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THE GREEN ISSUE

In with the Old!

Charles Shaw and Lisa Bodwalk at home in Durango, Colo.

Reusing a junior high school in Colorado

Restoring a Hudson River cottage

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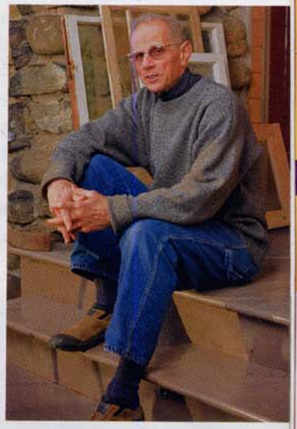
ON THIS PAGE: Architect Stephen Tilly's sketches of his 1904 cottage in Dobbs Ferry, N.Y. *Photo by Michel Leroy*

ON THE COVER: Charles Shaw and Lisa Bodwalk continue to rehab the Smiley Building in Durango, Colo. *Photo by Douglas Merriam*

Going Green at Home

How does a preservation-minded architect make his own house greener? Carefully ... very carefully



Architect Stephen Tilly had a commitment problem. Seventeen years after he and Elizabeth Martin moved into their stone-and-shingle cottage overlooking the Hudson River in Dobbs Ferry, N.Y., he still couldn't decide how or when to restore the place. "Working on clients' homes was easy," says the award-winning architect, who began practicing in 1972. "It was much harder to commit to our own project."

The 1904 house was stable and comfortable (he and Martin had painted and made modest improvements after buying it in 1979), but a host of challenges cried out for attention. Capitals atop the Ionic columns lining the porches had disintegrated, uninsulated plaster walls and leaky windows meant unacceptably high heating bills, and water had damaged portions of the original ceilings. And of course there was the roof: Whenever winds blew off the river with particular force, red asphalt shingles flew from above, usually landing in a neighbor's yard and requiring stealth cleanup missions—plus abject apologies.

Tilly's vexing problem was figuring out how to initiate a comprehensive home restoration program that was historically appropriate and emphatically green. "We chose this old house because it was well built, and because it was close to the village and transportation—very green attributes," he explains, "I wanted our restoration to blend the latest technology, proven methods, and building science. I admit that was a

BY JAMES H. SCHWARTZ
PHOTOGRAPHY BY MICHEL LEROY

What makes it green?

Windows
have been removed, recaulked, weatherstripped and replaced, and are now protected with energy-efficient storm windows to reduce air exchange.

Insulation
has been placed wherever air can penetrate the building envelope. Cellulose insulation, made from old newspapers, is energy efficient and ecofriendly.

Shingles
made from long-lasting Alaskan yellow cedar are naturally rot-resistant, require little maintenance, and could protect the house for as long as 50 years.

Paints
with lower levels of VOCs (volatile organic compounds) are formulated with fewer dangerous solvents, to minimize off-gassing and harmful fumes.

Architect Stephen Tilly (right) says his Dobbs Ferry, N.Y., house is "Colonial Revival with some Arts and Crafts touches." Now it's also green.

As part of the restoration, workers wrapped the walls with a moisture barrier, and built a grid of furring strips on top of the gambrel roof to support new shingles.

tall order, and I guess that's the reason we kept putting the project off."

Finally, in 2006, he and Martin gathered up their courage (and marshaled their finances) to implement the first phase of a green restoration program. They started outside with the two areas that required immediate attention: the failing roof and the shingled exterior walls.

"Green equals durability—that's the preservation mantra," Tilly says. When choosing new materials for the roof and walls, he searched for long-lasting products that would require minimal maintenance. At the outset he considered western red cedar, a traditional building material harvested in the United States and Canada, but a chance conversation with a craftsman changed his mind. "Our carpenter, who's very experienced, mentioned that he thought red cedar was getting less and less reliable," Tilly says. "He suggested we consider Alaskan yellow cedar, because it's extremely dense, insect resistant, and durable."

Before accepting his recommendation, Tilly and Martin calculated two important figures: the surcharge for yellow cedar (roughly 30 percent) and the environmental costs associated with trucking Alaskan shingles across the continent to New York. (Energy consumed by transporting building materials over long distances can compromise the green goals of a project.)

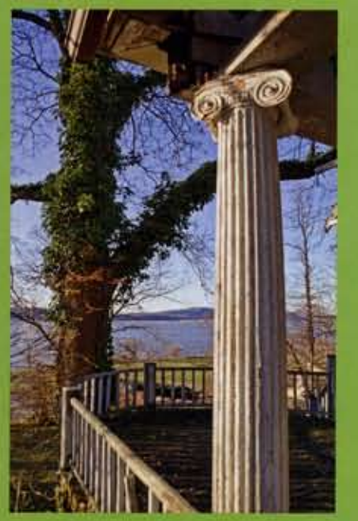
Greening the 1904 cottage meant reusing existing treasures, and replicating others with sustainable materials. Tilly repaired and rehabilitated the sidelight and a wooden storm window flanking the front door (left). Instead of tearing out damaged flooring, he and Martin had original floors sanded and refinished (middle). Historically appropriate cedar shingles (right) replaced asphalt shingles on the roof.

After completing basic research, Tilly concluded that the yellow cedar would likely last for 50 years or even more—much, *much* longer than the less expensive red alternative. The projected life expectancy, and the energy savings provided by stringently monitoring construction and keeping waste to an absolute minimum, mitigated his concerns, and he okayed the purchase of ½-inch yellow cedar shingles for the walls, and slightly thicker ¾-inch shingles for the roof.

That's when restoration began in earnest. "We decided to take the house down to the original sheathing," Tilly says. Off came all the loose asphalt on the roof, along with a motley collection of rotted wooden shingles that had survived beneath. Then workmen moved off the roof and onto the walls, peeling away all the decaying cedar still attached to the second and third stories. "When they were done we were able to start from substrait," he says, "a real *tabula rasa*."

To guarantee a long life for the new roof, Martin and Tilly opted for a meticulous installation method. Workers laid plywood down over the original sheathing and covered it with a waterproof membrane. Then they nailed a crisscrossing grid of wooden strips called cribbing to the new material. The cribbing provided a framework for the roof shingles, and acted as a sort of spacer between the roof and the cedar. Water runs off instead of getting trapped beneath the shingles, and the cribbing permits constant air circulation so that the shingles remain dry. "This is

Punishing winter storms severely damaged the wooden columns and plaster capitals (right and above) around the house. "If it's possible to repair and reuse, I'll always choose that route," Tilly says. He consulted a master craftsman in nearby Yonkers, N.Y., who made a mold and cast new capitals. Contractors scraped, primed, and reinstalled the columns (left).



The decorative transoms and sidelights around the front door flood the foyer with light. Elizabeth Martin and Stephen Tilly refinished original fir and oak floors here and throughout the house.

a conservative approach," Tilly admits, "a meld of contemporary and classic. And the payoff is that cold air no longer floods into the attic. For the first time we're keeping air out of the house, instead of heating the air that makes its way in."

With work on the roof nearly complete, workmen installed a Tyvek membrane on the walls to protect them from moisture. Then they judiciously replaced rotted window trim (saving and reusing sound pieces), and finished the walls with new shingles that will fade to a soft gray without the application of any special coatings or sealants. Today the house looks much as it did at the turn of the last century, with shingles that spring from a point above the stone base and crawl up and over the gambrel roof. The look is "shingley Colonial Revival," Tilly says. "It may not be a great architectural achievement, but it's a great house."

Now that work on the exterior is almost finished, Tilly and Martin have begun planning next steps for their restoration. Windows are first on the list, because energy-efficient window units are key to any successful green building project. Tilly has already removed and restored a few windows in the house, repairing and reglazing and weatherstripping, then putting them back in place behind functioning storm windows. (See "Window Know-How" on p. 36.) Some aluminum triple-track storms were already on the house in 1979, so he didn't see any reason to replace them. He rehabbed a few that were in poor shape and painted them a custom color so that they blend seamlessly into the facade. Storms that could not be repaired were recycled (glass and aluminum separated and sent to recycling centers) and replaced to prevent energy loss.

"There's this 'you must let old houses breathe' mentality, but here's the real secret: Old houses will breathe no matter what. It's virtually impossible to seal up an old house so tightly that it won't have adequate ventilation."
—Stephen Tilly

Though insulating the c. 1904 windows with storms has made a big difference, insulation elsewhere—or the lack of it—still poses a substantial challenge. "There are countless nooks and crannies that allow air to penetrate exterior walls—you can't believe the sneaky ways air gets in," Tilly says. He continues to pursue an aggressive program of insulation throughout the century-old structure. When a porch roof had to be removed, for instance, workmen filled the exposed cavity with foam insulation, before rebuilding and replacing the soffit. Tilly says he plans to continue using foam insulation where it makes sense, but will also study other options.

"We have used our house as a work bench and laboratory … We're actually learning here—something people forget to do in their own homes."
—Elizabeth Martin

"We may wind up using three different kinds of insulation at our house. Currently I'm evaluating cellulose, which is very green because it's composed of recycled old newspapers mixed with boric acid. That has the lowest carbon footprint. But I'm also considering foam for places where we can't get cellulose in. Recently I spent time at a workshop with contractors, gathering their information, so I'm trying to figure out which types to use before moving forward."

The pressing insulation dilemma that keeps him (and plenty of green preservationists) up at night is this: How do you insulate masonry walls? "We live in a house with these massive stone walls on the first floor that you can see from the outside. Inside of course, there's a layer of space through which run wires and heating pipes, then there's lathing and plaster. So do we insulate in there? Should we insulate? Or is it a waste of energy to warm and dry the inside of those granite walls?" Tilly admits that he's stumped, but his plan at the moment is to experiment: "We may remove an entire interior wall and build a new stud wall that we can thoroughly insulate in a conventional way … it's still an open question."

Elizabeth Martin, an accomplished landscape designer, says this thoughtful approach has served her and Tilly well, helping them to avoid costly errors. "Whenever possible, I always advise clients to go slowly and in phases so that you're learning from one project to the next."

What's next on her list? Replastering then repainting several rooms with the low-VOC paints mandated by the State of New York. Older, conventional paints contained high levels of volatile organic compounds, which released a potent form of gas when first applied to walls. Not only did VOCs compromise air quality, they drove plenty of homeowners away from their houses until the air had cleared and the walls were dry. Today's low- or no-VOC alternatives are odor free and pose fewer problems for residents suffering from allergies.

Tilly suggests choosing paints based on their predicted life cycle. He views this as a question of sustainability. Is it reasonable to choose and apply a low-VOC paint to the exterior of a building, for example, if you know you'll have to repaint in short order? "We need a lot more information about the carbon footprint associated with manufacturing low- or no-VOC paints before we can make a judgment about what's green," Tilly says.

As part of the interior rehab, Martin and Tilly also plan to remove poor-quality cove molding applied to the ceilings during the 1950s, and replace it with original lengths of picture rail, carefully preserved for just this purpose. (If gaps remain, they'll have replacements milled.) Before the restoration is complete, they'll also replace inefficient fixtures throughout the house with water-saving devices. Tilly says the low-flow showerheads he has placed in all four bathrooms save gallons of water. He's currently researching dual-flush toilets to find the best options.

With the restoration well underway, and energy-saving results already generating hundreds of dollars in savings, Tilly says he's looking forward to the next set of challenges. "For a long time I said that the cobbler's children always go barefoot, and our house was the last project on my list," Tilly admits. "I've finally decided to work on my own pair of shoes."

Before you Build...

Assemble accurate plans. Stephen Tilly (whose drawings of his own house appear here) says, "That saves a huge amount of time, and cuts down on the probability of 'redos.' " An architect or drafting service can measure and draw up your project.

Save everything. That length of chair rail you're ready to toss could provide a valuable clue about original finishes and detailing.

Invest in quality. After evaluating a variety of materials, Tilly chose lead-coated copper flashing with a soft pewter-like finish. Though more expensive than galvanized steel or aluminum, it will last longer.

Treasure old windows. The density of the old-growth wood and the beauty of old glass are practically impossible to reproduce. (And with old windows, you can repair single components instead of replacing entire units.)

Minimize construction waste. Always order accurately. During restoration, separate waste items on site and recycle recovered materials.

Check out the tools that Stephen Tilly and other preservation architects couldn't live without at PreservationNation.org/tilly.