choose should mesh seamlessly with the room. Pewter, satin nickel, bronze, and wrought iron are popular finishes today, as are glass pendants and globes, but it is important to make sure the fixtures and finishes you choose match the style and finish of the hardware in your kitchen. It's smart to bring material samples and to talk to professionals when shopping for light fixtures.

You don't have to spend a lot to get a lot

Whether you're designing a new kitchen, remodeling an old one, or simply replacing lights in an existing kitchen, you should do some legwork before talking to a designer or shopping for fixtures.

Study the kitchen's floor plan and identify workstations, social areas, and appliances that need to be well lit. Is there a detail that you'd like to highlight? Measure the ceiling and the cabinet height. If you're remodeling, note where outlet and junction boxes are currently located. You can

Photo 3: Charles Bickford. Photo 4: Joe DeMaio. Bottom photo, facing page: Jennifer Cheung.

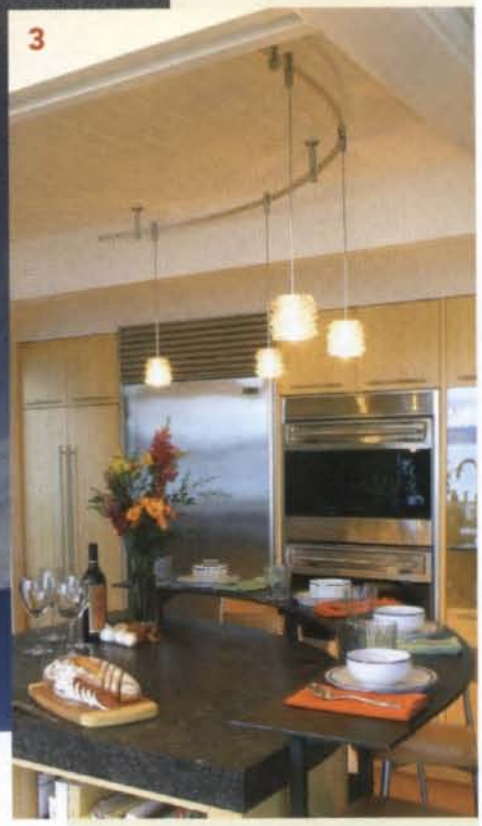
DEFINE THE DINING AREA WITH A CHANDELIER

Whether it's an ornate antique or a sleek, modern fixture, a chandelier is a decorative light source that can quickly establish your kitchen's style. Most commonly, chandeliers are used above a table to define the dining area. Although it is possible to use a chandelier as a kitchen's main source of ambient light, in most cases you'll need supplemental fixtures to reduce shadows and dark areas. A chandelier can also be used for task lighting, if a table doubles as a worksurface, for example. Allow at least 30 in. of space between the table and the fixture.

A period fixture makes an exclamation point. *Designer Lori Erenberg used fixtures from Fortuny Lighting (www.lightology.com) to boost the authenticity of this Craftsman-style home. The ornate chandelier defines the dining area with decorative and ambient light. At top, a chandelier from Kichler (www.kichler.com).*

FLEXIBLE FIXTURES ARE ON TRACK

Track-lighting systems allow you to change the direction of the light and even cast it a good distance away. You can point lights down at a kitchen island for task lighting while you're preparing a meal, then aim them to accent a detail while you're eating dinner. These systems come in both high- and low-voltage options. Although these fixtures tend to look modern, they're available in a wide array of styles, sizes, and bulb types. Tracks can be straight or serpentine. Some models allow you to hang pendants at varying heights, while others allow you to mix shapes and bulbs on a single track.



take along photos of your cabinets and countertops, samples of hardware, or an existing fixture for inspiration. Even paint samples can be helpful when choosing fixtures.

Just as important, have a firm idea of what you can afford to spend. "In the whole scheme of things," says Lynn Grubbs, an interior designer and owner of Lynn Grubbs Interiors in Nashville, "lighting is one of the more affordable ways to make a dramatic impact." For new kitchens (including major remodels), lighting is typically only 2% to 3% of the total cost.

"Prices have gone down dramatically in the last five years because of imports. You can now get the expensive look for the middle price," says Grubbs. Of course, you can spend as much or as little as you want. A recessed can with a basic white trim costs less than $30 at most home centers, while one chandelier at a lighting showroom may cost thousands.

Finally, don't underestimate the need for a lighting designer. At the very least, do your homework at a quality lighting center with knowledgeable associates. There is a wide range of products available. A good lighting consultant can even save you money, pointing you toward less expensive fixtures that achieve the same goals as top-of-the-line models. And don't hesitate to ask if your lighting consultant makes house calls. You'll thank yourself for taking the time to get the light right in the hardest-working room in your house. □

Matthew Teague is a writer and furniture maker in Nashville, Tenn. Photos courtesy of the manufacturers, except where noted.

Waves of light. 1. *A sleek track system from Sea Gull Lighting (www.seagulllighting.com) includes fixtures that aim and swivel to provide a range of ambient, task, and accent lighting.* ***2.*** *Halo's flexible track system can be shaped as you see fit and takes a variety of different fixtures (www.haloltg.com).* ***3.*** *Pendants can hang on a track, too, as shown in the arcing fixture (Prima; www.primalighting.com) that designer Amy Duerr-Day used above a similarly shaped island.*

Photo 3 above and photo left, facing page: Charles Miller. Photo top right, facing page: Justin Fink.

CFLs: a spectrum of energy-efficient lighting

According to the U.S. Green Building Council, outfitting your home's five most frequently used light fixtures with compact fluorescent lightbulbs (CFLs) can cut your electric bill by as much as $100 per year. That's because CFLs are four times more efficient than incandescents. In terms of watts, a 13w CFL produces as much light as a 60w incandescent bulb, and a 25w CFL is equal to a 100w incandescent. In an attempt to make shopping less confusing, most CFLs are marked with their incandescent equivalent.

If these savings don't seem worth the cost of humming fixtures and poor-quality light, it's time to check out the newest products. Many new CFLs have electronic ballasts that regulate the current going into the bulb, cutting out the noise that many of us associate with fluorescent lighting. Electronic ballasts also eliminate flickering. There have been improvements in the quality of light produced by CFLs as well. In fact, the bulbs are now sold in multiple shades, including "soft white" for a warm tone, "cool white" for brighter, whiter light, and "daylight" for clear blue light. Other manufacturers market their products with such labels as "warm" and "neutral." If you want to dim CFLs, make sure you pair a dimming ballast with a dimmer designed to work with it. It's slightly more expensive, but the energy savings are guaranteed.

WALL SCONCES ARE AN ELEGANT ACCENT

Hanging wall sconces alongside kitchen exits (to other areas of the house or to outdoor living spaces) helps to establish separate living areas in an open floor plan. If your dining area is open to the kitchen, sconces on the wall behind the dining table lend a dramatic look that helps to establish the mood and style of the room. Adding wall sconces in the dining area also helps to cut down on tabletop glare caused by overhead fixtures. Sconces can provide a certain amount of ambient light, but they're more often used as decorative and accent lighting.

Sconces up and down. *Architects Steven and Judy Selin used sconces from Conant Metal & Light (www.conantmetalandlight.com) for task, ambient, and accent lighting in this kitchen. Some point down to illuminate the countertop; others point up to highlight the ceiling. Sconces are made to suit just about any task and are a great way to define your kitchen's style.* **1.** *A double-lamp sconce from Lithonia Lighting (www.lithonia.com).* **2, 3.** *Artisan lights from Hubbardton Forge (www.vtforge.com).* **4.** *A glass globe from Bruck (www.brucklightingsystems.com).*

1

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Making a Galley

A new entry and a built-in breakfast nook transformed this room from a hallway to a destination

BY STEFAN HAMPDEN

The first time I met with Kimberly and Ryan Hamilton to talk about their kitchen, we sat around the dining-room table. Their affection for their home, a Craftsman-style house built in 1915, was irrepressible. They talked about the thoughtful detailing throughout the house, especially the newly restored built-in hutch in the corner of the dining room.

The only glaring weakness in the house was the kitchen. Poorly remodeled in the 1980s, it doubled as the primary route to the backyard (floor plan p. 76). With three doors into the space, the kitchen was a narrow hallway that zigzagged around the counter, past the stove, by the breakfast nook, and out the back door. The house was already built to the backyard setback line, and the bit of outdoor space on the south side was the only usable yard. So a big addition was out. We had to make every square foot of existing space count, and that meant rerouting foot traffic out of the kitchen.

I spread some tracing paper on the dining table and scribbled a few alternative plans that might rationalize the location of the doorways and the back door. The schemes all led to one conclusion: The hutch was in the wrong place. The irony was not lost on Ryan and Kimberly. Good-natured clients that they were, they had a healthy, eye-rolling laugh about it and agreed that work on the hutch wasn't quite finished.

Move a door, gain a kitchen

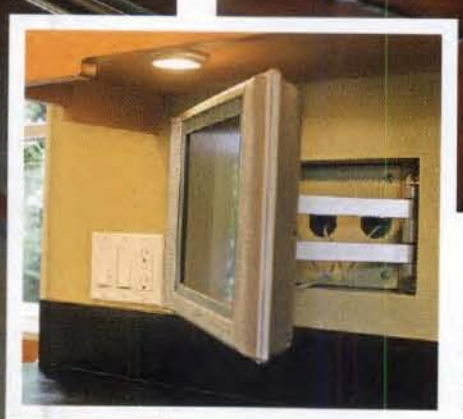
Flipping the kitchen doorway and the hutch (photos facing page) allowed the door to the yard to be next to the new kitchen entry, creating a compact circulation path. The space taken up by the doorways from the hall and the dining room could now be used for a pantry, a linen closet, a built-in oven, a warming drawer, and a microwave (floor plan p. 76). These changes freed up more space for countertops.

The other key to a more efficient plan was moving the breakfast nook from the back of the kitchen to a new bay window near the door. The kitchen bay mirrors another one in the dining room; I

Long-gone galley. *As a dead end, the remodeled kitchen has become an efficiently organized U-shaped workhorse with plenty of counter space. The compact breakfast nook has storage beneath the benches and a view of the garden. Photo taken at A on floor plan.*

Kitchen Count

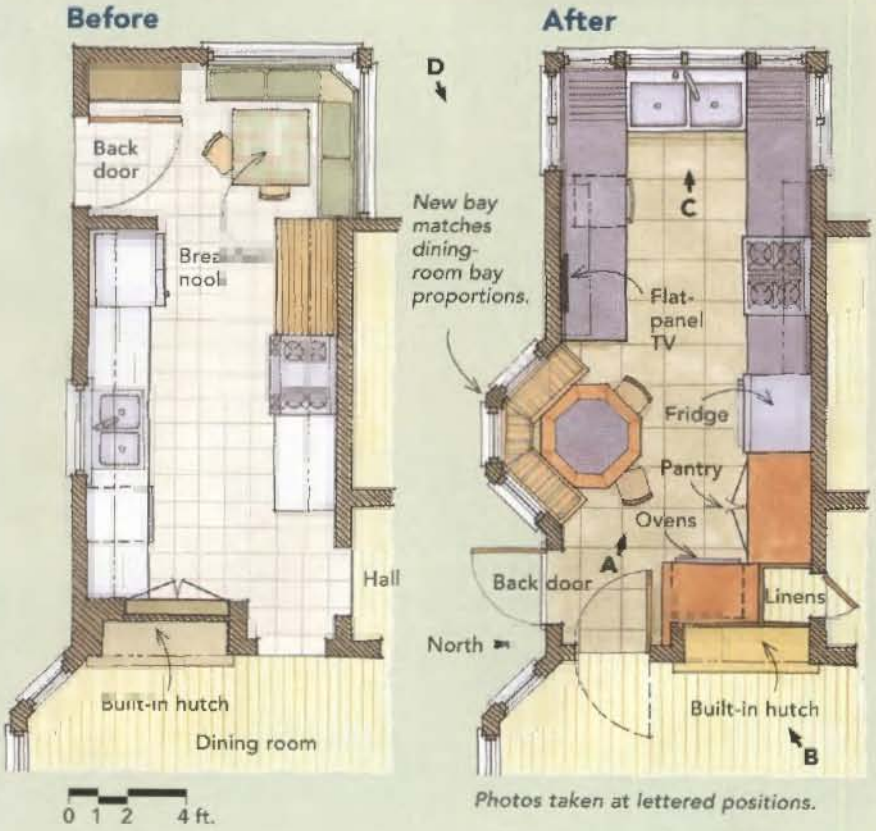
One move, several benefits. *Originally, the dining room's built-in hutch was to the left of the kitchen doorway (inset photo, right). Moving the hutch gave it more prominence. Moving the doorway shortened the trip to the new back door and the yard beyond. Photos taken at B on floor plan.*



Flat screen goes right, then left. *Mounted on a pivoting arm that folds into a wall recess, the TV can be adjusted for viewing from the breakfast booth or the sink workstation.*

MORE COUNTERTOPS, LESS TRAFFIC

Two doorways on one side and one on the other turned the original galley kitchen into a hallway. The location of the breakfast nook also contributed to the awkward layout. Relocating the hutch and moving the doorways took traffic pressure off the kitchen. The new bay window became an ideal berth for the breakfast nook, opening the rest of the kitchen to contiguous countertop workspaces, anchored by the fridge, the pantry, and the ovens in one neat cluster. Photo right taken at C on floor plan.



Photos taken at lettered positions.

A new back door between bays. *The breakfast-nook bay takes its shape and detailing from the bay in the dining room to its right. The new door is between them, sheltered by an extension of the existing shed roof. Photos taken at D on floor plan.*

integrated the bays by extending the existing roof over the new one and over the entry in between (photo left). These circulation changes turned the west side of the kitchen into a dead end, allowing me to join the opposing counters into a U-shaped workspace.

Maximum efficiency in a tight space

With only a 4-ft.-wide aisle between the kitchen counters, we decided that a big double-bowl sink would be the best use of the short side of the U-shaped counter. I couldn't find an off-the-shelf sink that exactly fit Ryan and Kimberly's needs, so I collaborated with Craig Jeppesen at Metal Masters Northwest (www.metalmastersnw.com) to design a sink that would take full advantage of the available space. Given the size of the bowls, we used 16-ga. stainless steel and a ¼-in. fillet radius for the corners.

The sink is overlapped on both sides by Fireslate-2 countertops (www.fireslate.com). Sloped grooves milled into the counters act as drainboards, directing drips back into the sink. Freshly installed and sealed with tung oil, the counters looked great at first.

Drawings: Martha Garstang Hill. "Before" photos: Stefan Hampden.

A custom sink and a garden view crown this kitchen

Wrapped in windows, the end of the U-shaped kitchen basks in sunshine. Counters with integral drainboards flank the sink. Below, pullout bins by Häfele make the most of base-cabinet space.

But the finish turned blotchy in just a few months. The manufacturer recommends reapplications of tung oil every four to six months to maintain the counters. If you want Fireslate-2 countertops and you want a uniform luster, be aware that it is a high-maintenance material.

The inside-corner cabinets on both sides of the sink are fitted with ingenious pivoting storage shelves. Made by Häfele (Magic Corner 1, www.hafele.com), these gracefully sliding, contortionistic wire cages do an excellent job of making accessible the impossible-to-reach corners of base cabinets.

I took advantage of another space-saving device on the wall by the breakfast nook. A flat-panel TV mounted on a pivoting arm swings out so that it can be viewed from the nook or from the sink counter. The folding arm tucks into a recess in the wall (model 75/100 CL, www.omnimount.com).

Benches border a stable table

Although the old breakfast nook was inefficiently planned, it was well used, and a replacement was high on the list of desires. Built-in benches with slide-in seating require less space than chairs, but they also require plenty of leg clearance so that diners can get in and out of them comfortably. The benches trace the octagonal footprint of the bay window, which strongly influenced our choice of a pedestal table with a very sturdy post.

Supporting the octagonal table is a steel column with steel crossbars concealed inside a shell of vertical-grain Douglas fir that matches the rest of the cabinetry. The steel post is bolted to a concrete footing in the crawlspace and is further supported by the floor framing. We're pretty sure it's not going anywhere. □

Based in Seattle, Stefan Hampden is a partner in CAST architecture. Photos by Charles Miller, except where noted.

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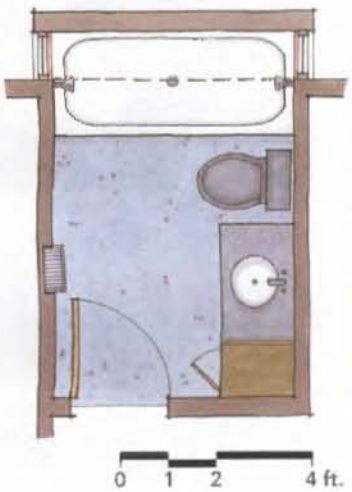
Look for the Magazine Extras section on our home page to see additional construction and finished photos.

Wake up to a hot shower

Most of us need a good jolt in the morning. The question is, does your shower deliver? If your daily vertical immersion is a yawner, consider the lessons to be learned from the following bathroom designs. In each, the inventive use of materials, space, and style provides an eye-opening start to the day.

STAGE A DRAMA AND LIGHT IT UP

The play of light and color in this bathroom isn't an accident. It's what happens when an architect—in this case Jay Lazerwitz of Seattle—plans a bathroom remodel with an artist—in this case his wife, Dionne Haroutunian. "Her thing was drama," Lazerwitz says. "Mine was natural light and recycled materials." Privacy was a shared concern, and a challenge because the original bathroom window faced a neighboring house. Lazerwitz closed up the window and pushed out the wall 20 in., allowing for a skylight above and side windows that invite light but not curious glances. By day, liquid sunshine spills through the ceiling and trickles down the luminescent tiles; at night, a light strip on the near wall provides the sparkle. The tiles are recycled glass, as are the vanity knobs and custom shelves set in the side windows. The vanity itself is reclaimed fir, its top salvaged chalkboard, and the floor cushy-soft Expanko, made from cast-off tires (see "Feedback," p. 96).



ARCHITECT Jay Lazerwitz, Seattle; www.artandarch.net

BUILDER Kohl Construction, Seattle

PHOTO Charles Miller

SOURCES Black wall tiles, Modern Dimensions by Daltile; dual-flush toilet, Aquia by Toto; recycled-glass shelves, Bedrock Industries, Seattle; red tiles, Tessera by Oceanside Glass Tile

TAKE AN INSIDE SHOWER OUTDOORS

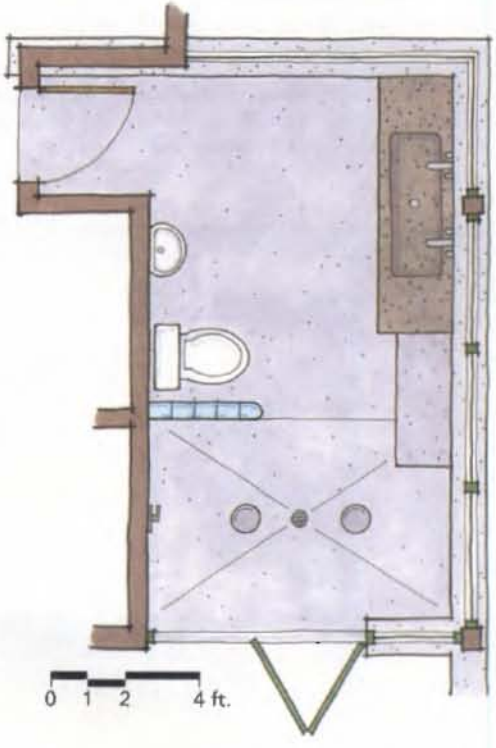
A desire for a modern, agricultural aesthetic drove the material choices for this home nestled in the woodlands in Occidental, Calif., says Laurie Erickson, a partner with Chet Zebroski in the San Francisco architectural firm EZDG. Those choices extend to the bathroom, where 6-ft. board-formed concrete walls topped by a roof structure of Douglas fir recall a wilderness outpost. Windows filling the space between walls and roof add to the pavilion-in-the-woods atmosphere. Served by two rainheads, the 5-ft. by 9-ft. curbless double shower is flanked by a bifold glass wall that opens to the outdoors. In a modest nod to privacy, along with the just-high-enough concrete walls, a glass-block partition separates the shower from the toilet and urinal. Both fixtures, as well as a concrete-topped vanity, are wall-mounted, making the room easy to clean. Floors and a concrete seat are warmed by radiant heat. With the visual weight of all that concrete, "you get such a strong sense of your surroundings when you're in that bathroom," Erickson says. The home's owners have discovered an additional by-product: great acoustics. "They find themselves going into the bathroom and dancing," she says.

ARCHITECTS Laurie Erickson and Chet Zebroski, Erickson Zebroski Design Group, San Francisco; www.ezdg.net

BUILDER Larry Horne Builders, Cazadero, Calif.

PHOTOS Dennis Anderson, Brian McCloud

SOURCES Glass door, NanaWall; vanity top, Bohemian Stoneworks; windows, Blomberg Window Systems, Sacramento



Drawings: Martha Garstang Hill

DON'T STOP AT A PERIOD

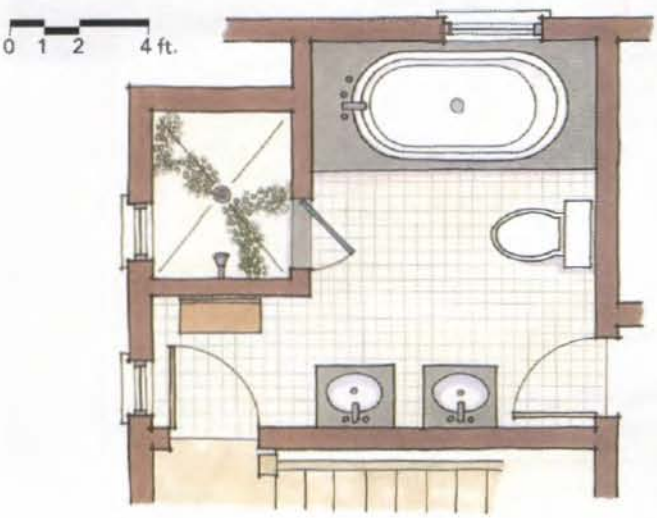
When David and Kathy Griffin decided to transform their brick-and-block rambler into a cozy bungalow, they wanted hallmarks of early-20th-century style carried throughout the house, including the new second-floor master bath. Project architect Sarah Farrell obliged, emphasizing crisp trim elements and outfitting the space with pedestal sinks and a pair of custom medicine cabinets. But she broke out of the period mold in the enclosed shower room. With two entrances to the bathroom, the homeowners decided a separate compartment for showering would offer more privacy. For Farrell, it offered an opportunity to relax the rules, so she covered the shower floor with river stones rather than the 1-in. by 1-in. keystone tile that covers the bathroom floor. "It was nice to be able to bring in a modern element," Farrell says, "and it gave us an opportunity to have some fun." The tub also strikes a balance between period and practical. Although the Griffins selected a traditional footed tub for its depth, they chose to surround it with a more modern-looking deck of Brazilian blue slate outfitted with simple fixtures. The modern moves are subtle, Farrell points out, but "it's nice that there are moments when the modern touch comes through."

ARCHITECT Moore Architects, Alexandria, Va.; www.moorearch.com; Sarah Farrell, project architect

BUILDER Gabe Nassar, GN Contracting Inc., Arlington, Va.

PHOTOS Daniel S. Morrison

SOURCES Faucets, Newport Brass; floor tiles, Keystone by Daltile; hardware, Ginger; shower's island stones, Architectural Ceramics; vanity light, Bonneville by Rejuvenation



GIVE GOOD BONES A FACE-LIFT

The wet zone in this remodeled bath delivers a quick shower for the bather-on-the-go or a relaxing place to soak in the tub. Clad in earth-tone ceramic tile, it's a stylish replacement for the original tub/shower combo with its cheap molded surround. When a custom glass door proved too expensive, the homeowners opted for a single 3-ft.-wide by 6-ft.-high glass panel atop a granite-capped curb. The doorless opening makes entering and exiting the shower effortless and hands-free, and a thin chrome strip prevents water from spilling over the curb. With no frame or moving parts, the glass panel "provides for a much cleaner look, a more modern look," designer Sonya Jacobs-Burkin says. On the floor, a switch from 13-in. by 13-in. to 2-in. by 2-in. ceramic tile distinguishes the shower from the dry part of the room, and on the walls, a mosaic strip adds zip.

0 1 2 4 ft.

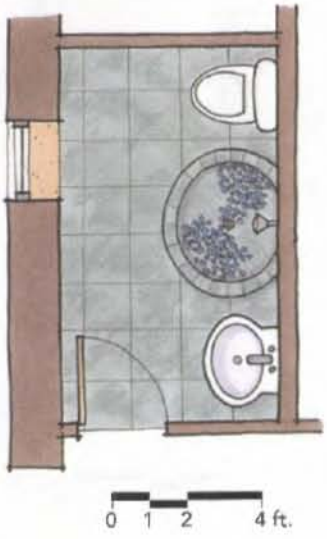
DESIGNER Sonya Jacobs-Burkin, SJB Designs, San Francisco

PHOTO Debra Silber

SOURCES Floor tiles, Stone Age by Cerim Ceramiche; toilet, Cimarron, bath fixtures, Symbol by Kohler; tub, Maui Maax; tub-surround tiles, Evolutions beige by Marca Corona; mosaic trim by Cerámica Tres Estilos

WHERE YOU CAN'T CREATE SPACE, CREATE INTEREST

Washington, D.C.-area architect Cheryl Mohr's response to the challenge of remodeling a 5½-ft.-wide, 9-ft.-long box of a bathroom was as deceptively simple as the mirrored wall that instantly doubled its square footage. Faced with an unalterable floor plan (co-op rules and plumbing issues in the vintage building ruled out moving walls), Mohr relied on visual and textural enhancements to grow the room's appeal. She started by warming up the 10-ft.-high ceiling, cladding it with walnut-slat shelves from several of Ikea's Molger benches. "We just tossed out the legs and used the seat and shelves," she explains. The pieces are screwed to furring strips affixed to the ceiling. To create more floor space, Mohr removed the existing tub and built a shower around the old drain, with a low curb to trap water and a tubular stainless-steel curtain rod suspended above. The shower's pebbled surface was chosen to suggest the look of a natural waterfall. A wall-mounted sink ("probably the biggest splurge in the room," Mohr says) is stationed where the foot of the tub used to be. Above the sink and toilet, a row of dimmable 100w lamps in simple porcelain fixtures illuminates the bath. If that doesn't warm the room enough, on the opposite wall, standard grab bars mounted over existing radiators become towel warmers—so chosen because the large diameter of the grab bars allows more heated air to flow around the towel than would standard towel bars. Mohr's ingenuity earned her the American Institute of Architects 2008 Small Project Award.



ARCHITECT Cheryl Mohr, Gardner Mohr Architects, Chevy Chase, Md.; www.gardnermohr.com

BUILDER Robert Chambers, Dunkirk, Md.

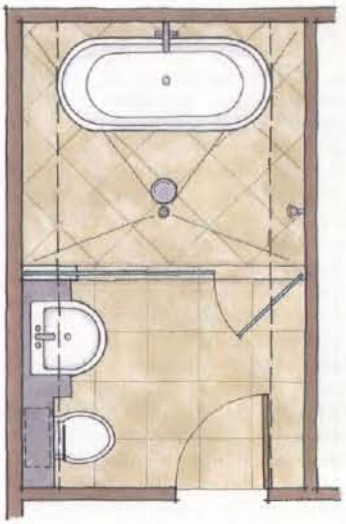
PHOTOS Cheryl Mohr

SOURCES Porcelain tile, Elba Night, Empire Series by Crossville; shower and wall pebbles, Black Sea Minor by Solistone; showerhead and controls, Grohe; sink, Hastings Zero + 70; toilet, Nexus by Toto

IF YOU FEEL BOXED IN, LOOK UP

As if redesigning any part of a landmark house doesn't present enough of a challenge, architect Gary Parsons faced additional dilemmas in his redesign of this master bathroom at renowned architect Bernard Maybeck's Wallen II house in Berkeley, Calif. Primary among them was how to make the new bathroom light and airy without sacrificing privacy—a tall order, considering a public walking path passes just a few feet from the bathroom's two exterior walls. Parsons found his solution in dual 15-in.-wide skylights that introduce sunlight and loftiness into the confining space, which he divided into wet and dry areas separated by a clear glass door. "It makes the room seem bigger and the shower less phone-booth like," he says. Further framing the bathing area is an existing beam that Parsons clad in vertical-grain Douglas fir, reflecting the wood tones of the vanity cabinet that supports a semi-encastre basin. The pairing of the bathtub with caged light fixtures above perpetuates Maybeck's habit of fitting industrial materials into traditional forms.

(The house itself is a prime example, built of concrete but featuring a Jacobean-style gable and a corrugated steel roof.) The finishes Parsons chose for the room—honed limestone on the shower walls and travertine tiles on the floor—appear as contemporary as they do classic.



ARCHITECT Gary Parsons, Berkeley, Calif.; www.garyearlparsons.com

BUILDER Zanderbuilt, Berkeley

PHOTO Muffy Kibbey

SOURCES Bathtub, Piedmont by Sunrise Specialty; Floor tile, Cobblestone Imperiale by Import Tile Co., Berkeley; light fixtures, REA series by Appleton Electric

what's the
HELPING READERS MAKE CHOICES

difference?

METAL COUNTERTOPS

A materials survey

So, you can easily discern soapstone from granite, granite from marble, and marble from any other stone-countertop material. But can you identify stainless steel, zinc, or pewter? How about copper or bronze?

The popularity of metal-countertop materials has grown considerably over the years. All of them offer homeowner-friendly benefits. They're all easy to keep clean and are relatively resilient when treated with care. However, none are inexpensive, and metal prices fluctuate so often that speaking in generalities is more accurate than giving definitive numbers. Here's what distinguishes each material.

Nena Donovan Levine is a kitchen and bath designer in West Hartford, Conn.

Zinc with an aged finish

Pewter with an aged finish

(A) STAINLESS STEEL

An alloy of carbon steel, nickel, and chromium, stainless steel doesn't oxidize or develop a patina like other metals, so it has a consistent look throughout its service time. Although stainless doesn't have the antimicrobial benefits of some other metals, it is less porous, which means it's easy to keep clean. Stainless steel is classified into "series" based on the percentage of each component element, and it is further classified into "grades" based on its crystalline structure. Countertops most often are made of grade-304 stainless, the hardest of the materials discussed here and the most scratch resistant.

Finishes: Stainless-steel finishes are numbered from 0 to 8 based on their polish; the higher the number, the shinier the surface. However, a brushed finish is most popular for countertops because it shows less wear and fewer fingerprints than a mirror finish. Brushed finishes can be maintained with a product called Beekeeper's Friend.

Cost ranking: Lowest

(B) ZINC

Zinc is a discrete element, whereas stainless steel, pewter, and bronze are alloys. An ordinary gray color, zinc is known (if at all) as a countertop material for oyster and seafood bars in Europe. Seams are welded and should be ground flush, but they are often visible due to color variations among zinc sheets. A good designer or fabricator can suggest a design compatible with the maximum sheet size, which is usually around 120 in. by 39 in. Zinc is not as hard as other metals, so it should be cleaned with a nonabrasive cleanser, and trivets should be used whenever possible to prevent damage.

Finishes: Zinc counters can be polished to a mirror sheen, but that's like polishing your work boots. The natural finish will develop a patina, or oxidation on the metal's surface. Applying beeswax can help to keep the countertop looking new.

Cost ranking: Low

(C) PEWTER

Pewter, an alloy that is mostly tin, resembles zinc in that it is naturally gray in appearance. When pewter develops a patina, it becomes a deep gray. Like zinc, pewter counters can create a distinctly European style as their use is more prevalent there. Pewter is the softest of these metals and melts so easily that it must be soldered, not welded. It is not as resilient as other metal countertops, but its softness is suited to intricately worked edge treatments. Like other soft metals, pewter should be treated with extreme care. Abrasive cleaners will scratch it, and a hardworking kitchen will take its toll.

Finishes: The results of aging are the same as zinc. Pewter countertops should also be maintained with beeswax.

Cost ranking: Highest

Continued on p. 86

Photos, except where noted: Dan Thornton. Photo top left: Charles Miller.

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Continued from p. 84

Copper with an aged finish

Bronze with an aged finish

(D) COPPER

According to the U.S. Geological Survey, copper ranks as the third most widely consumed metal on earth and one of the first metals used by man. When used in the kitchen, it can provide both an industrial and an old-world look. Like other metals, copper develops a patina over time, and its bright luster dulls as it ages. More so than other metals, copper has an inherent antimicrobial quality, which makes it a hygienic countertop option. Copper is relatively soft and malleable, so it should be treated with care to prevent damage.

Finishes: Copper can be polished to a high shine, left untreated so that it develops a patina, or chemically "aged" and sealed. Its finish can be maintained with copper cleaner and with waxes such as Trewax.

Cost ranking: Moderate

(E) BRONZE

Bronze is a metal alloy primarily composed of copper and tin, but it can contain other elements. It develops a patina over time, turning a dark, golden-brown color. Only a stainless-steel countertop is harder than bronze. However, bronze can still be scratched; as with all other metal countertops, cutting boards should be used. Bronze can be cleaned with a nonabrasive cleanser.

Finishes: The options are the same as zinc, pewter, and copper. Bronze countertops are often appealing to those who like the look of copper but find its hue too jarring. The finish can be maintained with the same products used for copper.

Cost ranking: High

WHY NOT ALUMINUM?

Inexpensive and readily available, aluminum seems like a great countertop option. So why, then, does aluminum seem to be the least popular metal among manufacturers and fabricators?

Aluminum is much softer than stainless steel but is still relatively resilient. The material has a few major drawbacks, though. Aluminum that is not treated with a protective finish, like a powder or clear coating, can stain and oxidize when it comes in contact with water and other substances found in kitchens. Unlike other metals, oxidized aluminum has a white, crusty appearance. It doesn't look patinated or well aged; it just looks unattractive.

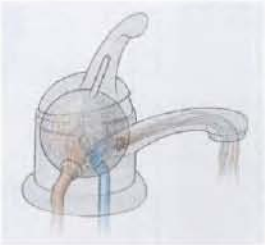
Aluminum can be bent easily, but fabricating the metal into a countertop can be very difficult. Welding aluminum is extremely hard, especially when working with the thin 16-ga. metal that most countertops are made of. Aluminum's susceptibility to warping under extreme heat is heightened by the process.

■ FAUCET VALVES

Which type is best?

Ball, cartridge, and ceramic-disk valves have all but replaced the old compression-style valve for controlling water flow in modern faucets. Choosing a faucet with the best type of valve can ensure that it rarely, if ever, will be in need of repair. Purchase a faucet wisely, though. Just because it's expensive doesn't mean it has the best valve. Style often trumps longevity.

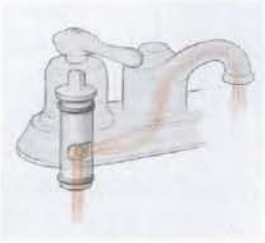
Rob Yagid is an associate editor.



BALL

Ball valves are most often found on faucets that have a single handle. When the hot- and cold-water supply lines are aligned with the holes in the hollow ball, water mixes and enters the faucet's spout. This valve has more moving parts than any other type of faucet valve, which means it's more prone to leakage and might require maintenance more often. Rubber seats, springs, and even the ball itself might need to be replaced over time.

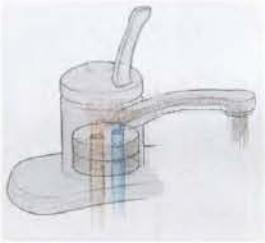
Replacement cost if not covered under warranty: $10–$15



CARTRIDGE

This valve is composed of a hollow stem—which is connected to a water-supply line—that turns inside a metal or plastic sleeve. Both have a hole. When the faucet's handles are turned, the hole in the stem aligns with the hole in the sleeve to allow water to flow. Cartridge valves have few moving parts, so leakage points are minimized. Replacing an O-ring often solves leakage problems, but should the cartridge need replacement, simply pull out the old cartridge and drop in a new one.

Replacement cost if not covered under warranty: $10–$15



CERAMIC DISK

Of the three, ceramic-disk valves are considered the longest lasting and most leakproof. This type of valve contains two perfectly flat, fire-hardened ceramic disks that have matching holes to control water flow. When the faucet's handle is turned on, the top disk shears against the bottom disk, aligning the holes. Mineral and sediment buildup that can damage other valves and lead to leaks is polished out.

Replacement cost if not covered under warranty: $20–$25

Drawings: Bob La Pointe

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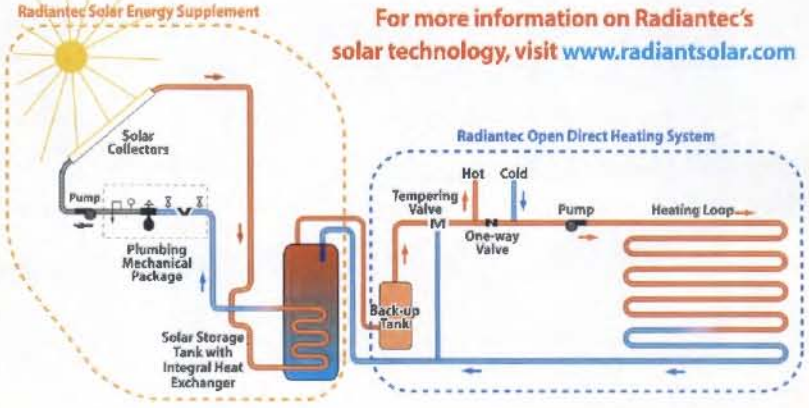

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HOLLOW-WALL ANCHORS

Which style is strongest?

It's not uncommon to have to install a wall-mounted fixture long after a kitchen or bathroom is buttoned up with drywall. When you can't secure the item to a stud or 2x blocking, a hollow-wall anchor is your best option. The anchors shown here, commonly found at home centers, often come with strength ratings. Some manufacturers (but not all) apply a safety factor when creating this rating to ensure performance under the listed load. Check to be sure. You might have to apply your own safety factor by dividing the listed maximum load value by four, per industry standards. The general load values listed here reflect the applied safety factor.

R.Y.

Plastic anchors serve the lightest duty. You can be comfortable hanging a small picture with these anchors, but not much else. They are not designed for use in ceilings and are the most susceptible to failing under heavy loads.

Auger anchors are the easiest to install. They don't require a pilot hole, which speeds up installation and minimizes damage should the anchor need to be removed. The strength of most auger anchors is comparable to that of plastic anchors, so their applications are similar.

Mollies are for permanent fixtures only. One type of molly needs a pilot hole; the other can be nailed. Both have a screw that flares the legs of the anchor to secure it. Mollies can be used in walls and ceilings, but removing this anchor causes significant damage.

Toggle bolts hold the most weight but are finicky to install. They require a large pilot hole and rely on a sprung toggle for support, which can limit their use. When used in walls filled with rigid or spray-foam insulation, toggles can't expand properly. These anchors perform well in most walls and ceilings.

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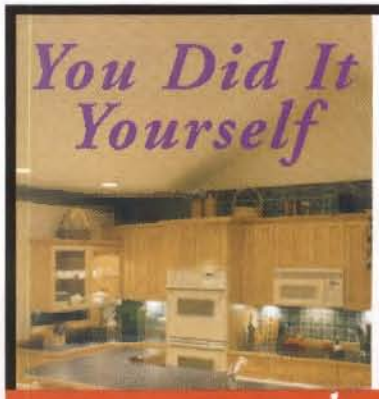

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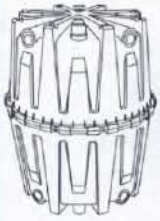

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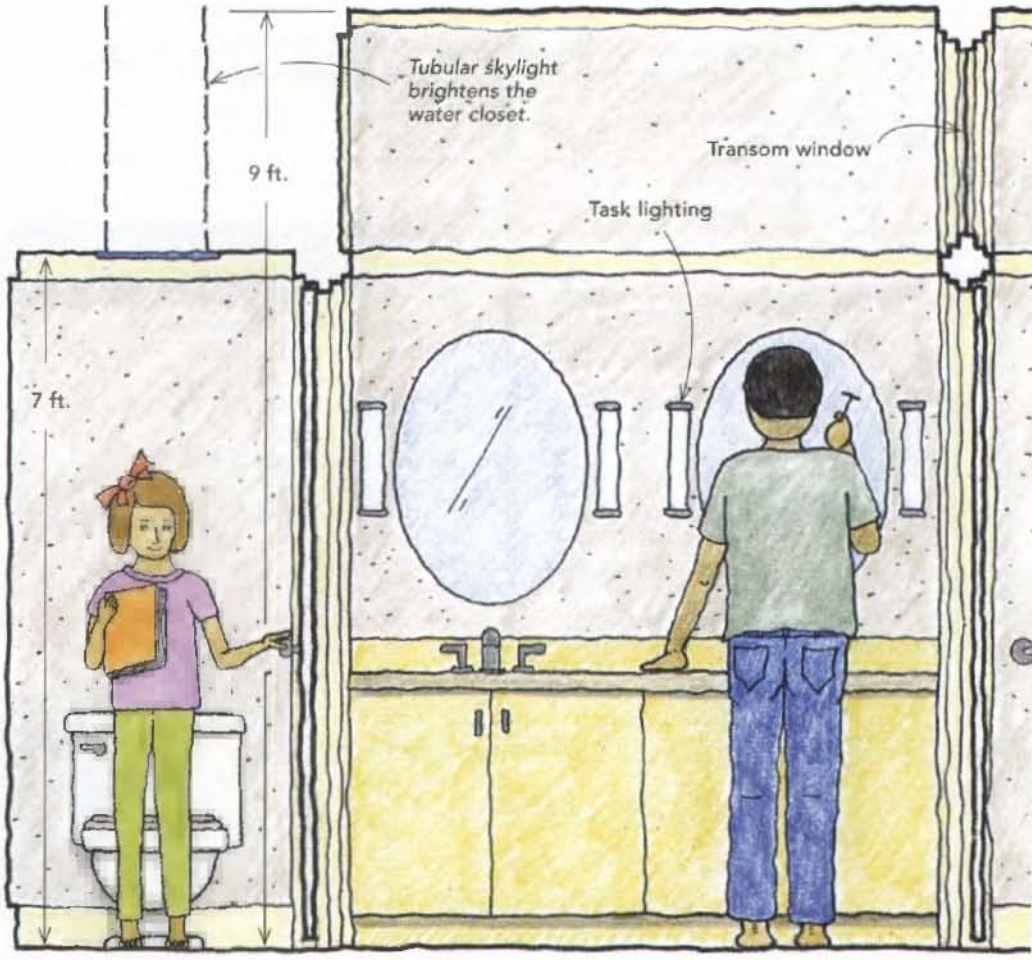
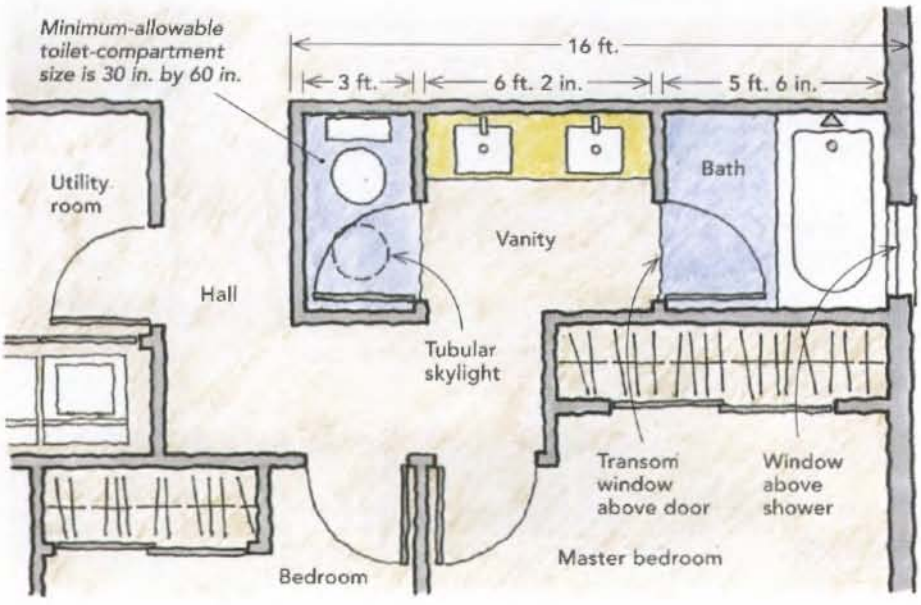
BY RUSSELL HAMLET

Sharing a bathroom

On a cost-per-square-foot basis, the bathroom is typically the most expensive room in a house. Instead of several bedroom/bathroom suites, one bathroom designed to serve several bedrooms is a smart strategy for keeping down costs or when building a smaller house. The trick, however, is designing a bathroom that can be used comfortably by two or more people at a time.

Too often, a designer adds a second entry to a traditional bath layout with the hope that it will serve more people. Despite two entry points, the bathroom is actually less accommodating of multiple users than it would be with a single door. A person using the toilet in the middle of the night is left to wonder nervously whether she locked the other door when she hears a houseguest walking down the hall. And if she forgets to unlock the door when she's done, that guest might not have access to the bathroom.





ADD PRIVACY TO A SHARED BATHROOM

Compartments for each bathroom function mean that a single person using the toilet won't halt others' morning routines. This bathroom for a small family is part of a suite away from the house's public areas. Sometimes called a European design, the layout has separate water-closet and shower areas, and takes the place of a typical bath-and-a-half found in smaller houses.

In contrast with the rest of the house, the low ceiling in the 3-ft.-wide toilet compartment creates a comfortably proportioned space. The 9-ft. ceilings in the rest of the bathroom allow light to stream through the compartments. A transom window above the shower-compartment door helps to bring natural light deep into the bathroom from the window over the shower.

Typically, a bathroom like this also includes a double vanity with the aim of accommodating two people getting ready for work or school in the morning or preparing for bed in the evening. But even for spouses or partners, this arrangement is of limited use if the bathroom has an open layout.

If you want to replace several bathrooms in a floor plan with a single bathroom serving multiple bedrooms, it's important to consider the users of the bathroom, the degree of privacy they need, and sightlines through the bathroom.

How many doorways?

Deciding how the bathroom relates to the bedrooms it serves is the first order of business. Shared bathrooms usually fall into three categories: a bathroom with a single hallway entry that serves several bedrooms; a master bath with a second entry from the hallway so that others can access the bathroom without traipsing through the bedroom; and a bathroom with access only from the two bedrooms that it is intended to serve.

To determine the number of entries and whether the bathroom should be tied directly to a bedroom, you first have to figure out who will use the bathroom. Will family members share it on a daily basis? Or will one family member share it with an occasional guest?

If people from more than one bedroom will be using the bathroom regularly, a single entry from the hallway often works best. Designing a master bathroom with two entries demands greater attention to limiting sightlines within the bathroom. Even with a single entry, a bathroom is more comfortable if the sightlines are carefully planned.

Compartments add privacy

By treating the vanity as a common area and isolating the toilet and shower, two or more people can use the facilities comfortably. A toilet compartment provides privacy and a sense of security for the person in the water closet, and it allows others to use the lavatory or shower at the same time. Depending on how you add compartments and arrange different functions, up to three people can use a bathroom at once within an 8-ft. by 10-ft. plan.

If it's not possible to fit a compartment with a door into the floor plan, carefully placed half-walls can shield the toilet and toweling-off areas to avoid embarrassing moments if someone accidentally barges in.

One efficient way of creating a bathroom that can serve several people at the same time is to adopt what some call a European design (bottom drawing, facing page). This type of bathroom has separate enclosures for the toilet and the shower, and the vanity is open to the hallway in the bedroom wing.

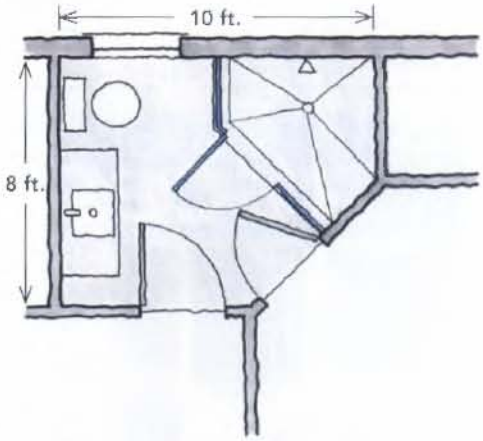
If the shower and the toilet area are in separate compartments, each one must be ventilated. A multiple-duct fan wired to a

SECOND DOOR LETS MASTER BATH DOUBLE AS POWDER ROOM

In some situations, the idea of a second door to the master bathroom makes sense. Visitors can use the bathroom as a powder room, and overnight guests can use the shower without having to tramp through the master bedroom. However, using the bathroom in the first drawing below involves a choreographed closing and locking of hallway and bedroom doors to ensure privacy—something of an inconvenience during a midnight trip to the toilet.

Adding a toilet compartment boosts privacy (bottom drawing). A pocket door is another option with a clean look that contributes to an open, light-filled space.

Don't do this



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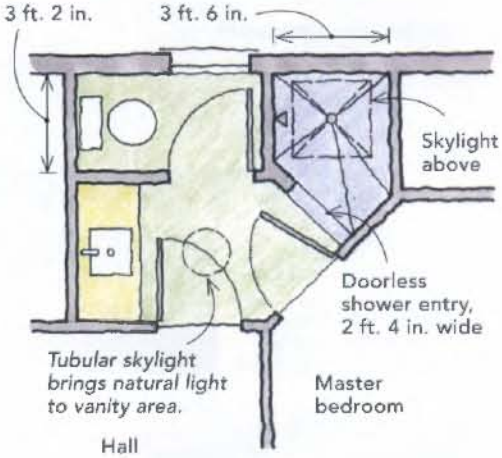
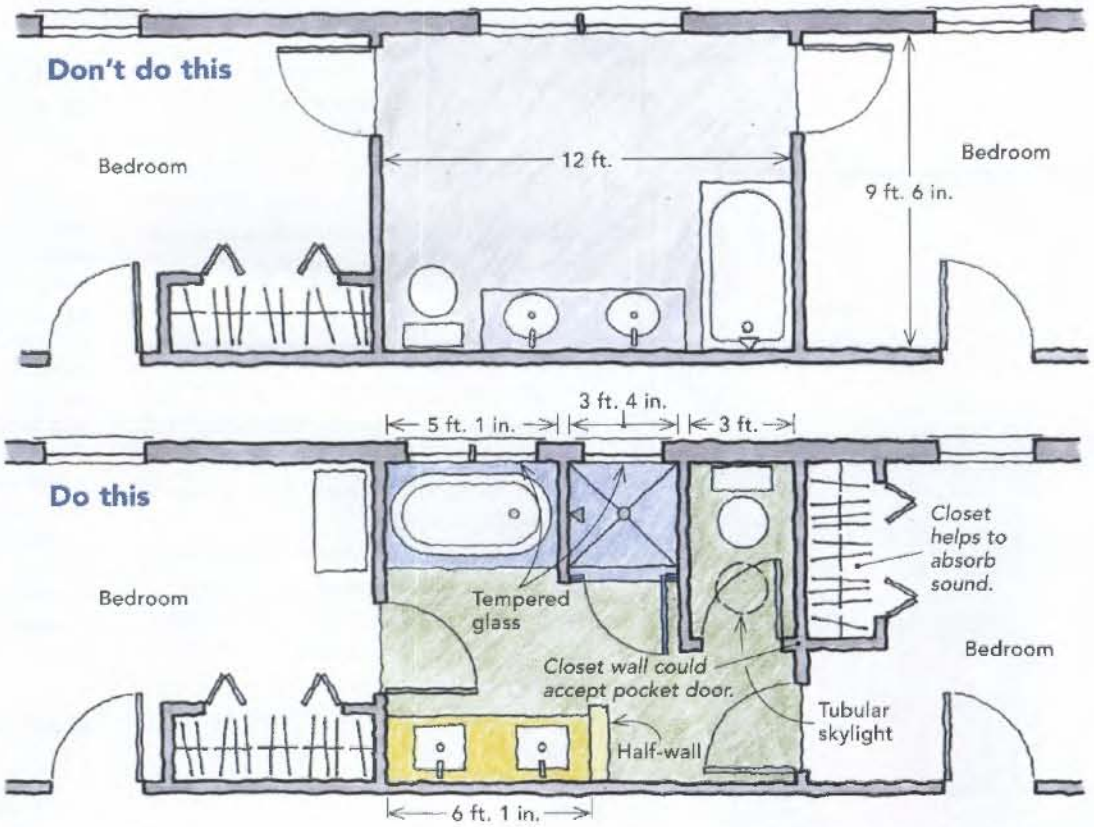


BETTER SIGHTLINES IMPROVE A BATH BETWEEN TWO BEDROOMS

This poorly planned bathroom between two bedrooms (top drawing) has a lot of wasted space. Attention to sightlines and the use of half-walls and enclosures improve the bathroom and make better use of the space, allowing for the addition of a tub.

Thanks to offset doors, the bathroom fixtures don't have to be lined up along one wall, and the hallway effect (a direct view from one bedroom to the other) is eliminated. A toilet enclosure and a half-wall at the vanity further shield views into the bathroom.



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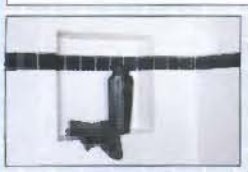

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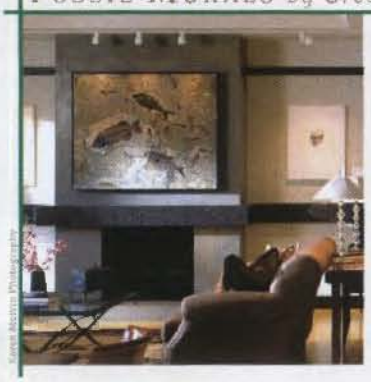

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timer switch is an efficient way to clear the air (see pp. 60-63).

Look on the bright side

"There isn't enough light" is the most common refrain I hear from clients about their bathrooms. Compartments and doors that divide a bathroom exacerbate the problem, so lighting strategies are important.

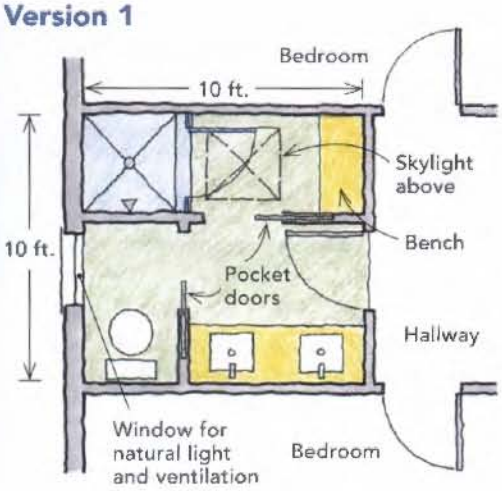
Adequate overhead lighting and good task lighting mounted on both sides of a mirror are essential, but nothing beats natural light. Skylights, both traditional and tubular, bring light into compartments, and I use them liberally. But I also make sure light from windows travels as far as possible. *Relites*—transom windows that function like clerestories—are a simple, effective way to get indirect light deep into a bathroom.

Russell Hamlet, AIA (www.studiohamlet.com), lives and works in Bainbridge Island, Wash., while planning his next telemark-skiing trip. Drawings by the author.

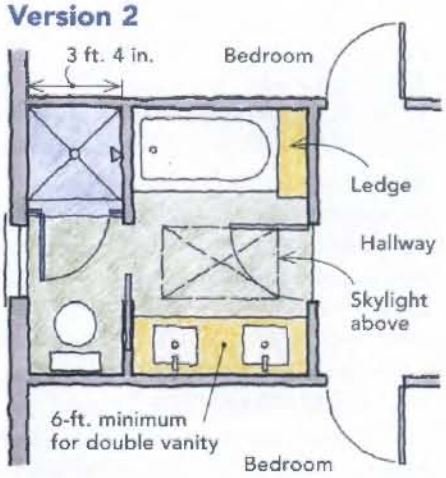
TAILOR THE AMOUNT OF PRIVACY TO THE USERS

Depending on who shares the bathroom (siblings, spouses, or children and guests), the amount of privacy they demand and the frequency with which they use the bathroom should determine the degree of compartmentalization. A relatively small bathroom divided into three compartments (Version 1) can be shared by people who want privacy. Pocket doors help to open up the space when the compartments aren't in use, and a skylight brightens the shower and dressing area. If people are on different schedules, the toilet and shower can share a compartment, and the same footprint can also accommodate a tub (Version 2).

Version 1



Version 2



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Life with a combo washer/dryer

My wife and I decided to put our laundry center upstairs, centrally located between the bedrooms in our new second-story addition. We had limited space for the machines, which got us wondering about a combo unit—one appliance that both washes and dries laundry.

While talking with our friends Loren and Heather, who had recently included water-conserving appliances in their remodel, we learned about the LG combination washer/dryer (model WM3677HW; http://us.lge.com). Loren and Heather liked it, though they described the laundry process as being different from the typical washer-and-dryer tandem setups. They said it would take a little getting used to, but that we'd be pleased nevertheless with the machine's advantages. My wife and I bought one for $1600, and here's what we've learned so far.

The magical innovation of this front-loading combo unit is that I can dial in a preset wash mode after filling the machine with laundry. I've used only the "normal" setting, but should the need arise, I can dial in "sanitary," "cotton/towels," "delicates," "permanent press," "hand," and "speed" wash. I haven't had time yet to install our backyard clothesline for drying, so I hit the "dry" button and let it fly.

The machine runs on 120v and does not require the 4-in.-dia. duct common to the typical clothes dryer. This is a real advantage: no tortuous route through an existing structure to the exterior; no lint clogging the duct and cutting down on efficiency; and goodbye to the flex connection at the back of the dryer that inevitably comes loose, dumping moist air and lint into the house.

I confess that I toyed with running a dryer duct anyway, just in case we decided that this machine wasn't for us. But then I remembered puzzling over the duct that I had installed for the bath fan downstairs, and the inspector remarking that "only an architect would duct a fan this way." I decided to skip the duct.

My wife and I agree that the combo washer/dryer is a good investment. It uses less water and energy than a standard two-appliance arrangement. The combo takes a long time (3 to 4 hours) to run through a full cycle of washing and drying at the normal setting; however, it eliminates the need to transfer laundry from one machine to another.

Our friends often run their LG at night; their machine is remote enough that it doesn't disturb their sleep. In our case, though, the spin cycle vibrated the entire house like a helicopter landing on the second floor. This made nighttime runs impossible and had me worried that our hard remodeling work was coming undone with each load of laundry. To remedy the situation, we slipped a thick rubber mat under the machine. This has made an enormous difference, but we still shy away from setting the spin cycle at extrahigh speed.

"My favorite attribute of this machine is its gentle approach to washing clothes."

One of the unique attributes of the LG combo is the drying quality. As clothes spin at high speed, they are dehumidified dry, and the resulting condensation simply runs out the drain line. When they come out, clothes are hot and slightly moist, like a towel served to me recently by JetBlue. They need to be hung up promptly or ironed if they are prone to wrinkling. A steam-cycle feature built into the newer LG model helps to prevent wrinkling.

Another peculiarity is that lint collects in the door lining. It is somewhat tricky to remove and, insofar as it remains caked in, becomes a part of the "combo experience."

This machine is not for people who desire higher productivity and prefer to run their washer and dryer simultaneously instead of sequentially. Perhaps my favorite attribute of this machine is its gentle approach to washing clothes. My favorite T-shirts will last a lot longer playing in this combo.

Scott Donahue is an architect in Oakland, Calif. Heather Kuiper and Dr. Loren Rauch contributed to this review.

Photo: Scott Donahue

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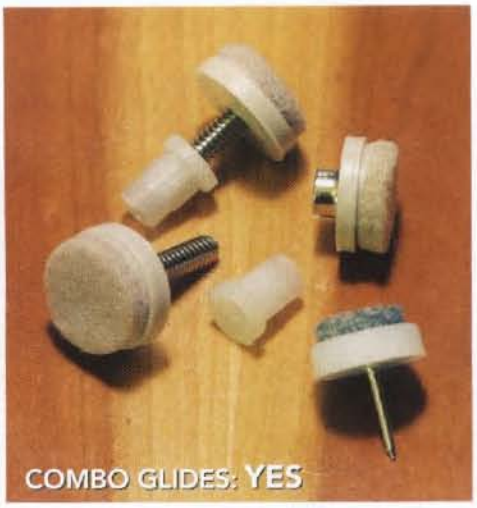
The best chair glides for minimizing floor scratches



Our kitchen has an elevated pedestal table where my wife and I eat just about all our meals, perched atop tall barstools. The red-oak floor below is finished with three coats of clear, oil-based polyurethane. When I built the kitchen, I was pretty sure this table would get a lot of use, so I installed nail-on PVC chair glides on the legs of each stool to minimize floor scratches. In no time at all, though, there were plenty of scratches.

My wife, trying to make me feel better, suggested that the floor wasn't actually scratched. Instead, the plastic glides were leaving plastic deposits on the floor as the stools were moved around. Whatever those marks were, they were ugly, so at the suggestion of a seasoned kitchen designer and barstool sitter, I replaced the PVC glides with stick-on felt pads. The floor marking stopped, but the stick-on pads, which are fine for stationary furniture such as tables, have shown a tendency not to stick very long on the barstool legs.

It turns out that a combo glide—felt on a plastic base with a mechanical connection to the leg—is the way to go. Charles Peterson, a professional floor finisher in Gales Ferry, Conn., polled a community of floor finishers around the country. They came to the same conclusion, with this caution: It's important to keep the floor swept on a regular basis to minimize grit; otherwise the felt pads will turn into little grinding wheels.

Incidentally, the PVC glides, which look like big tacks with thick heads, make excellent push pins for our wine-cork bulletin board.

Special-issues editor Charles Miller lives in Newtown, Conn.

Recycled rubber flooring

When we decided to remodel our bathroom, we thought it was important to choose materials that had some sustainable qualities and recycled content. We also thought it important that a bathroom floor be durable, slip resistant, long-lived, and resilient. At a local store that sells various "green" products, I found just the flooring I was looking for, and it came with LEED certification as well.

The flooring I chose is the Reztec brand from Expanko (www.expanko.com). A blend of post-consumer tire waste and manufactured rubber, Reztec contains recycled content that varies with the color choice, of which there are many, from muted and earthy hazelnut to fiery tangerine. Our bathroom's color palette is mostly red and black (p. 78), so we chose tiles that have red chips in a black field.

Reztec comes in various sizes and thicknesses. I bought 24-in. squares of 6-mm thickness, as this seemed thick enough for durability, not too soft, and easy to handle during installation. At $4.50 per sq. ft., I had to purchase a minimum of one carton (80 sq. ft.) for our small project. I needed only 45 sq. ft., but figured the remainder could be used in our soon-to-be remodeled laundry area.

Unfortunately, Expanko offers floor adhesive only in 2-gal.-minimum quantities. For me, this overshadows any LEED rating; I did not want to have 1½ gal. left over. After calling the local rep, I learned that I could use any polyurethane adhesive suitable for vinyl and rubber, which I could purchase in smaller quantities.

I installed the Reztec tiles over a plywood underlayment and cut the material where I had to scribe it to the tub and sidewalls. The material has some give, and I was able to achieve a seamless-looking installation. After the adhesive is applied and the tiles are placed, a 100-lb. roller is used to set the flooring. Expanko recommends a water-based sealer.

We love the floor's feel and finish, and we could not think of a better choice for our bathroom.

Jay Lazerwitz is an architect and artist in Seattle.

Top photos: Charles Miller. Bottom photo: Krysta S. Doerfler.

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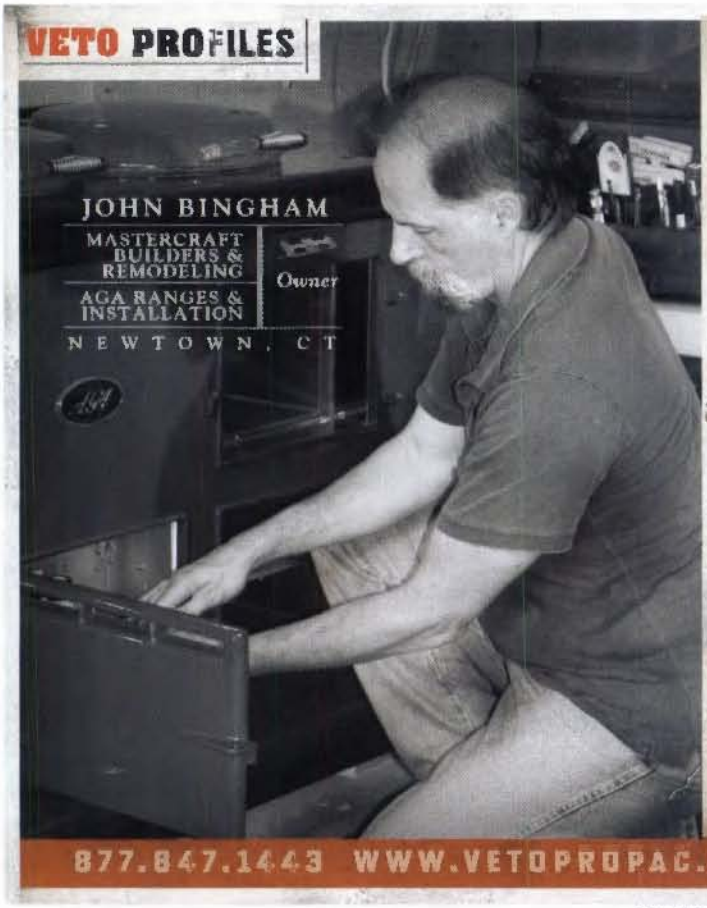

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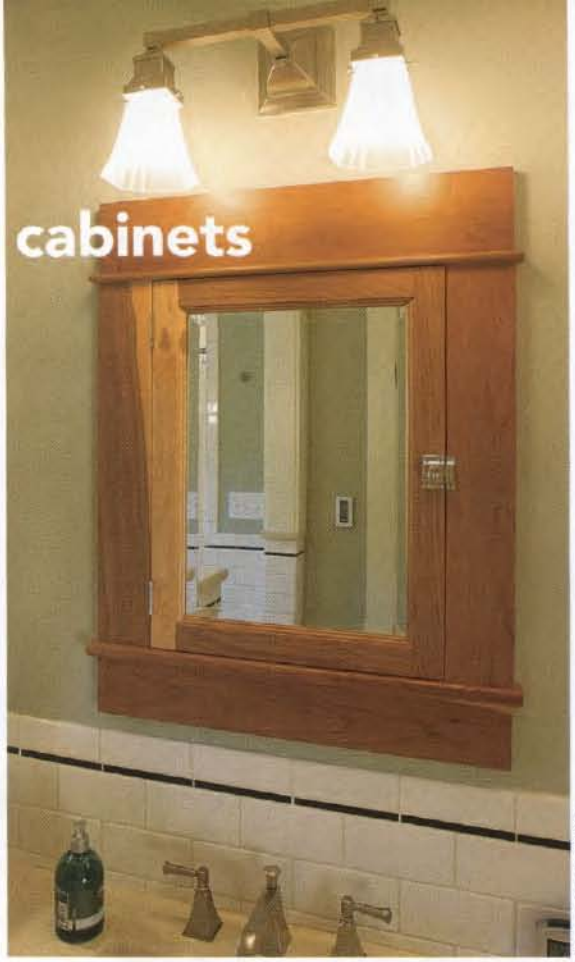

Photo: Charles Miller

The master bathroom in our home was due for a makeover. While an efficient design with modern conveniences was important, so was Craftsman-era style.

Our plan included individual recessed medicine cabinets above his-and-hers sinks. The local hardware store sold medicine cabinets that were rough-primed and assembled, but their $523 price tag struck us as expensive.

We went home, typed "Craftsman medicine cabinet" into Google, and found Van Dyke's Restorers (www.vandykes.com). They not only had a cabinet of essentially the same design and dimensions, but it also was available in solid, unfinished cherry, which would match our base cabinets. To make things even better, the assembled cherry cabinet sold for $230, and it also came in a fairly easy-to-assemble kit for $170. Shipping charges were $19.75 for two cabinets.

We did have a couple of ordering glitches, but Van Dyke's customer-service folks remedied them to our satisfaction. The first problem might have been our fault: We wanted one right-hand- and one left-hand-opening cabinet, and instead we received two of the same. Van Dyke's exchanged the cabinet at no additional charge (shipping or otherwise), but when the replacement cabinet arrived, one of the boards was split. After the second no-charge exchange, we were good to go. We had our painter spray polyurethane varnish on the cabinets, and they turned out great.

Tom and Maggie Evart live in Lake Oswego, Ore.

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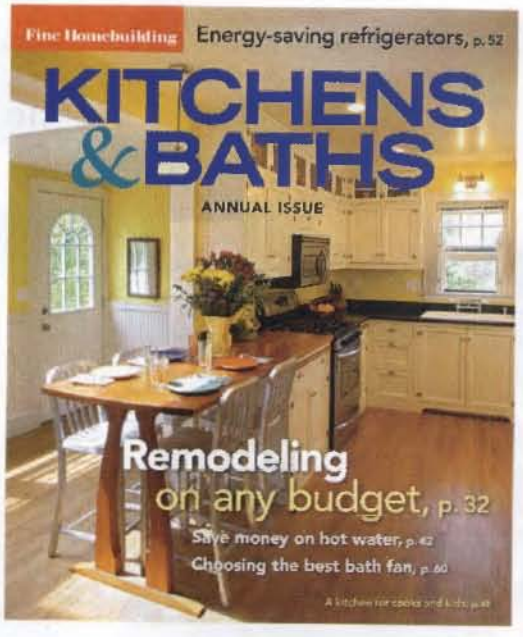
Call for Entries

It's a year away, but we're already scouting for the next issue of *Kitchens & Baths.* We're interested in brand-new or remodeled projects of every style from all over the country. And we're not looking just for big, expensive kitchens and baths; well-designed projects that are done on a tight budget are dear to our hearts. But big or small, expensive or thrifty, they must be well thought out and beautifully crafted.

Don't worry about professional photos. Right now, we just need decent color photographs and a brief description explaining which aspects of your project might prove interesting to our readers. We prefer email submissions to fhcallforentries@taunton.com (7-mb max file). We are equally happy to review CDs or hard copies of your materials. Send them to KITCHENS & BATHS, *Fine Homebuilding,* 63 S. Main St., P.O. Box 5506, Newtown, CT 06470-5506. For advice on how to refine your submission, please visit: **FineHomebuilding.com/kbsubmit**



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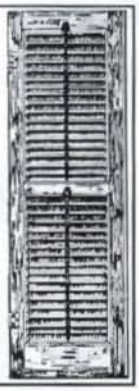

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Mystery Leak

One afternoon some years ago, I walked into the dining room on the first floor of our house and turned on the light. It seemed unusually dim. I looked closely at the spherical-glass ceiling fixture and was shocked to see that it was half full of water. This situation was not good.

I'd recently installed a bathroom on the second floor, and it was directly above the light. This was the bathroom five of us had lived without for 20 years. Now that our three kids were gone, my wife and I decided that we really needed this second bathroom. After months of labor, we had it. Or did we?

As a reluctant plumber, I hadn't been excited about tackling this job. How could I repair the leak without ripping up the new bathroom floor? Then I remembered that I had taken pictures of the plumbing before I installed the floor that covered it up. Because I had discovered that the leak stopped when the hot water was turned off, I could narrow my search to the hot-water supply line.

I'd built a small closet next to the shower enclosure as an afterthought. While nailing the bottom plate of a section of the wall to the floor, I realized that a copper pipe might be in that immediate area. As a result—and as the photos confirmed—the last nail was not driven all the way in. That was the area I needed to investigate.

After making a small opening in the wall near the partially driven nail, I discovered that the point of that nail had penetrated an elbow fitting on the pipe. Water was dripping from it.

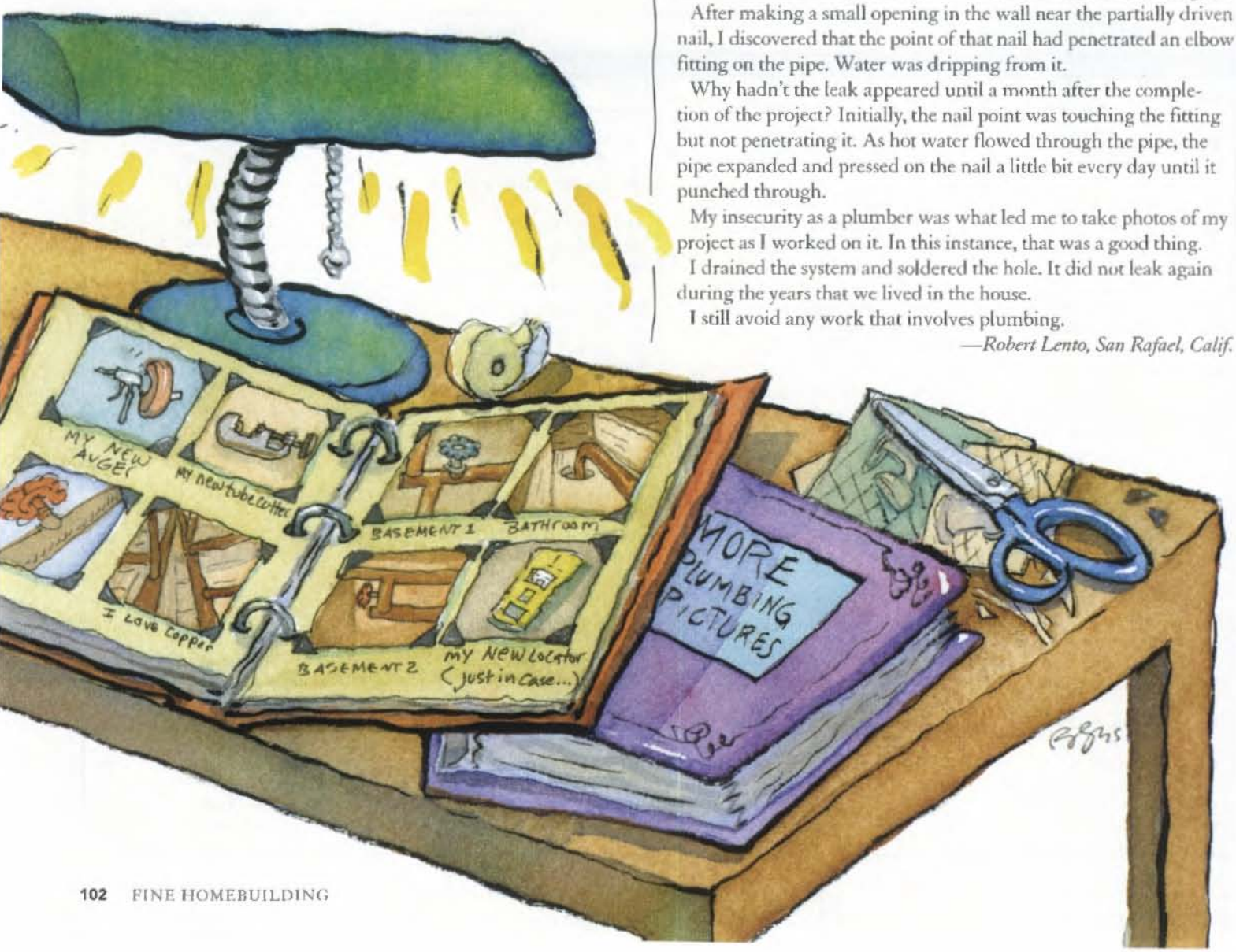
Why hadn't the leak appeared until a month after the completion of the project? Initially, the nail point was touching the fitting but not penetrating it. As hot water flowed through the pipe, the pipe expanded and pressed on the nail a little bit every day until it punched through.

My insecurity as a plumber was what led me to take photos of my project as I worked on it. In this instance, that was a good thing.

I drained the system and soldered the hole. It did not leak again during the years that we lived in the house.

I still avoid any work that involves plumbing.

—Robert Lento, San Rafael, Calif.



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Soak in the serenity

Slide open the shoji next to the soaking tub, and the music from a nearby waterfall dances into this timber-framed bathhouse. Inspired by Japanese design, Taproot Architects of Langley, Wash., transformed what was once an arid field into a series of ponds, waterfalls, buildings, and outdoor rooms. Sited at pond's edge, the structures are an integral part of this nurturing and restorative setting.

Facing east, the bathhouse welcomes morning light from across the pond but eludes evening glare. The exposed ceiling structure of Port Orford cedar will remain light as it ages, in contrast to the deeper color of the western red-cedar decking. Lights at the base of the building reflect off the pond at night to wash the landscape with a gentle glow, and a nearby bench receives those who wish to sit for a moment to watch the koi.

Visit the Magazine Extras section at FineHomebuilding.com to see more photos of the bathhouse.

Photos: Matthew Swett