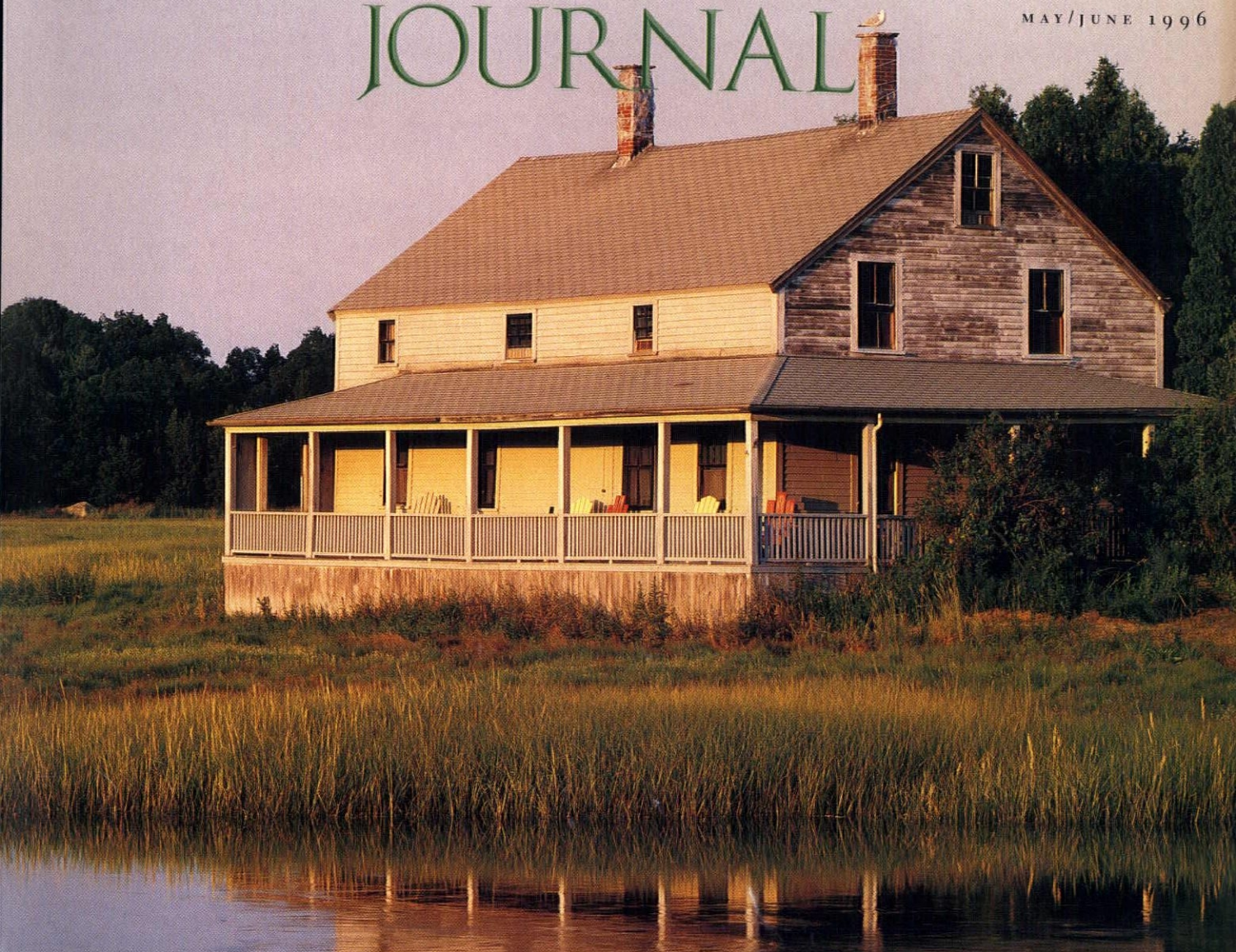


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# OLD-HOUSE JOURNAL

MAY/JUNE 1996



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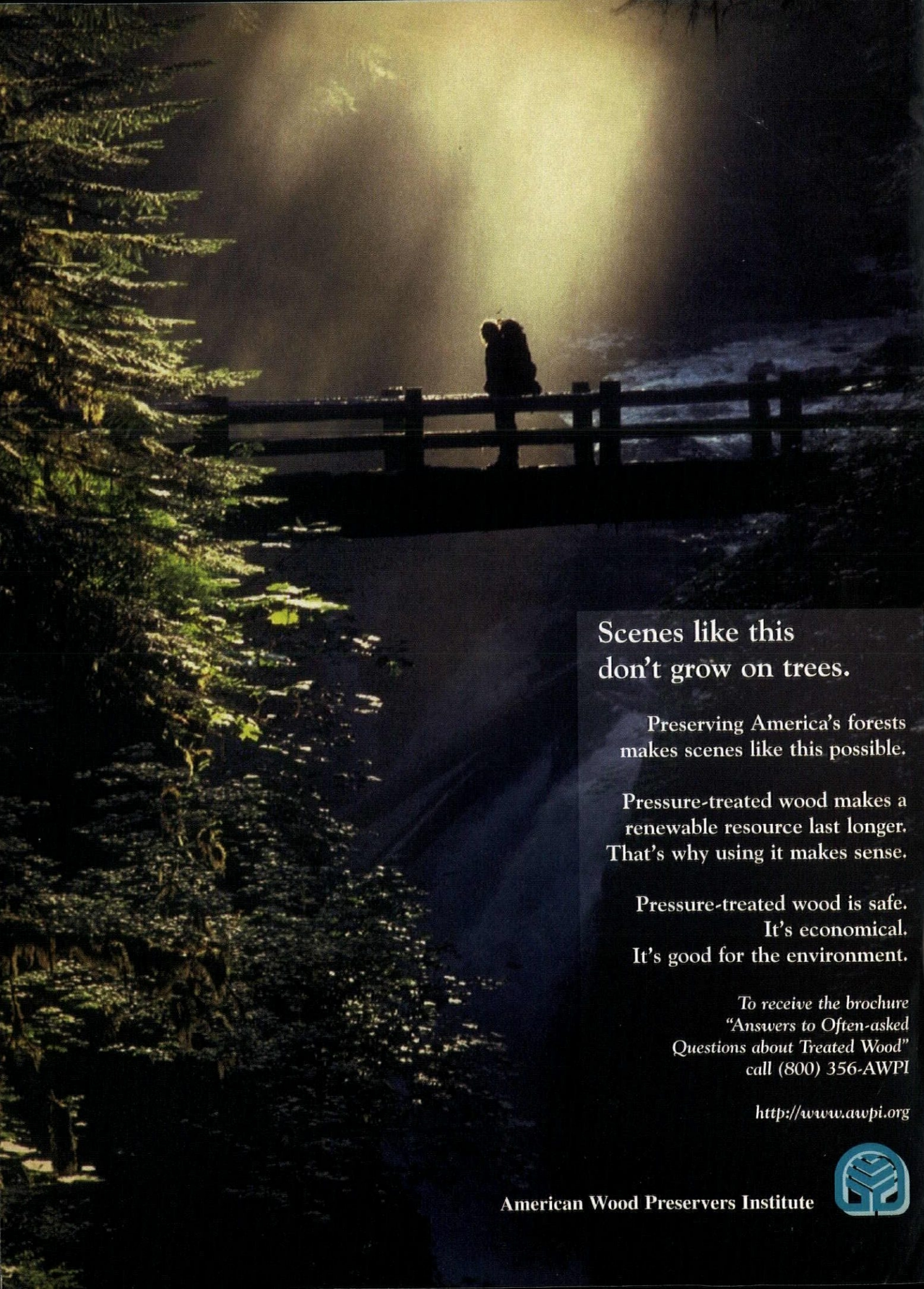
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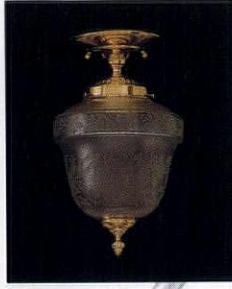
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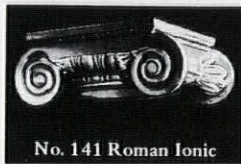


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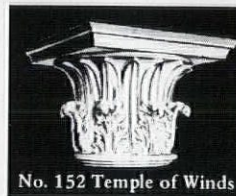


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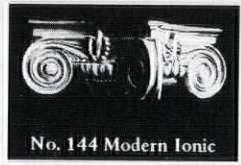
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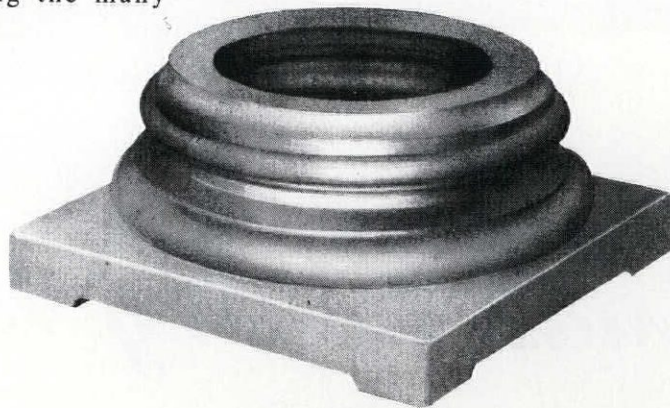


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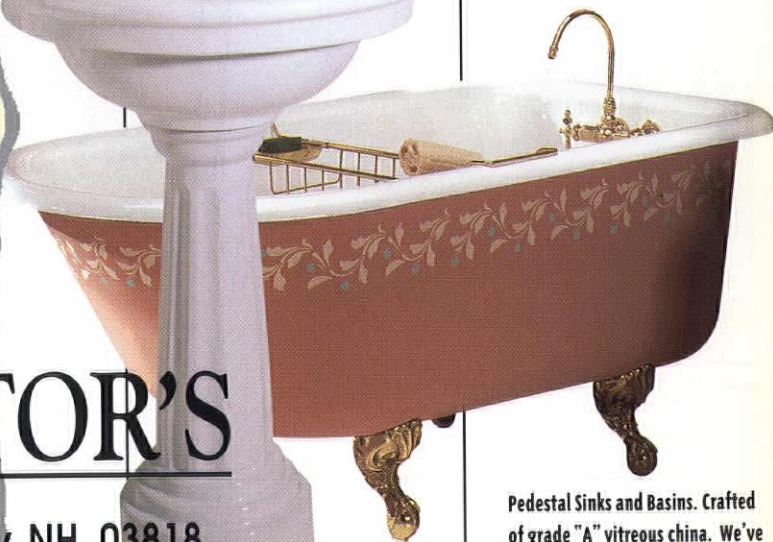
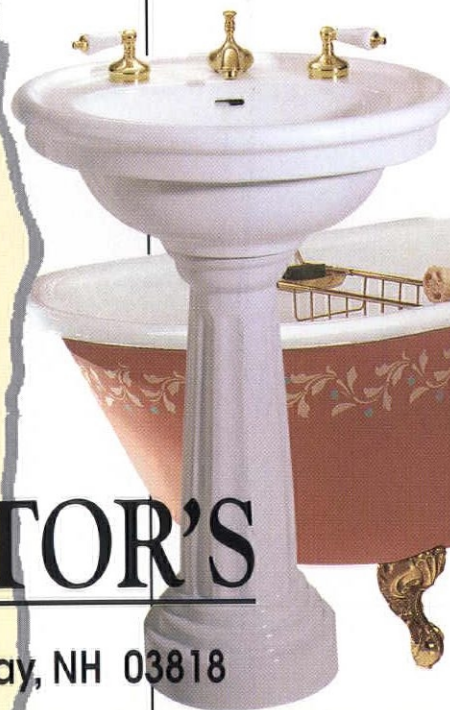
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## 8 EDITOR'S PAGE

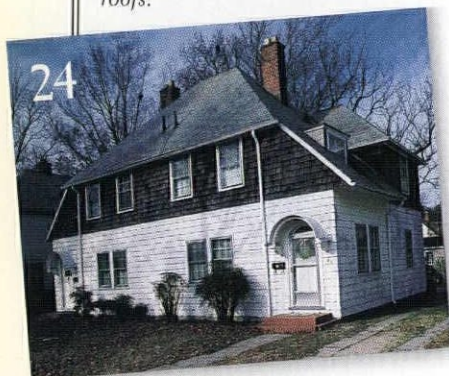
*Rich Reading on a Not-So-Dry Subject.*

## 10 MAILBOX

*An update on the location of a Julia Morgan house and century-old spectacles are uncovered. Also, Contributing Editor James Massey is leading a two-week architectural course.*

## 14 ASK OHJ

*Reader queries about glass doorknobs that spin, corner block styles, the necessity of lightning rods, and fastening cresting to roofs.*



## 18 RESTORER'S NOTEBOOK

*Installation tips for tongue-and-groove boards, a recipe for cleaning brass hardware, and repairing marble with marine epoxy.*

## 20 GOOD BOOKS

*Two easy-to-read guides that describe time-tested solutions to water problems.*

BY GORDON BOCK  
& LYNN ELLIOTT

## 24 READING

### THE OLD HOUSE

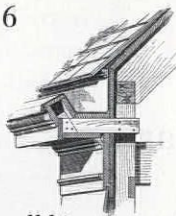
*Twin houses and fourplexes share a party wall, but don't call them row houses. These unified abodes visually look like one large house and have more yard space.*

BY JAMES C. MASSEY  
& SHIRLEY MAXWELL

MAY/JUNE 1996

## 30 TECHNIQUES

### Rebuilding Box Gutters



*Leaks in box gutters spell big trouble. If properly restored, built-in roof drainage will again be trouble-free and maintain an aesthetically pleasing façade.*

BY JOSH GARSKOF

## 36 KNOW-HOW

### The Dews and Don'ts of Insulating

*Peeling paint and rotting sills can be caused by incorrectly placed insulation. Prevent moisture build-up, and its resulting problems, with this primer on installing insulation.*

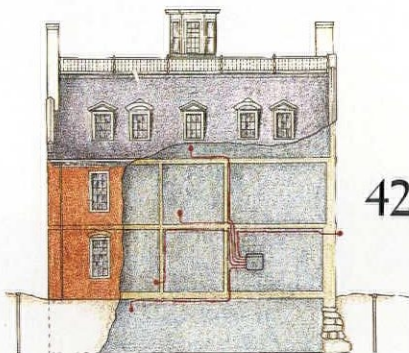
BY ERNEST A. CONRAD

## 42 KNOW-HOW

### Detecting Moisture

*A leak in the roof is easy to spot, but how do you find other sources of moisture? Here are the methods and technology that detect moisture so the problem can be controlled.*

BY JOHN LEEKE



**ON THE COVER:** Water attacks old houses from the ground, the sky, and even from the interior. This building sits on the bank of the Essex River, in Massachusetts.

COVER PHOTOGRAPH  
BY DAVID BROWNELL





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46 HOW-TO

## Caring for Carvings

*Carved woodwork adds a richness to any period interior, but the delicate reliefs are easily damaged. Fortunately, homeowners can do some minor repairs themselves.*

BY KATIE GARDNER

52 HISTORY

## Gambrels Are Alive and Well

*From the ubiquitous gable to the complex mansard, a parade of roof shapes dominated 19th-century architecture. This style guide sorts out the most often encountered roof types.*

BY GORDON BOCK

56 HOW-TO

## Just Lube It!

*If selecting the proper lubricant for squeaky hinges and sticky locks is a bit of a mystery, it won't be after reading this.*

BY NEAL A. VOGEL

58 OLD-HOUSE LIVING

## Saving Time in a Bottle

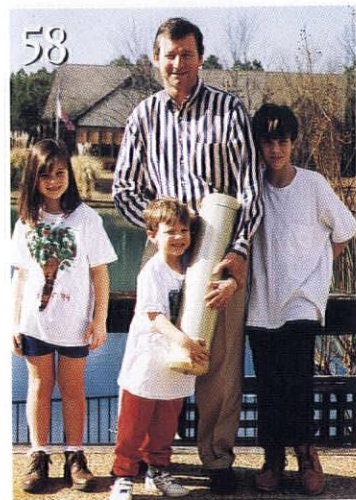
*An old-house owner discovers the history of time capsules — and how to time-proof messages from the present.*

BY JOHN G. FOX

## 64 RESTORATION PRODUCTS

*Items for the inside and outside the old house: wood screen doors, Victorian garden edging, roof cresting, and a punched tin panel cupboard.*

BY JOSH GARSKOF



## 68 HISTORIC HOUSE PLANS

*A cedar-shingle cottage influenced by the Shingle Style and a 18th-century Massachusetts house with a gambrel roof.*

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*Catalogs, Products & Services, For Sale/Swap, Real Estate, and Events*

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## 98 REMUDDLING

*A Depression-era apartment building built on top of half of a Gothic Revival mansion.*

## 100 VERNACULAR HOUSES

*Germanic Stone Houses of the Shenandoah Valley.*

BY JAMES C. MASSEY & SHIRLEY MAXWELL





## Rich Reading on a Not-So-Dry Subject

**W**ATER IS AN OFFBEAT FOCUS, PERHAPS, ESPECIALLY when viewed from a publishing perspective. (You can't really photograph humidity or a moisture level!) Yet, for those of us immersed in the world of old houses, there's hardly a subject that could be more important—or more timely.

This winter has been one for the books. In San Francisco, last December, I had a first-hand experience with torrential rains and 100 mph winds that rocked my 40-storey hotel like a boat. Snow has piled up to record levels in the East. (We could see the ice dams coming almost before the first snowflakes fell.) Have no doubt, all this water will be with us through the spring as snow melts and water tables rise.

No one would deny that water is an elemental force on earth and vital to all life, but why should it command so much attention in the realm of restoration? The late Lee H. Nelson, Chief, Preservation Assistance Division of the National Park Service and a founding member of APT, summed up the answer in the foreword to *Moisture Problems in Historic Masonry Walls*, by Baird M. Smith AIA:

"Moisture is probably the greatest source of damage to historic buildings. Excessive moisture from rain, ground water, and condensation can inflict damage ranging from dampened wallpaper and plaster to severe deterioration of structural components. In extreme cases, moisture can jeopardize brick and stone walls and can threaten building stability."

Water is mercurial, and the forms it takes can affect every material in an old house. That would be a lot of water to cover in a book—to say nothing of one

journal issue—so we decided to dive into just a few of the most critical topics.

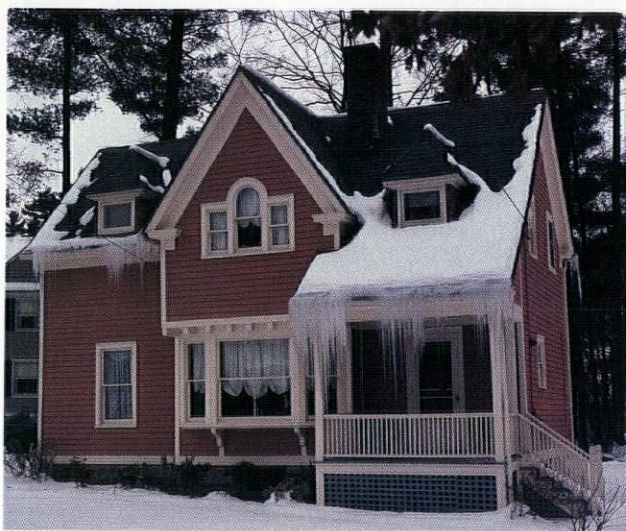
For the insulation article, we started by going over a file full of letters that goes back to 1988. Two things became clear. First, the majority of current literature assumes you are installing insulation in a new building, not adding it to a pre-1940s structure. Second, moisture inside the house is discussed as an after-

thought, not the basic living condition it is. We're happy to have a historic buildings specialist like Ernest Conrad on board to put his finger on how insulation works, and how moisture works against it. (He's the first person to explain why all the metal in my old house gets rust marks during the winter, when the house is unoccupied.)

When it comes to water, what you can't see *can* hurt your building. John Leeke shows us the machinery—from low-

high-tech—that helps increase our perception of moisture in building components. (We've suggested to John that he has a whole new calling as "Mr. Leak," but for the time being he's keeping his powder dry.)

The information on rebuilding box gutters is also reader-inspired. The best way to reduce water problems is to avoid them, and conducting rain safely away from the old house is the first line of defense. Box gutters are essential features of many old houses, yet when they fail they often cause drastic water problems. Josh Garskof's collection of expert advice and new ideas will restore gutters to better levels of performance.



Ice damming up on a (probably uninsulated) old-house roof—a water problem in its winter form.

*Gordon Bock*





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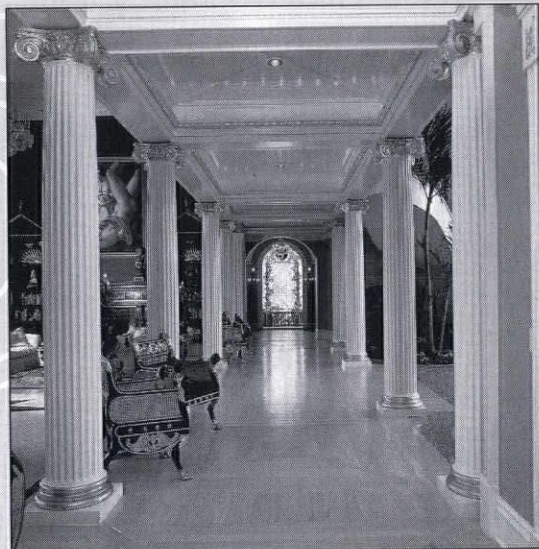
SUBSCRIPTIONS: Subscription service (800) 234-3797; back issues (available at \$4.95 per copy) (508) 281-8803. ADVERTISING: (508) 283-4721. EDITORIAL: (508) 283-3200. We are happy to accept editorial contributions to Old-House Journal. Query letters that include an outline of the proposed article are preferred. All manuscripts will be reviewed, and returned if unacceptable. However, we cannot be responsible for non-receipt or loss—please keep copies of all materials sent. POSTMASTER: Send address changes to Old-House Journal, P.O. Box 58017, Boulder, CO 80322-5017.

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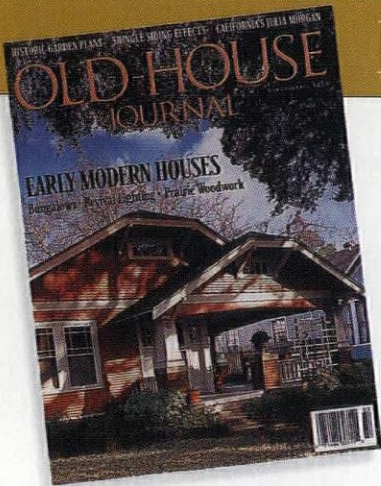


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**COVER KUDOS**

Dear OHJ,  
I REALLY ENJOYED YOUR ARTICLE "A Nation in Bungalow." The house that graced your cover is truly beautiful. It has a jewel-like quality which I would like to give the new house that I hope to build this spring. Thank you for publishing such an interesting and informative magazine.

— J.R. ALTON  
Beaufort, N.C.

M A I L B O X

**LIGHT-BULB LORE**

FIRST OFF, OF THE TWENTY-ODD magazines that I receive every month, yours is one of the few I read cover to cover the day it arrives. However, missing from your article on Colonial Revival light fixtures (March/April 1996) was a mention of period light bulbs. Your readers may be interested to know that a few companies manufacture reproduction bulbs, the perfect companion for the fixtures shown in your article. I myself use old-style light bulbs made by Kyp-Go in St. Charles, Illinois, and let me tell you, those bulbs can really dazzle.

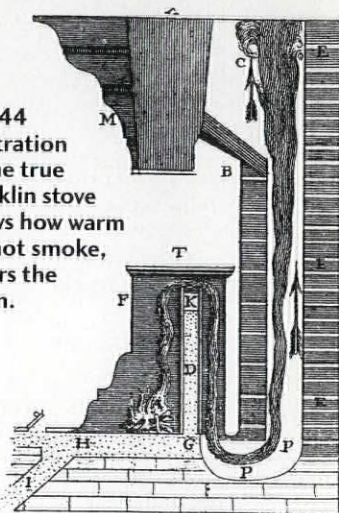
— JOHN SMITH  
Sheldon, SC

**MANTEL INSERTS**

YOUR "IN SEARCH OF MANTEL INSERTS" article was great. Your readers may be interested to know that the

cast-iron "Franklin stoves" marketed today (upright models with splayed sides and without baffles) are actually Rittenhouse stoves. The true Franklin stove was oriented hori-

**A 1744 illustration of the true Franklin stove shows how warm air, not smoke, enters the room.**



zontally and took up a lot of space in a room. A similar upright, cast-iron model patterned after the fireplace designs of Count Rumford was known as the Rumford stove.

— WARD BUCHER, A.I.A.  
Washington, D.C.

**MORE ON MORGAN**

SEVERAL READERS WERE CURIOUS ABOUT THE REDISCOVERED J.H. Pierce house shown in "Julia Morgan, Engineer and Architect" (March/April 1996). So we contacted San Jose architect George Espinola who found the building and took the photo.

It seems that 1290 The Alameda, the 1910 address, is now an empty lot, which led Morgan scholars to assume the Pierce house had been demolished. However, Mr. Espinola realized that the street numbering system had been changed in 1930 when the city limits moved. With some digging, he was able to locate the building again, still on Alameda in San Jose, but at a new number.

Besides tracking down Julia Morgan houses, Mr. Espinola is researching the career of architect Frank Wolfe who worked in California at the turn of the century. Readers with information can write to him through OHJ. — THE EDITORS



The Pierce house, designed by architect Julia Morgan, was rediscovered in San Jose.

**150-YEAR-OLD SPECS**

"THE HIDDEN STAIRCASE" (JULY/AUGUST 1995) reminded me of a mysterious item I discovered in my 1830 home. When I lifted the attic floor to lay insulation, I found a pair of spectacles laying on the lath and plaster ceiling. They are similar to the ones in pictures of Ben Franklin. Since the 12" wide planks were still fastened with cut nails, I suspect that these glasses have been there since the house was built. I can picture one of the carpenters who constructed it—after a hard day of work—exclaiming, "I wonder what I did with my glasses. They were right here in my pocket this morning." Thanks for an interesting article.

— RALPH RIKER  
Cincinnatus, N.Y.





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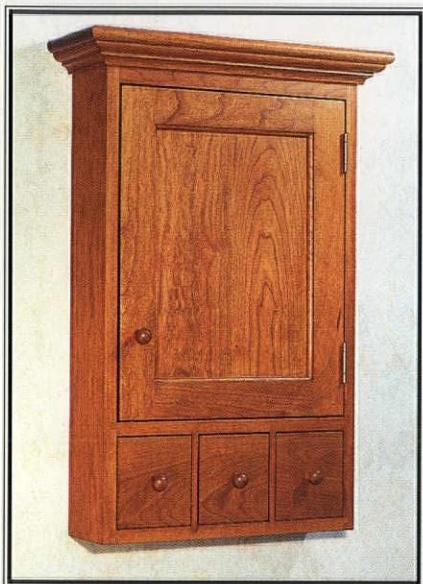


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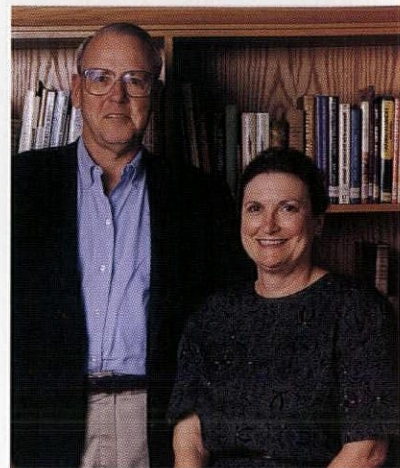
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[continued from page 10]



**OHJ Contributing Editors James C. Massey and Shirley Maxwell.**

## OHJ'S MASSEY TO TEACH COURSE

OLD-HOUSE JOURNAL CONTRIBUTING Editor James C. Massey will lead a two-week course on American architecture at Drew University in Madison, New Jersey. Using the buildings at Drew University as the focus, the class will examine the various styles of architecture popular between the 17th century and World War II. The class will be held June 2-13 from 9 a.m. to noon, Monday through Thursday. Shirley Maxwell will be a guest lecturer for the course.

For more information, contact Ronald A. Ross, Director of Continuing Education, Drew University, 120 Madison Avenue, Madison, NJ 07940; (201) 408-3400.

**CORRECTIONS:** For those shopping for doorbells or light fixtures, we have two corrections to make from the last issue. First, the Friedland doorbells shown on p. 68 in "Restoration Products" are not wireless. Second, an incorrect address was printed for Rejuvenation Lamp & Fixture Co. on page 56. It is 1100 SE Grand Ave., Dept. OHJ, Portland, OR 97214; (503) 231-1900.



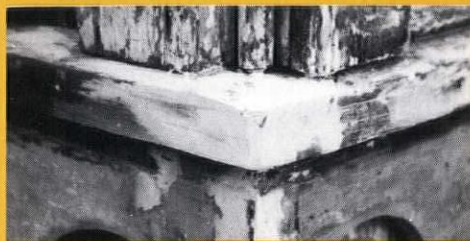
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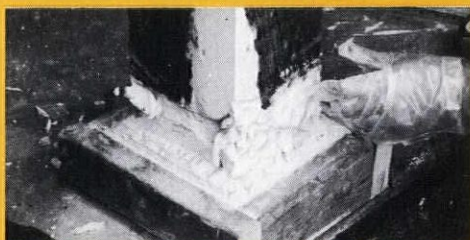
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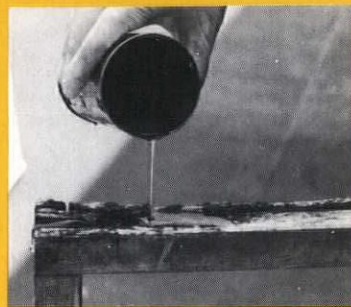
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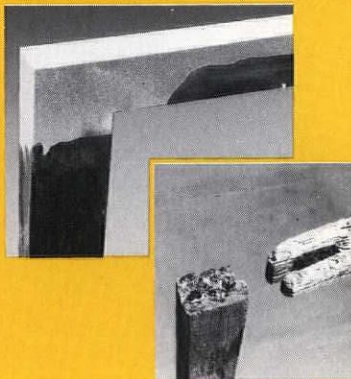
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**Spinning Glass Doorknobs**  
*My glass doorknobs from early in this century are loose and turn freely in their metal bases. We have to grab the base in order to open the doors. After numerous bruised knuckles, I am looking for a way to fix the problem. Any suggestions?*

— Bonnie Gemgross  
Bellaire, Tex.

TO SECURE THE GLASS KNOB TO THE spindle that moves the latch, manufacturers commonly used three redundant fastening systems. First, a decorative star pattern in the back of the glass mates with an indentation in the metal base. Second, metal and glass are cemented with adhesive. Third, and most important, the edge of the base is crimped around a lip in the glass. It is this third method that provides most of the gripping power, and once it goes, the other two generally fail.

That's what Crown City Hardware, in Pasadena, California, told us when we called about this question. These folks handle much salvage hardware, along with their extensive line of reproductions, and despite extensive research they've come up with no effective repair for this very common problem. In fact, when they come across loose

glass knobs, they throw them away. "About the only thing it'd be good for is a paper weight," says Crown City owner Richard Perris.

Recrimping is not an option, and any cement that's strong enough to hold also corrodes the silvering on the back of the glass knob. The result is a discolored, ugly doorknob. Unfortunately, your knobs may be a lost cause. However, matching replacements are generally pretty easy to find. Crown City is still researching the prob-

lem. Perris has promised to announce any success through the pages of OHJ.

**Cresting Question**  
*An early photo of my 1882 Eastlake-style home shows cresting around the perimeter of the flat roof. I was able to find similar cast-iron cresting at a local salvage yard, but now I have to install it. It has small notched flanges on the bottom that appear to have been designed for*

[continued on page 16]

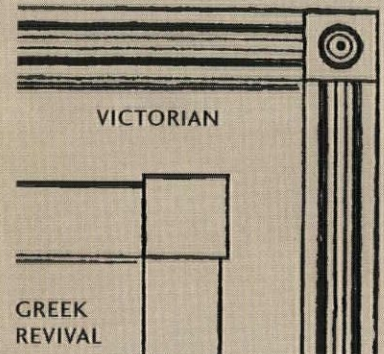
## Cutting Corners

*Some of the interior door trim you showed in "Going Over the Transom" (Jan./Feb. 1996) looks like what I have in my house. Does this type of woodwork represent any particular style or period?*

— Kathleen Phillips  
Lewiston, Idaho

THE ANTIQUE ART YOU REFER TO shows a corner block. These squares are used where mouldings change direction around windows, doors, mantels, and other interior elements, expediting the finish carpentry installation. They eliminate the need for miter joints and were less likely to show gaps if the trim shrank.

The corner block could also be part of the interior architecture of the room. For example, corner blocks were often used in the Greek revival era (1825 to 1860), which drew on the classical details of the ancient world. Combined with relatively flat casings, corner blocks



The plain corner block of the Greek Revival and the Victorian bull's eye corner block.

could simulate the post-and-lintel construction of temples or "Greek ear" ornament.

As the 19th century moved into the Industrial Revolution and the Victorian era, the corner block continued its popularity, though now adorned with machine-cut shapes. The most common corner block detail was the bull's eye, a set of concentric circles (above). This design retained popularity throughout the late-19th century and is still available as stock millwork.



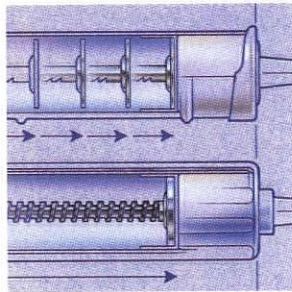
Putting an adhesive behind the glass will prevent it from spinning loosely, but will corrode the silvering on the back of the glass.





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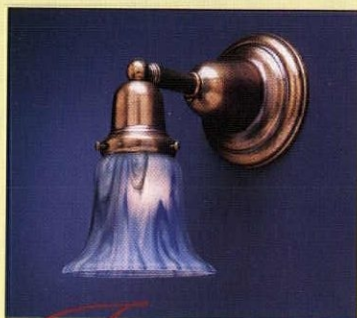
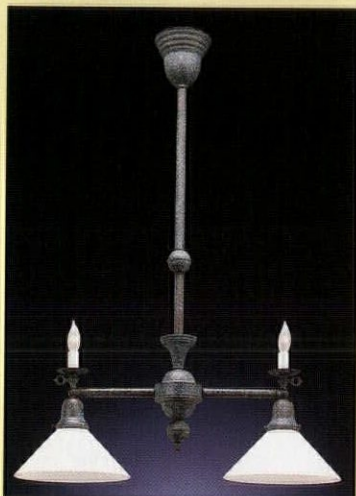
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## Ask OHJ

[continued from page 14]

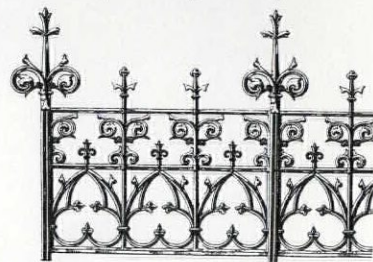
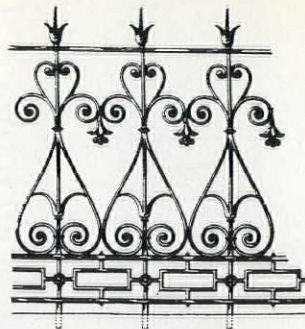
*bolting it to the roof. How do I prevent leakage at the holes created by the bolts?*

— Carlton G. Salmons  
Des Moines, Iowa

BY THE 1890S, CRESTING—A ROOF ornament usually made of tile or metal—could be had in scores of stock, mass-produced designs. Sheet metal crestring was popular for ridges and hips because it was light and easily manufactured to produce a weatherproof connection to the roof. In a typical arrangement, channel strips are nailed to each side of the roof right at the ridge. The last course of slate or shingles slip under these strips; the crestring is seamed over the strips, covering all nails.

Your ornament sounds like one of the larger versions, used on flat surfaces and made of cast iron. These were sometimes called "balcony crestring." Attachment methods vary, but, it was commonly bolted down as you describe. Without a doubt, though, some crestring didn't last long because it was merely screwed to the roof without accounting for water intrusion. We asked Tony Milburn, of crestring manufacturer Stewart Iron Works Company, in Covington, Kentucky, for his recommendations.

He said that since crestring was originally installed directly on the roof deck, before the roofing material went on, roofers could flash or tar over the bolt heads. You can add crestring on an existing roof too, Milburn said, just make sure the holes are sealed well. Also, bevel roofing material away from the bolts so that water won't stand over them. Look into using a modern membrane roofing material (such as self-ad-



Just two of the hundreds of cast-iron roof crestring designs from Macfarlane's Castings, 1882.

hesive neoprene) as a weather barrier under the crestring and modern sealants around the bolts.

### Lightning Strikes

*We recently added some steel support to our old log cabin, and a short time later, the house was hit by lightning. Could the two events be related? Does this steel need to be grounded?*

— Jane Reilly  
Chattanooga, Tenn.

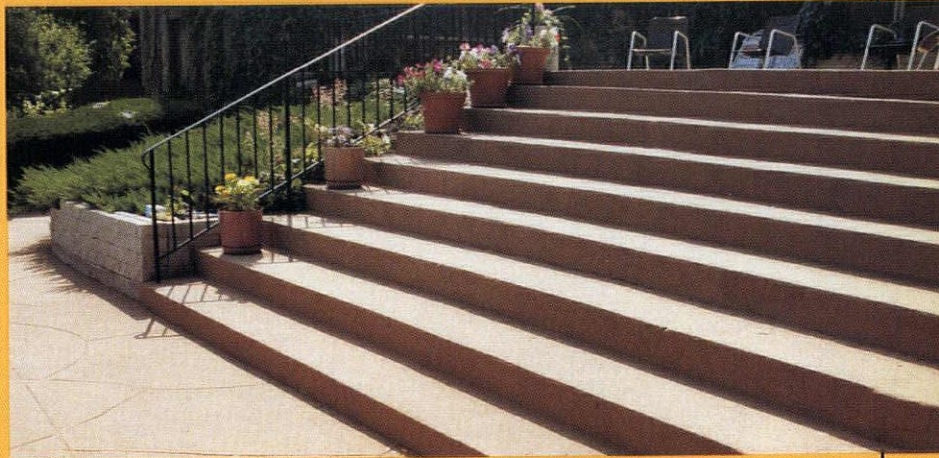
OLD HOUSES ARE ALREADY FILLED with metal. Cast-iron sewer stacks run from the basement through the roof. Copper or steel water pipes, too, are placed throughout the buildings. The addition of steel beams and other supports probably wouldn't substantially increase the risk of lightning in most cases. What's more important is the placement of the house in a lightning prone area. We'd recommend having a lightning control expert come to the house to review your situation. A lightning rod can be installed on the roof, and, if a lot of connected steel is in the structure, the steel can be bonded to the lightning control system.



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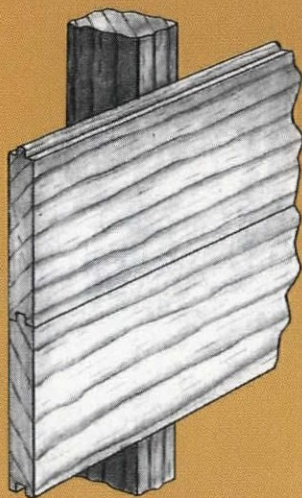


# RESTORER'S NOTEBOOK

## BE TRUE TO YOUR TONGUE-AND-GROOVE

**I**F YOU'RE WORKING ON AN OLD house with tongue-and-groove boards on either the wall sheathing or the roof deck, you might want to heed a bit of advice my carpenter grandfather taught me. Exterior matchboards such as this are always installed with the tongues pointing up to increase the life of the sheathing. If the tongues are down then the grooves are up, which creates little troughs that can trap moisture and open the door to decay.

— MIKE KENNEDY  
*Columbus, Ohio*



**Install horizontal tongue-and-groove boards with the tongue up, so if seams open up or water wicks in, moisture doesn't collect in the groove.**

## NATURAL COOLER

**U**SE THE "CHIMNEY EFFECT" TO your advantage this summer. Open the attic windows in your old house and install temporary screens. Then open the door to the attic stairs. Hot air will rise through the house and up into the attic where it will be vented outside. Meanwhile, cooler air will be pulled in through windows on lower storeys. If keeping the door open is a problem, take it off its hinges. To keep pets or children out of the attic, temporarily replace it with a screen door.

— STACEY NEWBERRY  
*Ithaca, Mich.*

## BATHING BRASS

**T**HIS RECIPE FOR A CLEANING solution was given to me by an old clock maker. It is effective for removing lacquer, paint, and tarnish from brass hardware. Mix equal parts water, liquid dishwashing soap,

and household ammonia in a glass container. Remove the hardware and submerge it completely because high-water marks are very difficult to remove. Soak for 15 minutes to one hour. Brass will be clean, but not shiny.

— MRS. N.L. BOOZ  
*Escondido, Calif.*

## HAMMER MEASURES

**F**INDING STUDS BEHIND a plaster wall can be tedious, damaging work. Once you've found one, you'll most likely find others at 16" intervals. But instead of a tape measure, you might be able to use your hammer. If you have a long-handled, framing hammer, simply mark the handle at 16" from the top of the head. Then you can quickly and easily locate studs in the future.

— RICKY A. SISTE  
*Columbus, Ga.*



## CLEANING UP SHOWERHEADS

**T**HE TINY HOLES IN SHOWERHEADS tend to clog up with mineral deposits from hard water. Modern showerheads disassemble for cleaning, but not the large, one-piece "sunflower" spray in my shower. I removed the showerhead and boiled it in a pan of white vinegar for a half-hour. The vinegar (a mild acid) dissolved the scale (a base) inside the head, leaving only two or three holes to be cleared with an unbent paper clip.

— BARBARA KRANKENHAUS  
*New Ulm, Texas*

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**I** REPAIRED THE WHITE MARBLE threshold under the door to my bathroom with marine epoxy (made for fiberglass boat repairs). I mixed epoxy and hardener and applied it to both sides of the break. Then I reassembled the threshold. With the excess epoxy that oozed from the crack, I filled chips and wear spots along the joint. Once the epoxy had begun to set, but was still soft, I shaved off excess with a razor blade. Next day, when the epoxy was hard, I sanded the entire stone with fine paper to smooth and blend in the repair.

— LARS O'TUNA  
*Long Beach, Calif.*

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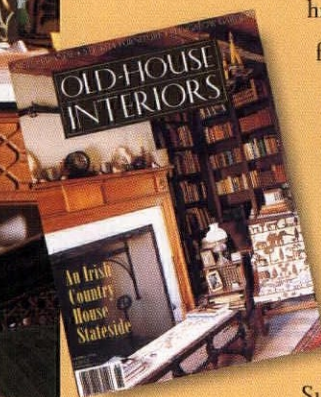
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# Water Books

BY GORDON BOCK & LYNN ELLIOTT

*Controlled and put to work, water is an obedient servant—to say nothing of an essential substance—for comfortable living. When it invades a house, however, water quickly becomes the wellspring of expensive damage. Unlike most trade tomes, these two guides are marvels of user-friendly writing and to-the-point solutions.*

**L**AST SPRING, OHJ HAD A CALL FROM OUR Chicago colleagues with a typical warm-weather question. “We’re facing the ultimate horror for summer-cottage owners,” related Jan and Bob. “Our 50-year-old septic system has given up; can you give us some advice?” Our long-distance answer was simply, “We’ll send you our copy of *Cottage Water Systems*.”

The subtitle for this attractive paperback is “An Out-of-the-City Guide to Pumps, Plumbing, Water Purification, and Privies,” and it deftly fulfills its promise. Says Jan, “The book is written for property owners like us—anyone who has to use a well or septic system, but knows nothing about how they work.” Indeed, *Cottage Water Systems* covers a lot of water in its 14 chapters, from water sources to cold-weather plumbing and winterizing.

**Order from Cottage Life Merchandising Dept., Box 5399, Paris, ON, Canada N3L 3W5; (519) 442-6897. (1995; 150 pages, softbound; \$24.95, plus \$4.50 shipping; ISBN # 09696922-0-X)**

The bulk of the book is on disposal systems, and not surprisingly. According to Jan: “Obviously the author, Max Burns, knows summer cottages and understands our dilemma: sinking many dollars in a system used only a few months a year. Mr. Burns uses humor (one chapter is titled “Pump and Circumstance”) interspersed with excellent illustrations to convey technical information in layman’s terms. He provides a comprehensive overview of all possibilities, from out-

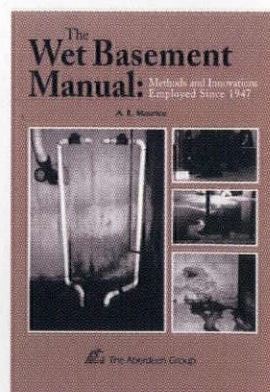
houses to alternative toilets, to pump septic systems and leaching fields. The pros and cons of each alternative are thoroughly examined.”

*Cottage Water Systems* is written with an eye on groundwater regulations and the environment, too. “Back when our cottage was built,” says Jan, “all they used was a simple septic tank made of bricks and a dry well. Now restrictions abound. Until this book, it proved almost impossible to find written directions for new systems, and even harder to compare them.” At last report, their septic-system contractor used the illustrations in the book to help Jan and Bob make the final decision.

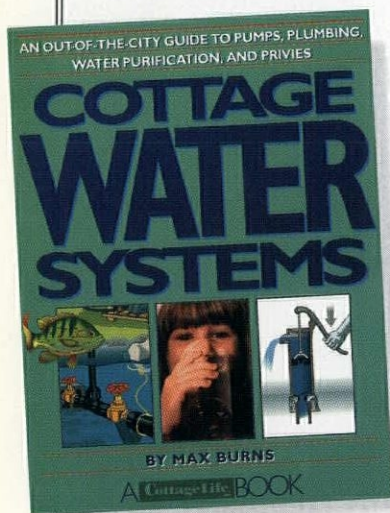
IF EXCESS WATER IN THE BASEMENT IS WHAT AILS YOUR house, *The Wet Basement Manual* is the cure. Written by A. E. Maurice, a construction contractor and waterproofing specialist, this 62-page manual describes techniques for preventing flooded basements (including underground garages), leaking windows, or efflorescence on fireplace bases.

Mr. Maurice is a proponent of French drain systems, a passive but effective method. Whether your house is built on a stone foundation or a concrete slab, this manual takes the reader step-by-step through digging out floor trenches, laying in the pipe, and installing the sump pumps in the holding chambers. The guide also covers when to use an outside drainage system, so that you can waterproof without disturbing a finished basement.

The no-nonsense, straight-forward manner of the text presents the information clearly enough for a beginner, yet provides technical details that are valuable enough for a professional. *The Wet Basement Manual* is a handy resource for those facing the task of controlling groundwater.



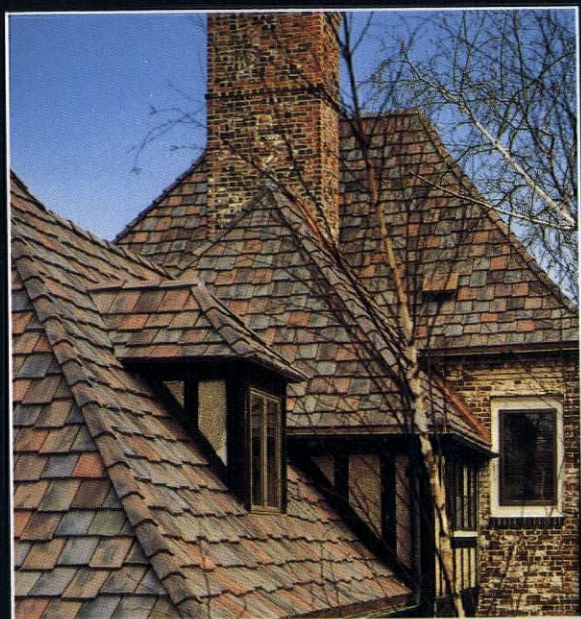
**Order from The Aberdeen Group, 426 S. Westgate St., Addison, IL 60101; (800) 323-3550, ext. 219. (1993; 62 pages, softbound; \$14.95, plus \$3.25 shipping; ISBN # 0-924659-68-8)**





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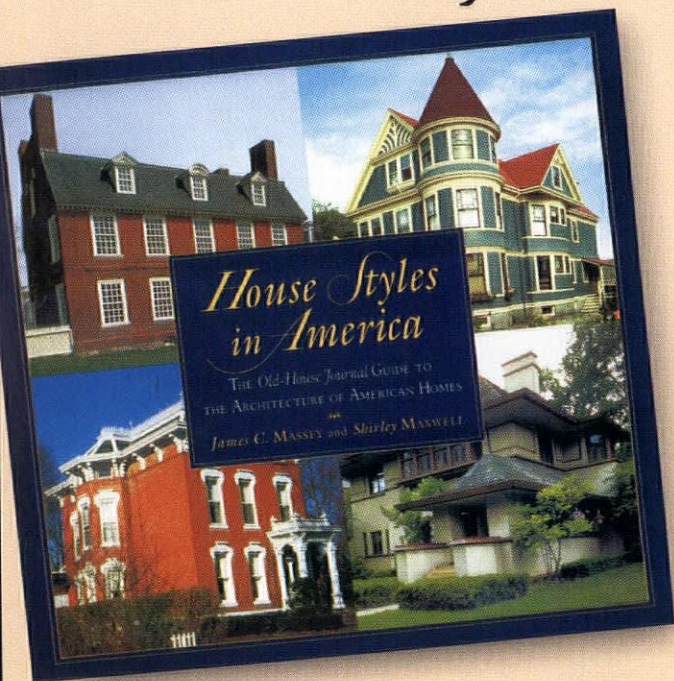
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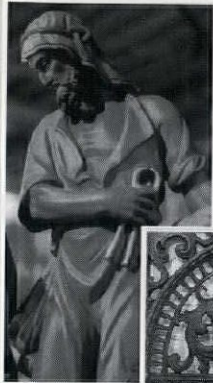
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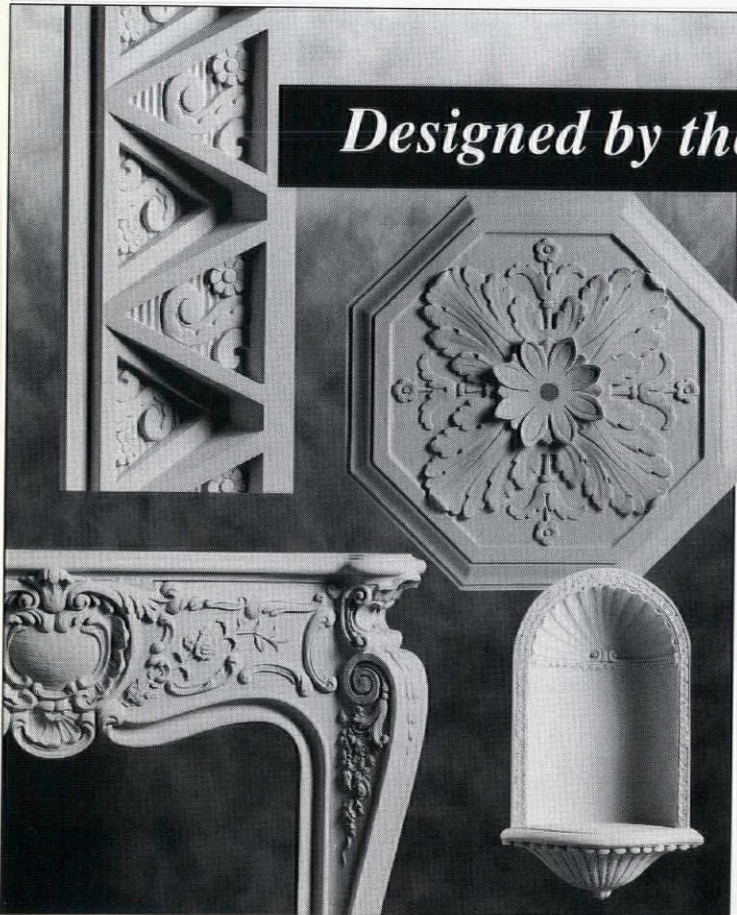
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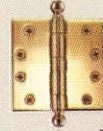
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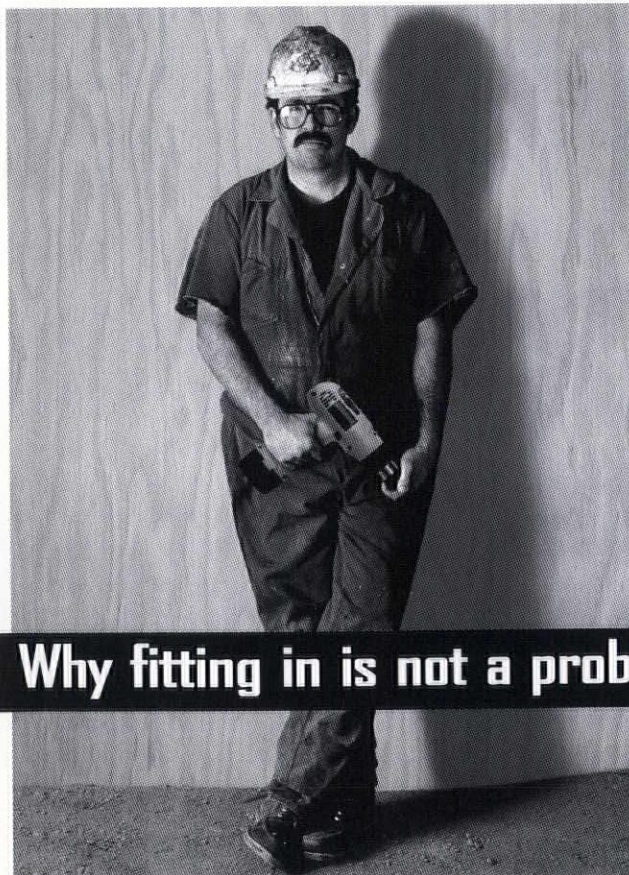
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# Multiple Choices



## *Summing Up the Twin House and Its Exponents*

BY JAMES C. MASSEY  
& SHIRLEY MAXWELL

**T**WIN HOUSE, DOUBLE HOUSE, SEMIDETACHED, duplex, triple decker—there's clearly more than one way to spell "home." If you count the pueblos and Indian cave dwellings of the American West, multiple residences were built on this continent well before the first cities began to take shape. Row houses—or town houses as they are now usually called—have been common since the late-17th century, and early tenant houses in the rural South prove that "compound abodes" haven't been an exclusively urban phenomenon either.

Yet here we're going to talk about unified-but-separate structures that fit two or more individual homes on a minimum of land at reasonable cost without entirely giving up the cachet of a single-family dwelling. Our particular subject is the twin house

(also called the double house or semi-detached house) and its most important variations. These are discrete—if not entirely freestanding—houses that are definitely not apartment buildings or row houses.



**Generous in size and single-family in appearance (even with their double entrances), twin houses were a delight to owners and neighbors alike. This one is in Hilton Village, Newport News, Virginia.**



### The Truth About Twins

TWIN HOUSES (AND THEIR YOUNGER RELATIVES, THE fourplexes) are very different from either apartment buildings or row houses in design, construction, and use. They really are individual houses. Their cohesive design may make them look like one large house—even one large mansion. However, they are situated on separate if small tax parcels (most often with different owners), and they have separate roofs and separate entrances. They are divided (or, depending on your point of view, joined) by solid party walls that usually extend above the roofline as fire walls.

What distinguishes twins and fourplexes so emphatically is that they have side yards. (Row houses, by definition, line up shoulder-to-shoulder with no space between them.) Granted, these yards are sometimes no more than a narrow alley or even a sidewalk. Still,





everybody in a twin house gets at least three outside walls, with a corresponding opportunity for windows on those walls. Generous front and rear yards are another potential benefit.

### The Double Identity

ONE BIG ATTRACTION OF THE TWIN OR DOUBLE HOUSES constructed in the early suburbs of Philadelphia, Boston, New York, and elsewhere was that they presented a prosperous, thoroughly respectable appearance. They weren't necessarily cheap, but they had fewer walls and more owners to share the costs, so they delivered a lot of house for the dollar. Best of all, they looked like substantial single houses sitting on suburban lots with spacious front and side yards for each unit. Neighbors could generally rest easy about property values on the block. The impression of prosperity and respectability

**Before the mid-19th century, twin houses were usually single pairs erected on a subdivided lot. By 1900, however, whole blocks of them were built in inner suburbs, such as this phalanx in York, Pennsylvania.**

was important when twins first came into their own, because living in a semidetached house was still a bit socially suspect. (Apartment-dwelling was worse, representing a decided slide down the social ladder.)

Twins took root in the mid-19th century when the leading architectural style was the stately Italian Villa. As it happened, the rather formal, blocky lines of the idiom lent themselves admirably to the design of double houses. The semidetached form blossomed throughout the long Victorian era, as many block-long developments of Queen Anne-style twins attest.

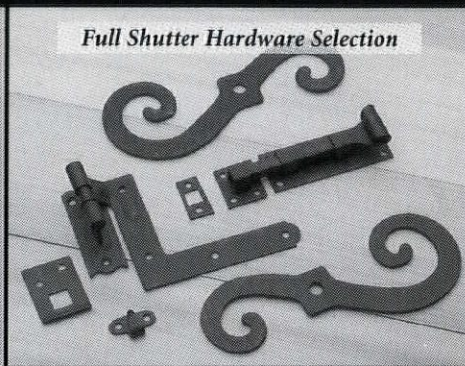
They prospered even further in the 20th century. In post-World War I [continued on page 28]



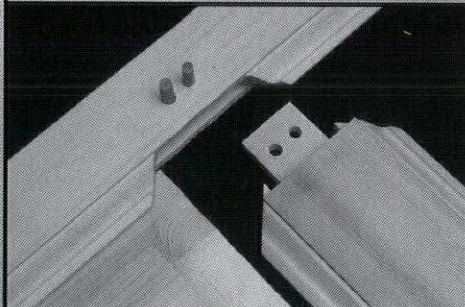
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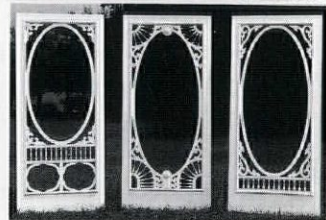
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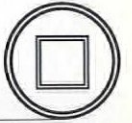


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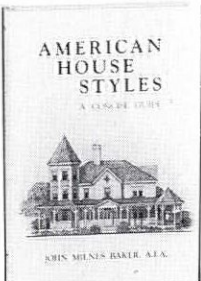
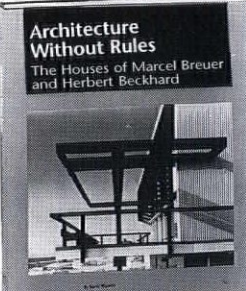
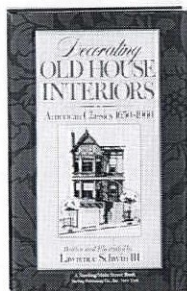
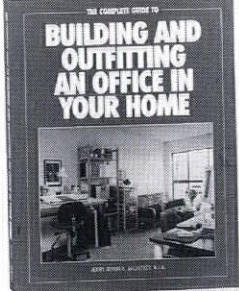
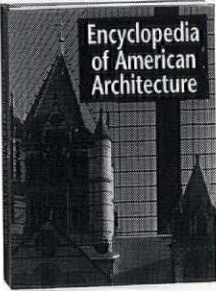
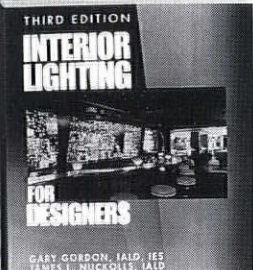
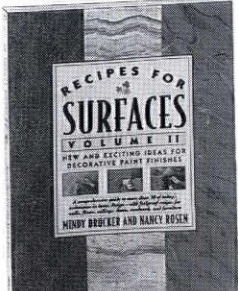
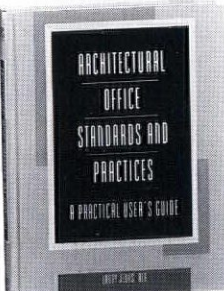
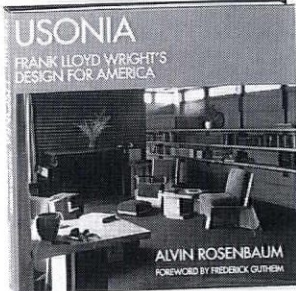
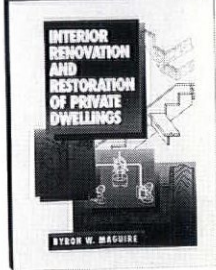
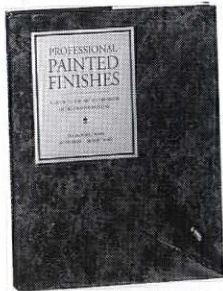

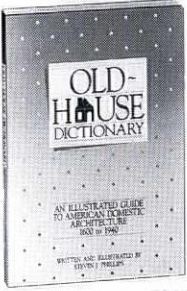
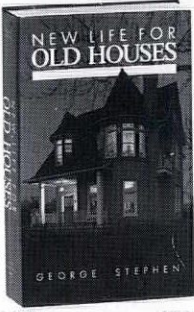

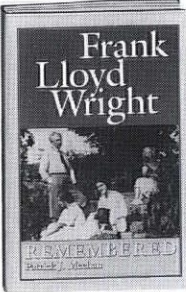
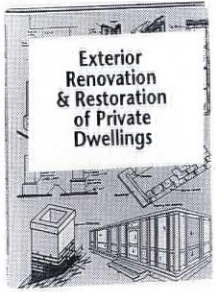
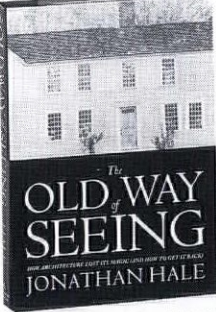
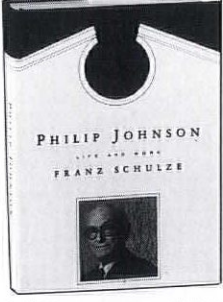
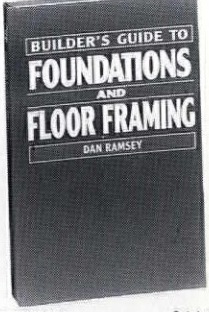
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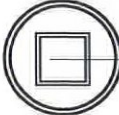
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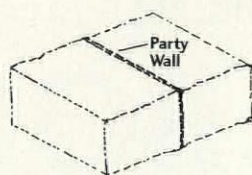
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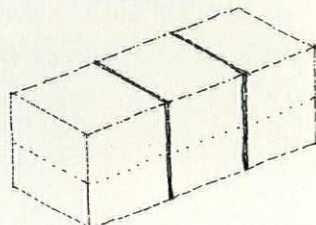
## The Lines Between Multiple Houses

**TWIN HOUSE (Double House or Semi-detached House)**—These are two separate houses connected by a common party wall and providing yard space on three sides.



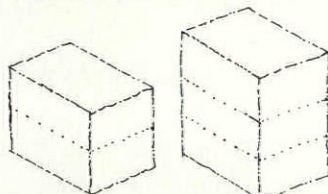
TWIN OR DOUBLE

**ROW HOUSE (Party-Wall House or, in modern usage, Town House)**—A row house is one of an unbroken, linear grouping of three or more houses, each of which shares side walls (party walls) with its next-door neighbors. The facades may be identical or varied, as town houses usually are today.



ROW HOUSES

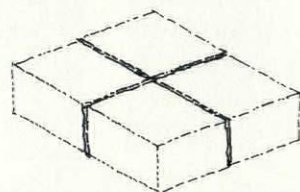
**DUPLEX**—The true duplex is a two-storey house with one apartment per floor—that is, two dwelling units stacked one on top of the other. Frequently one unit is owner-occupied, and one unit is rented as an apartment.



DUPLEX

TRIPLEX

A two-apartment house with side-by-side units is also sometimes called a duplex, as is a single apartment that occupies two storeys.



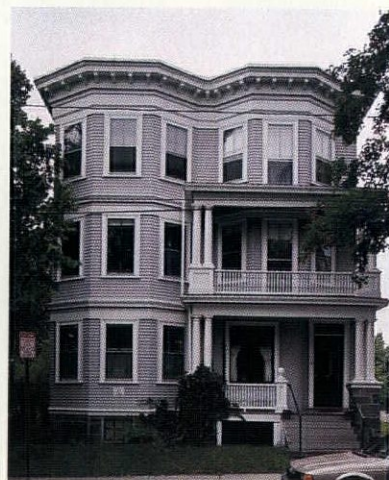
QUADRUPLEX OR FOURPLEX

**TRIPLEX**—A triplex has one apartment on each of three floors. In New England, the triplex is called a “Triple-Decker” or “Three-Decker.”

**QUADRUPLEX (FOURPLEX) AND SUNTOP HOUSES**—Fourplexes are an early-20th-century variation on the multiple-house theme. At their core is a cross-shaped solid party wall with a separate house at each of four corners. The most important use of the fourplex came at the hands of master architect Frank Lloyd Wright in his imaginative Suntop Homes in Ardmore, Pennsylvania.

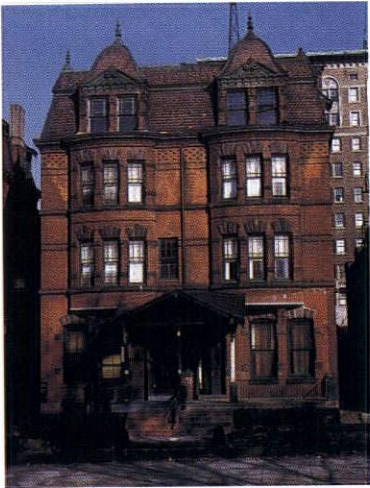


The classic, two-storey row houses of San Francisco are duplexes with an apartment on each floor.



The ubiquitous New England “Three-Decker” is, technically speaking, a triplex.





By 1850, twins found fertile ground in Philadelphia. This Queen Anne duo dates to about 1880.

years, the houses took on a decidedly suburban look, sporting Colonial or Old-English façades with expansive front and side yards. Driveways led through the side yards to the now-requisite garage behind the houses.

The 20th century even saw the doubling of the twin house, so to speak. In fourplexes, four individual houses are unified by a four-way party wall. We have spotted postwar examples from Saginaw, Michigan, to Reno, Nevada. Frank Lloyd Wright's Suntop houses offered what may be the best in fourplex benefits—private yards, private entrances, abundant light and air, and distinguished architecture.

When skillfully designed, twins blended in with conventional single houses or created interesting, block-long streetscapes. Careful siting insured private entrances, perhaps on separate sides of the building. Solidly constructed party walls minimized the sound problems from next door, and there were no heavy-footed strangers living upstairs. At their best, twin houses were convenient, attractive, economical homes that avoided most of the drawbacks of apartment and row-house living. 🏠

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# REBUILDING



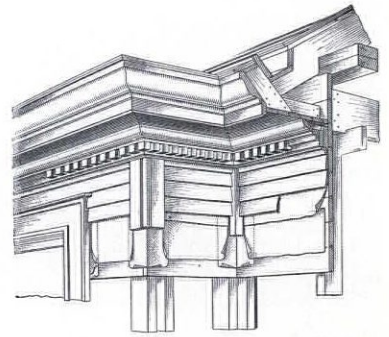
Repairing box gutters requires good footing. You'll need sturdy staging along the length of the gutter.



# BOX GUTTERS

*How to bring built-in roof drainage back to life*

BY JOSH GARSKOF



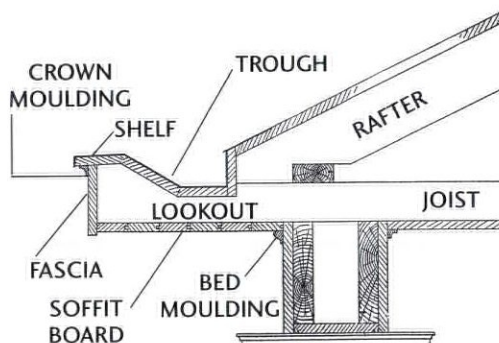
**B**OX GUTTERS ARE CONSTRUCTED IN THE CORNICE, SO WHEN LEAKS OCCUR, water pours into the eaves, attic, and walls. That spells big trouble, especially if emergency patches fail to completely seal water out. Properly restored, though, the historic box gutters will once again provide trouble-free, concealed roof drainage. Rebuilding them requires a methodical approach and an understanding of correct design and materials.

BEGIN BY REMOVING THE GUTTER LINER, wood trough, and the boards that comprise the cornice. Also, pull off the lowest two or three courses of roofing. Allow the cornice inwards to dry out in the sun for a few days.

When box gutters leak for any significant period of time, the damage can be extensive. Inspect and repair rafters, joists, top plates, braces, masonry walls, and any other damaged building components you find inside.

## Designing the Gutter

BOX GUTTERS ARE MOST OFTEN SET INTO notches in *lookouts*, the ends of ceiling joists

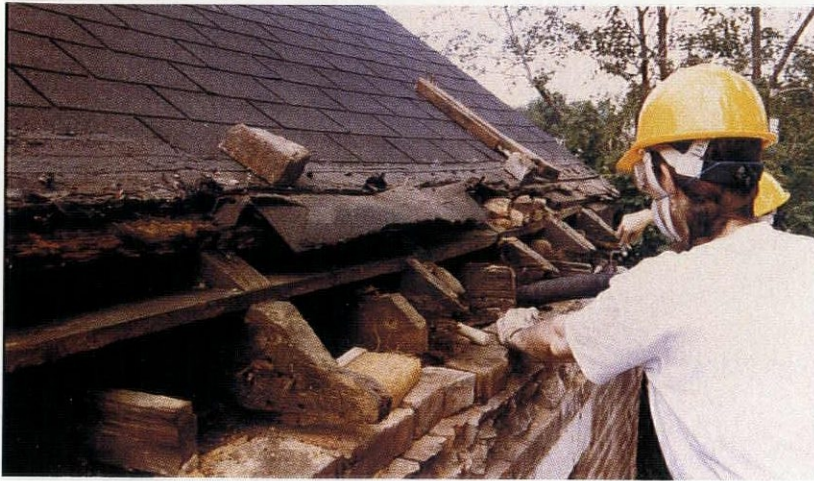


that continue past the wall, or in *rafter tails*, roof members that hang over the wall. Other designs use an independent cornice framework that's bolted to the main structure. Draw a cross section and an elevation of the cornice. These sketches will serve as references for rebuilding it, but do not be a slave to existing construction details. Some box gutters have design flaws that caused their downfall. If repeated they will again doom the gutters to leaks. Make sure your gutters meet these basic parameters:

- The front lip of the gutter should be at least 1" lower than the rear. Some period references demanded a 3" differential. It's crucial to have a lower front edge so that, if there is a clog, water will spill to the ground and not puddle against the roof.
- The box gutter will work best if the sides meet the bottom at a 90° angle in the back and a 120° angle in the front. This is not re-

**TOP:** Hidden in the cornices of Georgian, Greek Revival, Second Empire, and Colonial Revival houses, box gutters channel rainwater.  
**LEFT:** A typical box gutter and cornice from a porch plan by William Radford, 1912.

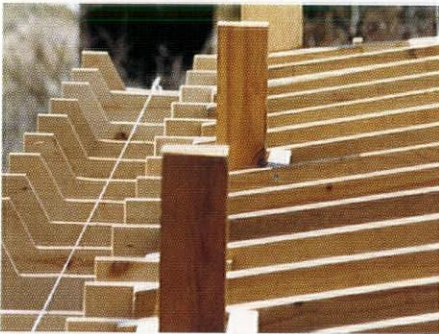




**ABOVE:** Proceed slowly with demolition and document the cornice construction. **RIGHT:** In this case, sisters were carried the full length of rafters and joists because the roof was settling.



**BELOW:** Another approach to creating the slope is to cut standardized notches, then create the pitch by furring. **BOTTOM:** Make sure the wood trough has no gaps or dips and then screw it to the lookouts.



quired, but, in climates where temperatures regularly dip below freezing, it's essential that the front angle be greater than  $90^\circ$ . Otherwise, when ice forms in the gutter and expands, it will rip the liner.

- ☛ The gutter should drop at least  $\frac{1}{8}$ " per foot as it slopes toward downspouts.

- ☛ As the notches get deeper, forming the slope, it's important to maintain the bottom of the gutter at a constant width (at least 4"). Increase only the size of the walls.

### Cutting New Lookouts

HANG A LEVEL LINE THE LENGTH OF THE GUTTER (below). This reference will help you build a straight, level cornice and properly slope the trough. The drawing is the best place to calculate the slope. Locate lookouts, downspouts, and expansion joints—required for metal liners—on your elevation drawing. Expansion joints (discussed later) create dams in the gutter and must be accounted for when planning the slope. Assign labels (such as letters of the alphabet) to each lookout on the drawing and mark each with the appropriate depth of the notch.

In almost every case of gutter leakage, the lookouts are weakened. Repair them with sisters cut from pressure-treated boards of the same dimensions as the original lookouts (typically 2x6 or 2x8). The longer the sisters, the more structural support they will pro-

vide. Yet, this will be limited by the access to the attic floor joists inside the building. One good goal is to use 8' stock to create two 4' sisters.

When they're all cut, carry the sisters up to the cornice and tack them in place with galvanized nails, but do not set the nails. First fine tune the lookouts' placement for level and straightness, accounting for the settlement of the building. Also, measure against the level line to check for the sloping depth of the gutter notch. There can be no dips or ridges along the gutter bottom. When satisfied, set the nails and fasten the sisters with zinc-coated decking screws placed every 6" in a zigzag pattern (alternating between 1" from the top and 1" from the bottom). If changes in the gutter design leave any original lookouts standing above the sisters, carefully cut them down with a reciprocating saw or a chisel.

### Building the Trough

USE 1" THICK REDWOOD OR CYPRESS TO build the wood trough. (Pressure-treated stock is OK, too, unless you are using a copper liner, which corrodes from the preservative chemicals.) When the trough is wider than the board widths that are available, you can use  $\frac{3}{4}$ " CDX plywood.

The trough consists of bottom, back, and front boards, which should be mitered along their edges. End joints can simply be butted, but be sure they land over lookouts so both sides can be fastened.

Lay the bottom board in the notch and check the fit, adjusting as necessary. Check the slope of the gutter by pressing it against



the sisters and measuring the distance from the level line. If you find problems, fix them by cutting down the notch with a reciprocating saw or furring it up with pieces cut from the sister stock. When the slope is perfect, place the back and front boards and correct as necessary for a tight fit.

Screw in the boards—first bottom, next back, then front—to the lookouts using pre-drilled, countersunk holes. Again, use zinc-coated screws.

Joints between trough boards should not be fastened or sealed. The trough provides a surface for the liner, but not weatherproofing. With a loose trough, future leaks in the liner will quickly show up in the soffit as a warning of the problem. A sealed trough hides leaks while rot advances. However, since small leaks are



**It's best to locate downspouts at corners, where they are the least visually obtrusive.**

common for metal liners, some experts install a secondary liner underneath them. This must be a completely waterproof coating, such as W.R. Grace's Ice & Water Shield (Grace Construction Products, 62 Whittemore Avenue, Dept. OHJ, Cambridge, MA 02140, 617-876-1400).

### Installing Drop Tubes

DOWNSPOUTS MAY BE exposed or hidden in the walls of the building. Exterior downspouts are preferred because internal units can cause major damage when they fail. Plus, their repair requires demolition of walls.

Install downspout drop tubes by cutting holes in the bottom board with a hole saw (above). Oversize the hole by  $\frac{1}{4}$ " in diameter to account for expansion of the metal drop tube. Then, using a router, create a mortise in the bottom board to accept the flange of the drop tube. This must be set flush so that it does not hinder water flow to the downspout. The liner will be carried over the flange and into the drop tube.

## GUTTER CHOICES

Unless you live in a desert climate, gutters may be an unfortunate necessity. Without them, rainfall careens off the roof and falls to the ground, where it splashes onto siding and drains against the foundation. To help you choose a gutter, here's a survey of the historical options.

### Built-In Gutters

On high-style houses built before about 1930, builders often constructed *BOX GUTTERS* (also called eavestroughs or built-in, cornice, or sunk gutters).

These channels were laid in the roof or cornice, providing invisible roof drainage. If the house doesn't have evidence of original box gutters, do not add them. That would require cutting open the rafters and cornice, introducing irreversible damage to the historic fabric of the house.

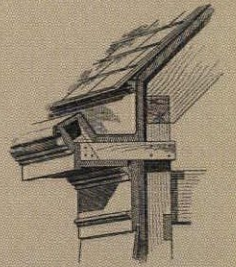
*YANKEE GUTTERS* (also called flush or Philadelphia gutters) were simply stops fastened horizontally across roofs near the eaves. Made of metal-lined wood or of metal alone, the sloped gutters channeled water toward downspouts. While these can be added today without affecting the building too much, heed the objection voiced in the 1913 book *Building Construction*, which said "in cold climates [Yankee gutters] retain more... snow, causing the water to back up on the roof."

### Hung Gutters

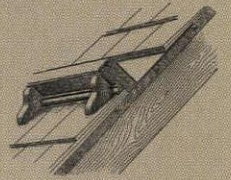
Very popular in the late-19th century and until World War II, the *WOOD GUTTERS* offered a compromise that kept water drainage external and, yet, maintained a pristine cornice. Milled with an decorative detail in its face, the wood gutter doubled as a crown moulding. The trough inside was sloped so the gutter could be level. Adding hung wood gutters to a gutterless roof may require removing the original crown moulding.

Metal gutters came on the scene earlier than many old-house aficionados assume. Records from a family of tinsmiths in Massachusetts show that they were churning out metal gutters as early as 1821. Early examples were *HALF-ROUND GUTTERS*, shaped like a pipe that was cut in half. Later, manufacturers imitated the decorative effect of wood gutters by making *MOULDED GUTTERS*. These were the predecessors of modern metal gutters.

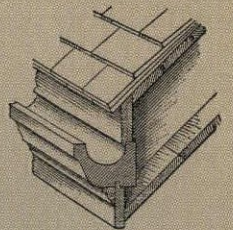
If the house provides no clues about early gutters, half-round metal gutters are the best choice. They can be added and removed without damaging the building, and they have at least 170 years of precedent. For houses older than that, half-round gutters could have been added in the 19th century, and those would be historic by now.



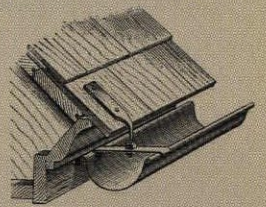
BOX GUTTER



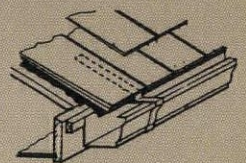
YANKEE GUTTER



WOOD GUTTER



HALF-ROUND METAL GUTTER



MOULDED METAL GUTTER





To form the lock seams, cut triangular notches at the folds and then bend the edges as needed with a hand seamer.



Once the bends are interlocked, flatten them down to crimp the seam and to prevent a ridge in the gutter.

### Lining the Gutter

THE ENTIRE GUTTER MUST BE LINED with a waterproof material, either metal or rubber membrane. The liner should begin under the bottom-most row of roofing, continue through the gutter trough and up over the shelf, terminating in front of the crown moulding.

Replace the boards that comprise the cornice before lining the gutter because it will strengthen and stiffen the whole assembly.

**SHEET METAL:** Most box gutters were originally lined with lead. Today, you can select any corrosion-resistant, long-lasting metal. Keep in mind that galvanized steel and terne will require regular painting. Copper and lead-coated copper are, therefore, preferred. Do not use aluminum or pre-

finished metals. Make sure the metal you select is compatible with all of the materials used in your project and on the roof.

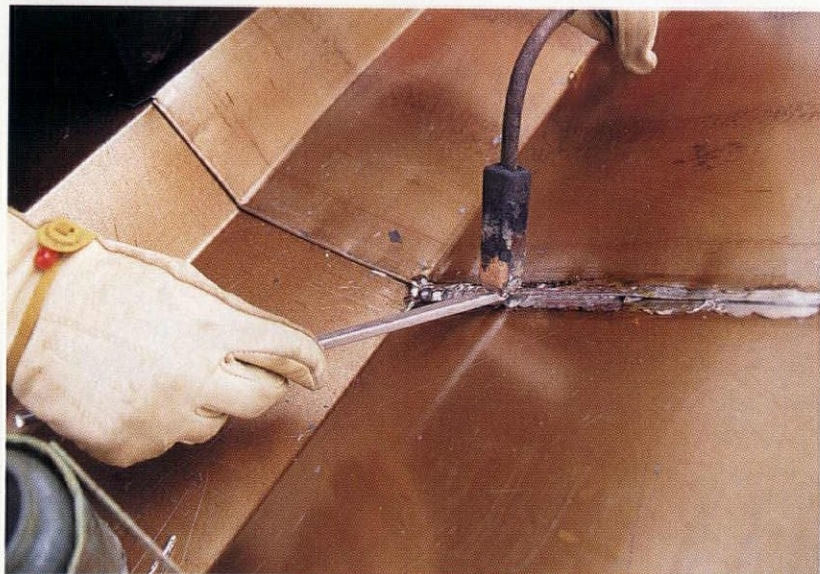
Lay smooth building paper under the metal liner to prevent binding as it expands and contracts with the weather. Bend the metal so it will extend 6" to 10" up onto the roof. The other edge should culminate in a  $\frac{1}{2}$ " kick out (to provide a drip edge) above the crown moulding. Form the liner to account for expansion of the metal, undersizing the bottom of the gutter by  $\frac{1}{2}$ ", split equally in the back and front.

There are two methods for joining metal sections: lock seams and riveted seams. To create a lock seam, bend each piece  $\frac{3}{4}$ " from its edge. One is bent upward, the other is bent downward. Next, the folds are overlapped and flattened. Then, solder the seam. For riveted seams, the metal is simply lapped and rivets are installed every 2" along the seam. Riveted seams also must be soldered. For both seams, it's best to solder with a hot iron that's been heated with a propane tank or coal pot (left). Paint on flux—ruby is best for copper and rosin is best for terne—and then apply 50/50 solder.

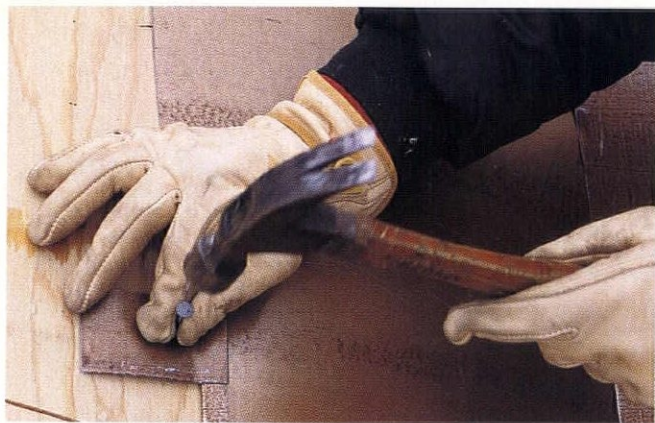
Fasten the liner using *cleats*, pieces of metal that are nailed in place and seamed into the liner. No nails should pierce the liner. A continuous cleat should be nailed to the shelf along the edge of the gutter and bent down in front of the crown moulding. The bottom of the liner will be bent over and crimped onto the exposed edge of this cleat. At the top of the liner, cut a  $2\frac{1}{2}$ " tab into the metal every 16" and fold it up about 1" from



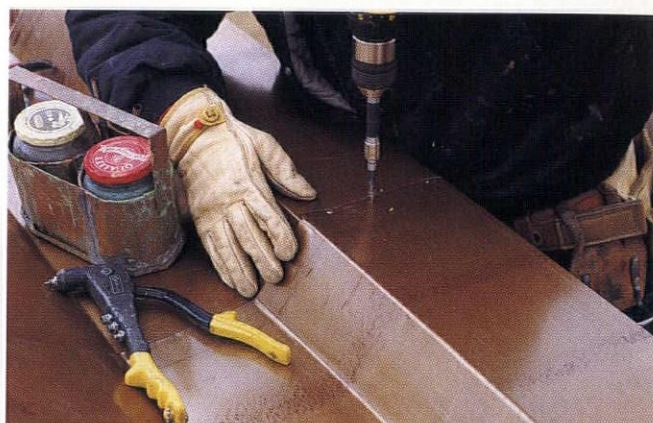
**ABOVE:** The metal must be bent to shape, a process that's made easier with the use of a bending break.  
**BELOW:** Draw solder into the seam by placing the iron directly over it.







Form the cleat into a tab in the liner and then nail it to the roof deck. Cleats, nails, and liner must be of the same metal.



Riveted seams are best where the liner is folded because the seam is thin. Drill 1/8" holes and pop in rivets with a rivet gun.

the edge. Then cut a 2" wide cleat and fold it over the tab. Crimp the seam together and nail the cleat to the decking (above). Where the liner meets walls or other architectural elements, it must be flashed.

To allow climatic expansion of the metal, you must install expansion joints. Design requirements depend on the roof, gutter, metal, and other variables. For expansion joint and seaming specifications, refer to the Architectural Sheet Metal Manual (available from the Sheet Metal and Air Conditioning Contractors National Association, P.O. Box 221230, Dept. OHJ, Chantilly, VA 22022, 703-803-2980).

**RUBBER MEMBRANE:** Many box gutter restorers, especially those without metal-working experience, opt for a rubber membrane liner. Rubber requires no expansion joints, no riveting, and no soldering. Plus it comes in long lengths, so there is no need for seams at all.

There are many rubber membrane options. Most popular is EPDM (Ethylene Propylene Diene Monomer), made for roofing flat commercial buildings and lining manmade ponds. It can handle standing water, and it won't break down in extreme cold, heat, or under ultraviolet exposure. (One manufacturer is Firestone Building Products, 525 Congressional Boulevard, Dept. OHJ, Carmel, IN 46032, 800-428-4442.)

Sand down rough areas on the substrate and caulk screw holes and gaps larger

than 1/4". Sweep the surface with a stiff broom to clear away debris. There are a variety of EPDM products with their own installation specifications. Follow the manufacturer's directions. Generally, that means rolling a specialized adhesive on both substrate and membrane and allowing it to dry until tacky. Then gradually place the membrane, working slowly to avoid wrinkles. When it's laid down, use the stiff broom to compress it against the substrate. Cuts and tears from the installation, or those that occur later, can be repaired with adhesive.



Rubber is not a historic material, but it's not visible from below, and it has a proven track record for box gutters.

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### Adding a Snowbelt

BECAUSE BOX GUTTERS TEND to keep snow on the roof, it's important to take steps against infiltration by water that gets trapped behind the snow. If your liner is rubber membrane, simply continue it up the roof for 3' to

6' under the roofing. Nail roofing back over the liner. For metal liners, use a self-adhesive rubber membrane (like the secondary liner) as a snowbelt. Overlap the membrane onto the liner by 3" and snap a chalk line to indicate the top edge of the metal so it is not accidentally pierced when nailing roofing over the snowbelt.

Once your box gutters are operational, stand back and let it rain. You'll be happy to know the water is being successfully funneled away from the building. And you'll happily enjoy your cornice, free from any evidence of gutters.



In addition to providing attic ventilation, soffit vents provide a quick exit from the cornice for moisture that leaks through the liner. This vent will receive insect screening to be lightly painted the cornice's green.

*Thanks for technical assistance to Michael Chan, president of The Durable Slate Company, 1050 North Fourth Street, Columbus, OH 43201, (800) 666-7445; and Simon Herbert, associate professor at Belmont Technical College, 120 Fox-Shannon Place, St. Clairsville, OH 43950, (614) 695-9500.*

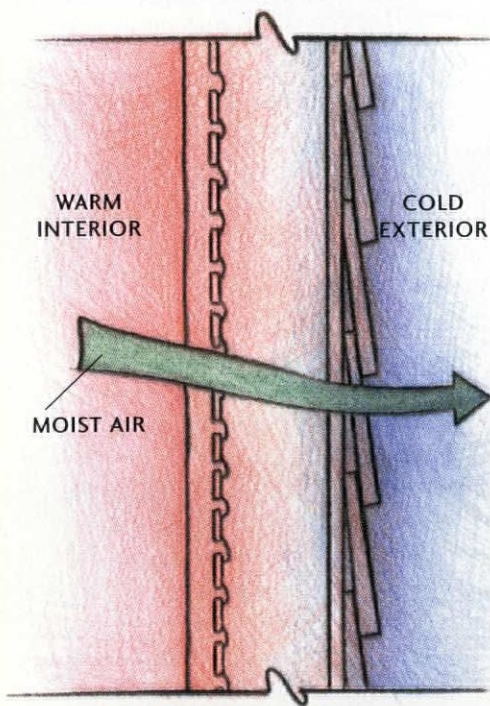


# *the* DEWS & DON'TS of INSULATING

## How Adding Insulation Improperly Can Cause Peeling Paint & Rotting Sills

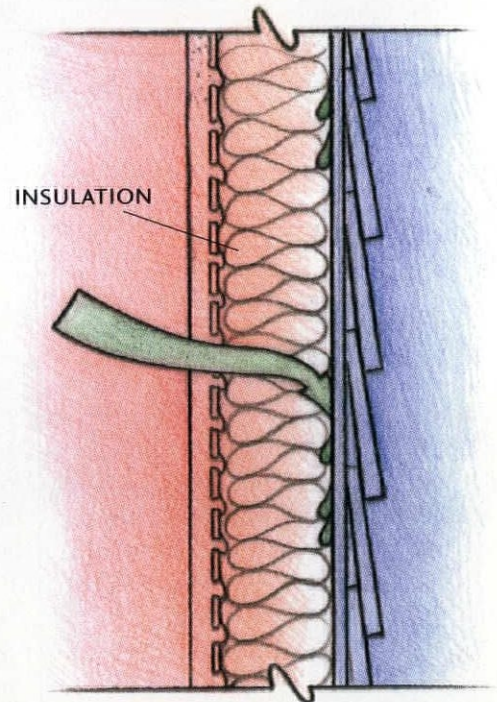
By Ernest A. Conrad, P.E.

**M**ANY OLD HOUSES ARE ABOUT AS WEATHERTIGHT as sieves. Icy wintertime wind whips through walls, heat pours out attics and windows, and fuel bills skyrocket. That's why one of the most popular home improvement projects in heating climates is to insulate walls and attic spaces. If not properly installed, though, insulation can cause moisture buildup inside walls and roofs. The water left behind can ruin the new insulation's effectiveness, push exterior paint off the building, and lead to decay of building components. ■ Moisture, not temperature, is the biggest issue you'll need to wrestle with when you're insulating an old house. I am an environmental engineer who specializes in assessing and remedying such problems in historic buildings. In this article, I'll explain why moisture problems can



UNINSULATED WALL

**LEFT:** In an uninsulated wall, moist air freely moves from the warm interior to the cold exterior. The whole wall is kept relatively warm by the escaping heat, so the moisture stays in vapor form. **RIGHT:** Adding insulation to the wall keeps the sheathing and siding colder. When the moist air from inside migrates through the wall, it can condense on the cold sheathing. **FAR RIGHT:** Insulation should be installed with a vapor retarder, to limit moisture migration through the wall, and a vented void, to exhaust the moist air that sneaks through the vapor retarder.



INSULATED WALL

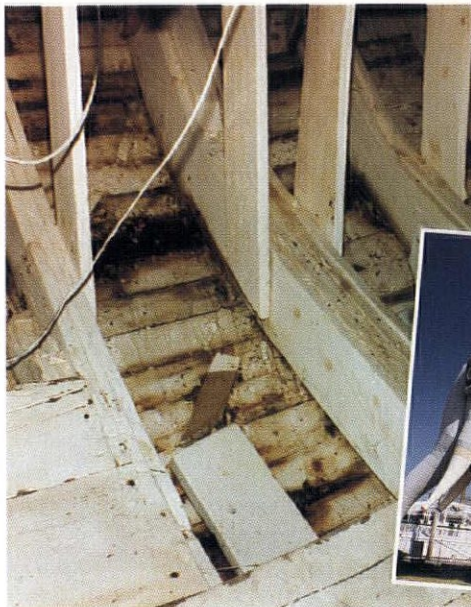


result from insulating an old house. Then, I'll show you how to control this moisture and how insulation should be installed to avoid trouble.

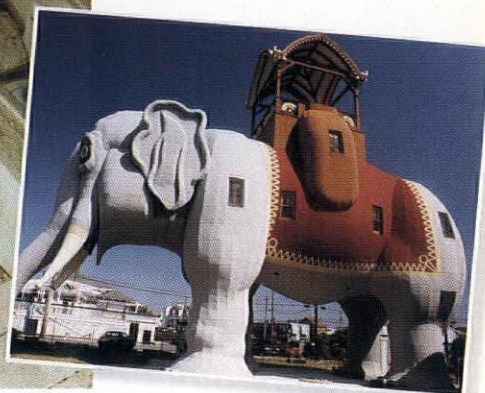
### Moisture and Insulation

HUMANS CAN SENSE A WIDE RANGE OF TEMPERATURES accurately. Humidity is more subtle. The body can't sense it very well, but the air inside old houses often has a significant moisture content. If this air cools to the *dewpoint*, moisture will condense out of it. The higher the humidity, the less cooling is required to reach the dewpoint. Some examples of condensation: frost on a windshield, dew on grass, water in the pan under a refrigerator, and the drip from an air conditioner.

Insulation can cause condensation too. It keeps the house's interior warmer by keeping heat from getting through. That means building components at the outside of the wall—the siding and sheathing—stay colder. When indoor moisture migrates through pores in the wall and hits these surfaces, it cools to the dewpoint. Then, water condenses out of the air and collects on studs, rafters, joists, siding, and sheathing. It can dampen insulation, reducing its value; it can soak through siding, causing exterior paint failure; and it can pud-



**BELOW:** Lucy, an architectural folly of elephantine proportions, is a historic landmark built in 1881 in Margate, N.J. **LEFT:** Evidence of moisture on Lucy's interior walls shows how insulating the structure led to condensation.



dle on wood, causing rot. Condensation can occur when you insulate any part of the old house's exterior.

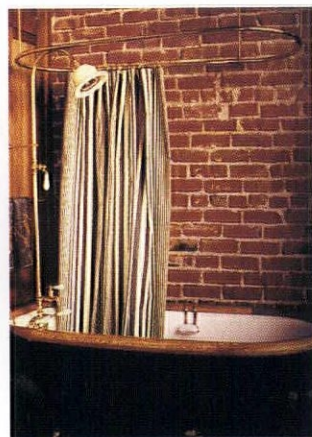
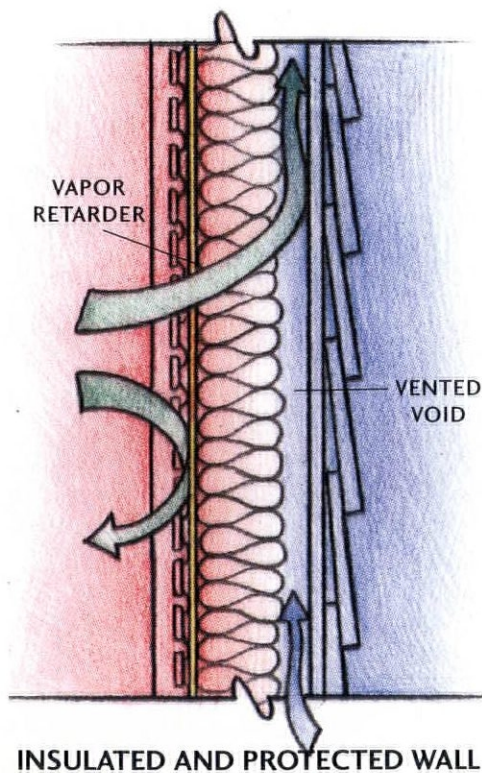
### PREVENTING CONDENSATION

SO, BEFORE YOU INSULATE, CONDUCT A MOISTURE hunt. Assess the sources of interior humidity around the old house and determine the extent of the problem.

#### Lifestyle

OBVIOUS, BUT OFTEN OVERLOOKED, IS THE relationship between residents' lifestyle and interior humidity. The concern here is the magnitude of moisture generated by the everyday activities of the house's occupants. For simplicity, I divide houses into three categories of use.

**LIGHT OCCUPANCY:** These summer homes or vacant buildings are left unoccupied for long periods. Some are unheated. Often owners seal them tight and drain the pipes to "winterize" them. But if moisture gets into the house—through an undetected roof leak or damp basement—real trouble begins. As this water evaporates, the moisture vapor migrates throughout the building and condenses on cool surfaces. If there's no heat, then condensation can occur everywhere, and the surfaces may be continually wet. To make matters worse, sealed doors and windows trap moisture within the building. Mold and rot will occur. For more information about caring for light occupancy



**Showers are major sources of interior humidity. Make sure bathroom exhaust fans vent outside and use them whenever showering.**



HOUSEHOLD HUMIDITY	
Moisture Source	Estimated Amount MEASURED IN PINTS
<b>Bathing</b> (excludes towels & spillage)	
BATH	0.12/STANDARD SIZE BATH
SHOWER	0.52/5-MINUTE SHOWER
<b>Clothes Drying</b>	
VENTED OUTSIDE	0+/LOAD (USUALLY NIL)
NOT VENTED	4.68 TO 6.18/LOAD (MORE IF GAS DRYER)
<b>Combustion</b> (unvented kerosene heater)	
	7.6/GALLON OF KEROSENE BURNED
<b>Cooking</b> (family of four)	
LUNCH	0.53 (PLUS 0.68 IF GAS STOVE)
DINNER	1.22 (PLUS 1.58 IF GAS STOVE)
BOILING 10 minutes, 6" pan (plus gas)	0.48 COVERED; 0.57 UNCOVERED
<b>Dishwashing by hand</b>	
DINNER	0.68/FAMILY OF FOUR
<b>Firewood Storage</b>	
CORD OF GREEN WOOD	400 TO 800/6 MONTHS
<b>Floor Mopping</b>	
	0.03/SQUARE FOOT
<b>Gas Range Pilot Light</b> (each)	
	0.37-/DAY
<b>House Plants</b>	
5 TO 7 AVERAGE SIZE	0.86 TO 0.96/DAY
<b>Human Respiration/Perspiration</b>	
	0.44/HOUR (family of four)
<b>Saunas, Steambaths, Whirlpools</b>	
	0 TO 2.7+/HOUR
<b>Ground Moisture Migration</b>	
1,000 SQ. FT. BASEMENT	0 TO 105/DAY

SOURCE: WILLIAM ANCELL AND WANDA OLSON, COLD CLIMATE HOUSING INFORMATION CENTER, UNIVERSITY OF MINNESOTA

Controlling condensation created by insulating begins with controlling the moisture sources in the house. The everyday activities of a family put pints of water into the air inside an old house.

Some of the biggest moisture sources for old houses are faulty drainage systems. It's best if gutter downspouts lead to underground pipes to carry water away from the foundation.

buildings, see "Mothballing Buildings" (July/Aug. 1993).

**HEAVY OCCUPANCY:** These are old houses that contain social clubs, restaurants, private clubs, bed & breakfasts, and other high-density commercial uses. These buildings have lots of people, food preparation, and other sources of abnormally high moisture generation. They require custom engineered solutions.

**MEDIUM OCCUPANCY:** Somewhere between the two extremes is the typical family home. Essentially, it's occupied every day by an average sized family that prepares two meals and uses multiple bathrooms. Such houses can typically be insulated without promoting condensation, but it's a tricky process—much more involved than insulation manufacturers' television commercials or product la-



bels let on. For starters, take a look at this chart (left) showing the humidity produced by just a few of the biggest moisture culprits.

### Solutions

IF YOU WANT TO INSULATE, YOUR OPTIONS are limited. You cannot change the climate; you cannot change the building methods used by the craftsmen who built your house long ago. The only part of the condensation equation you can control is indoor humidity. There are four ways to approach this. Very likely, you will need to apply them all.

**PREVENTION:** This is far-and-away the No. 1 moisture control technique. Prevention doesn't mean you should stop taking showers. Rather, it means going after big, curable moisture sources, such as faulty roof drains, boiler leaks, dripping garden hoses, unvented dryers, and underground drains blocked by roots. Never undertake an insulation project without solving these sorts of problems first. Prevention also means being aware of how your lifestyle affects the house, and being smart.

**DILUTION:** Here, humid interior air is exchanged for dry exterior air through ventilation. There are two primary ways this is accomplished. First is the exhaust fan. When you run the exhaust fan while taking a shower, and afterwards, or while cooking, moisture is diluted by removing humid indoor air. This same technique can be used in kitchens, basements, and attics. Be careful to ensure that the make-up air comes from outside. Otherwise the moisture will not be

successfully diluted, and insufficient make-up air can create a vacuum that can lead to dangerous back-venting of exhaust gases from furnaces and water heaters.

The second major dilution method is to ventilate behind insulation. Create a *vented void* (a cavity with vents at either end) between insulation and the exterior of the wall or roof. This serves to remove moisture that migrates through insulation in walls and



roofs. Diluted, the air is less humid and does not condense on the cold exterior components. This is an essential part of installing insulation. The key to successful venting lies in its 100% thoroughness. The reason is not a complex engineering formula, but a rule everyone is familiar with: Murphy's Law. If I do a 99% perfect job of venting the roof rafters, condensation and rot will occur in the other 1%.

**REMOVAL:** This is best conducted by a portable dehumidifier, a mechanical device that removes moisture from the air. It can scavenge small amounts of moisture from small unoccupied, sealed spaces, such as basements and storage closets. The equipment has limitations, however. It cannot function below 60 degrees because it will ice up. A window air conditioner can also perform this removal process during the summer.

**ISOLATION:** This is the ever-popular process that uses a so-called *vapor barrier* (more appropriately, a *vapor retarder*) to block moisture's migration into the wall. Plastic sheeting or metal foil (the standard kraft backing on batt insulation is insufficient) is placed over the insulation—on the side facing the living space. This limits the ability of moisture to migrate through the wall. Unfortunately, this method is relied upon too heavily by many overzealous insulators.

Even with a good vapor retarder that is sealed against windows and doors and that continues around outlet and switch boxes, you must ventilate behind the insulation. The vapor retarder will be a great help,

especially in locations of high moisture generation such as kitchens and bathrooms, but Murphy will always prevail. Wherever there is a breach, warm moist room air will escape into the colder part of the wall. It is only the vented void behind the insulation which can prevent a condensation calamity. Remember, no vapor retarder is perfect!



Stains on this stucco house are evidence that water is dripping down the wall, and very likely getting inside.

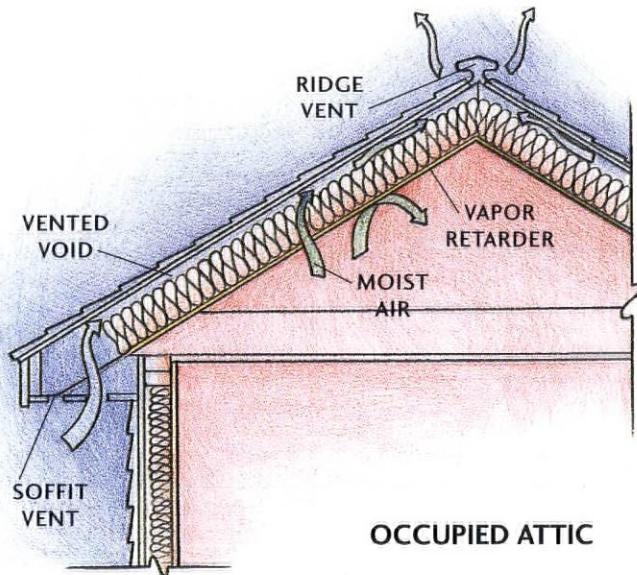
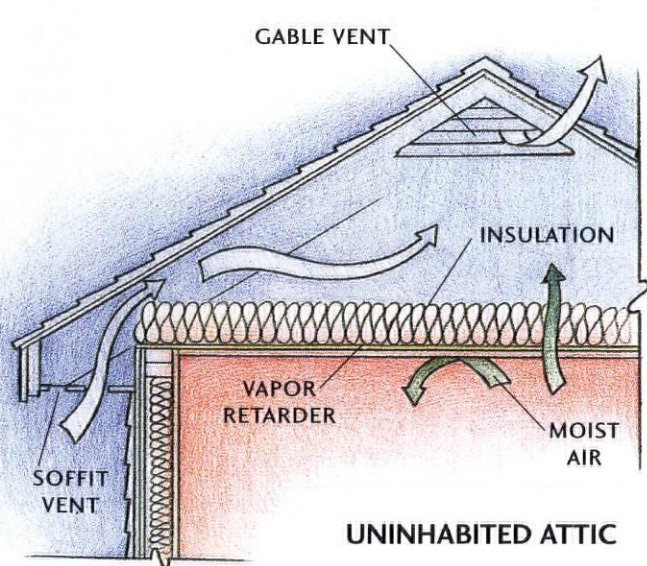
### INSULATING THE OLD HOUSE

THE HOUSE HAS THREE BASIC PARTS, WHICH are distinct in their construction and in how they must be insulated to prevent, or at least lessen, the condensation risk.

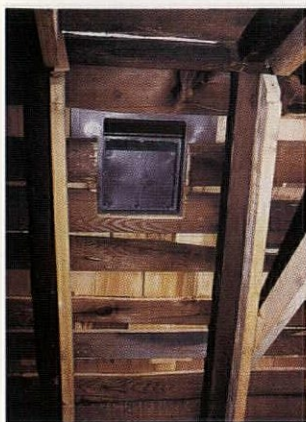
#### Roof and Attic

AN OLD-HOUSE ROOF IS ALMOST ALWAYS A wood frame with an exterior covering of metal, slate, tile, wood, or asphalt. The purpose of the roof is to solely keep out precipitation, right? Wrong! It actually has a second job: allowing moisture from inside the attic to vent to the outside via dilution. If this second function is blocked, moisture vapor accumulates and condensation occurs on the cold roofing materials. Rot is guaranteed.

**BELOW LEFT:** For uninhabited attics, insulate the floor with a vapor retarder toward the living space. With proper ventilation, the attic becomes a vented void to remove moisture that migrates through the attic floor. **BELOW RIGHT:** If the attic is occupied, the insulation goes between the rafters. But do not pack it against the roof. There must be a vented void, as well as a vapor retarder.







**ABOVE:** Where ridge or gable vents are not an option because of aesthetics, in-roof ventilators may fill the bill. **CENTER:** Cellulose insulation is effective for attic floors, but mice like to nest in it. Select batt or rigid insulation where pests are a problem.

The safest approach to attics is to keep them unoccupied. Insulate under the attic floorboards—with a vapor retarder on the side toward the living space—and install good vents in the soffit and gables. Then let the wind blow through the unheated attic space. This treatment combines the principals of isolation and dilution. The insulation and vapor retarder act as the isolation boundary. Because no vapor retarder is perfect, however, attic space above is freely vented to the outside. This venting dilutes any moist air that leaks through the insulation or the door from the warm, moist rooms below.

Many homeowners convert empty attic space into a living area. Good luck. This removes the advantage of the unheated attic and you'll have to take steps to prevent condensation. For modern commercial buildings with occupied top floors, architects solve this dilemma



by designing flat roofs with a “keep-it-warm” approach. The insulation is placed on the exterior side of the roof deck and then covered with a watertight membrane of rubber, metal, or fiberglass. The insulation keeps the interior roof framing and sheathing relatively warm and, thus, prevents condensation. This technique can end up being costly and may not even be possible in many old house applications.

The more appropriate option for old houses is to insulate between the rafters with a vapor retarder on the living space side. The key is to create a ventilated space be-

tween the insulation and the roof sheathing. Vents at the soffit and the ridge are used to dilute indoor air that sneaks through, replacing it with dry, outdoor air. Roof fans and circulators may also be options. Take care to maintain a vented void between insulation and sheathing in every rafter bay. Specialized baffles can be used to keep the insulation away from the sheathing where it passes the top wall plate.

Do not block the vented void with too much insulation. That will ruin the effectiveness of the dilution. Plus, it can lead to ice dams. You see, in addition to removing moisture, ventilation with exterior

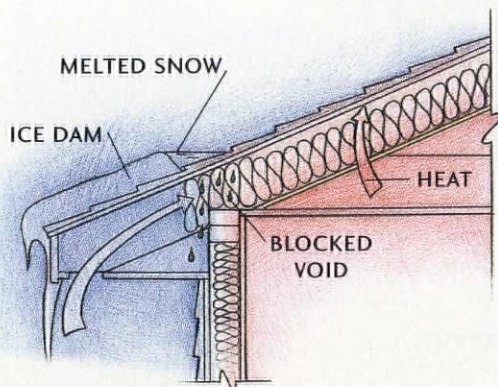
air allows any heat that makes it through the insulation to escape. This is crucial because heating the roof can melt snow, which then refreezes at the much-colder eaves. Future melt-off can get stopped up by the ice dam and can back up and

under roofing. For more on preventing ice dams, see “Frost in the Rafters, Ice on the Eaves” (Nov./Dec. 1993).

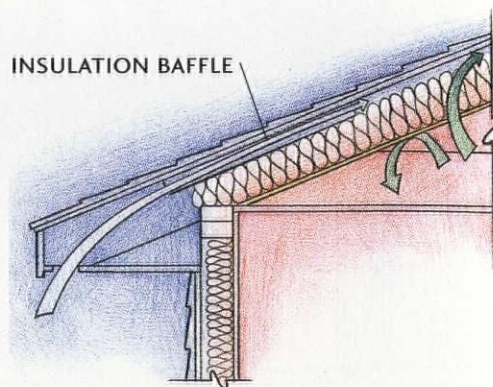
### Walls Above Ground

PERIMETER WALLS IN AN OLDER HOUSE ARE generally either masonry or wood. These materials have different moisture behaviors and require different insulation approaches.

Masonry, whether it be mortared fieldstone, cut granite, brick, or terra cotta, is a dense, inorganic material. Compared to wood, masonry conducts heat easily, making it a poor insulator. A 12" thick stone



**RIGHT:** One common cause of ice dams is insulation that clogs the vented void where it passes the top wall plate. **FAR RIGHT:** Specialized baffles should be used to maintain the vented void.





wall has only one half the insulation value of a 2" thick board wall. The problem is that adding fiberglass batt or rigid board insulation to a masonry wall on a building's interior side is very risky. The insulation causes the wall masonry to be cooler, and it's difficult to create a cavity that will vent to the outside. The result is condensation. Although stone won't rot, moisture can lead to increased capillary moisture movement (rising damp) from the foundation, spalling due to freeze-thaw cycles, and even crumbling. If your old house is masonry and has at least 4 courses of brick or 24"-thick stone walls, I would not add insulation.

Walls constructed of wood tend to be more forgiving. This is because they are much more porous and infiltration levels are higher. However, ventilation between added insulation and exterior sheathing is still important. Install vents at the sill and top plates, or small louvers that pop into cutouts made by a hole saw. In addition to a vented void behind the insulation, a vapor retarder should be used on the living space side of the insulation to inhibit moisture migration through the wall.

### Basement Below Grade

I WOULD NOT INSULATE THE BASEMENT. IT'S almost exclusively masonry, plus it stays cool well into the summer, raising a whole host of additional condensation problems. The basement is critical, however, because it is a potential source for moisture to enter the house. Although test data is limited on the subject, a dirt floor can be expected to generate about .004 pints water vapor per square foot per hour. (This is roughly the amount of water handled by six residential dehumidifiers all running at once.) To make matters worse, the same moisture migration rate applies to all other porous surfaces in contact with soil, including old mortared joints, and hand-laid brick or stone floors. It does not apply to surfaces that have a modern water proofing bituminous coating on their exterior side (rare before 1900).

So, what does all this have to do with insulating the old house? Everything! The odds are that the basement in an old home is the primary *moisture engine*, producing more interior humidity than the residents themselves. The moisture it creates can mi-

grate through the house and upset the delicate equilibrium that insulated walls and attics need. Regrettably, there are no stock answers for dealing with basement moisture. Ventilation, such as louvers in place of windows, will remove wintertime moisture but, in the summer, can actually allow exterior moisture to enter. Plastic vapor retarders can block moisture's path to the living space above, but may trap moisture in the cellar, which can mean rot. A custom engineered combination of these methods, in conjunction with mechanical dehumidification, may be required.

The upshot of all of this is that you must consider moisture when you insulate. I've seen too many insulation projects cause major damage to historic houses. Insulating an old house can indeed be an effective energy saver during winter heating periods in temperate regions. However, weigh the moisture-related issues that it will raise. And remember, no energy savings are worth long-term damage to the old house. 🏠

*Ernest A. Conrad, P.E., is president of Landmark Facilities Group, Inc., an engineering consultation firm specializing in historic building preservation from their offices at 252 East Avenue, Norwalk, CT 06855, (203) 866-8019.*



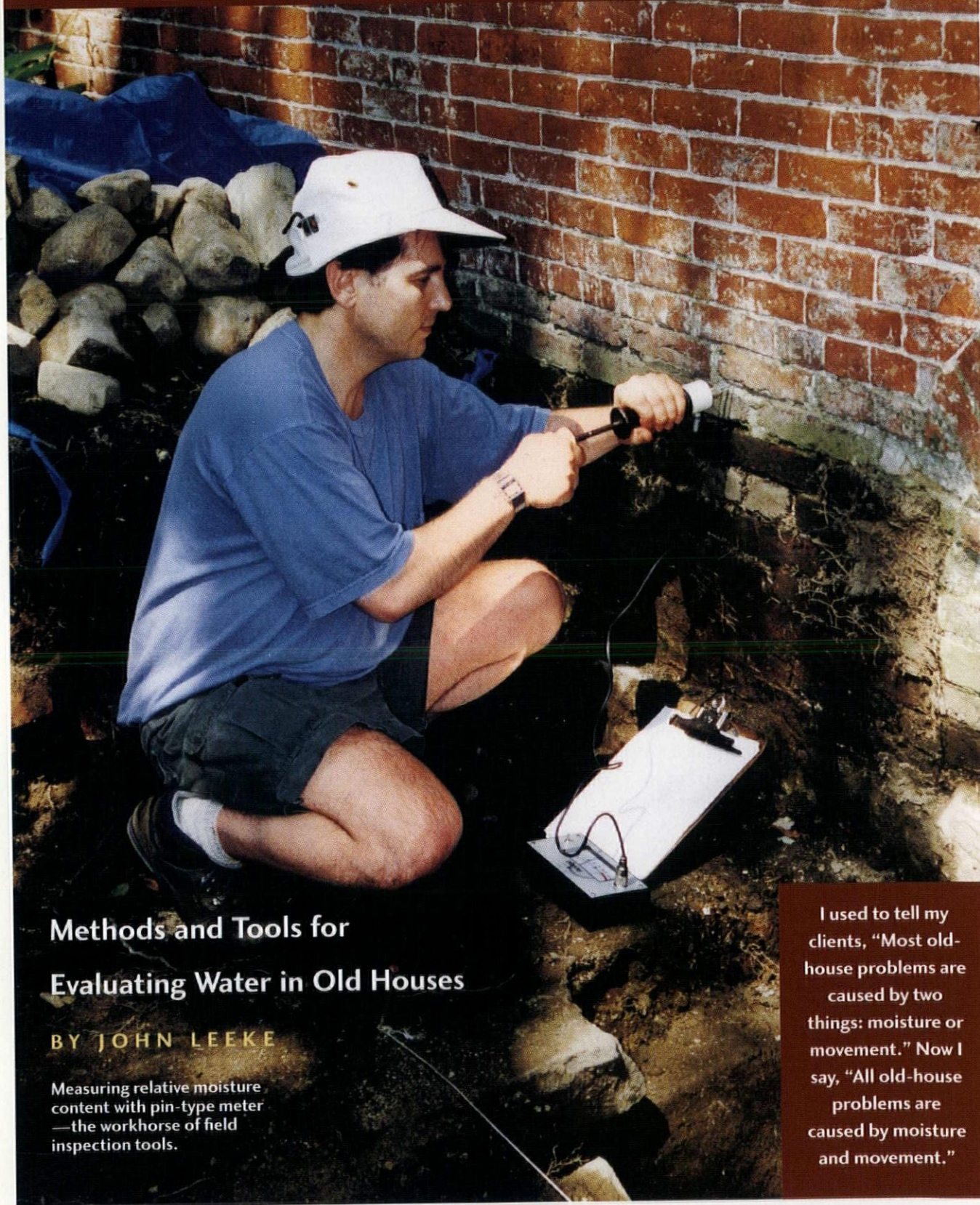
**This house offers a good example of venting exterior walls. The dark lines where the wall meets the foundation and at the cornice are vents.**



**This 1743 basement is clay, packed almost as hard as rock, but extremely porous. Underground moisture that evaporates into the house is often the No. 1 source of humidity.**



# DETECTING MOISTURE



## Methods and Tools for Evaluating Water in Old Houses

BY JOHN LEEKE

Measuring relative moisture content with pin-type meter—the workhorse of field inspection tools.

I used to tell my clients, “Most old-house problems are caused by two things: moisture or movement.” Now I say, “All old-house problems are caused by moisture and movement.”



**U**NDERSTANDING WHEN AND HOW moisture appears in buildings is key to reducing deterioration and preserving your historic house. When you can detect the presence of moisture in its subtlest forms and smallest amounts, as well as how it is behaving, it will lead you to the cause of any moisture problem.

We can all identify water in its liquid form. Its path from, say, a leak in the roof, onto the attic floor, and down through the ceiling plaster is usually obvious. Much harder to see is moisture that passes through building materials as vapor or by capillary action, and how it moves over a much longer time. For that you need help. Over the years, preservationists and engineers have developed methods to identify water in its various forms. Today's technology has brought new devices that make moisture much easier to detect and measure so it can be brought under better control.

### Simple Inspection

IT'S EASY TO RECOGNIZE SOME OF THE VISUAL clues of water presence when you know what to look for. Usually, they manifest themselves as some sort of deterioration:

- Brown or grey stains on wood or plaster are typically the work of water saturation.
- Paint peeling to bare wood is a common indication of excessive moisture in the wood.
- White, frosty blooms of efflorescence occur when water travels through masonry, then deposits these salt and calcium compounds as tiny crystals on the surface.
- Brick surfaces that dust off or split away are a sign of moisture buildup in the masonry.

However, you cannot depend solely on your body's senses for detecting significant moisture, especially if you want to discover moisture before it causes damage. By the time a wood surface looks or feels wet, the moisture content of the wood is well within the level where fungal decay flourishes. There are many simple, low-tech devices that will enhance your ability to detect moisture.

For example, to detect moisture in a cellar with a concrete floor, tape a 3' by 3' square of clear plastic sheeting to the floor. Leave it undisturbed for a few days. If water condenses underneath the plastic, you

know moisture is coming from a source beneath the floor. If water condenses on top of the plastic, you know the floor is dry and moisture is coming from the air in the cellar. Knowing the direction of moisture movement helps lead you to the source.

Some moisture detection devices are already in place in your old house. In the winter, however, moisture may condense on the interior side of window glass as frost since the glass is impervious to moisture. This frost is a telltale sign of moisture in the air, which will also be hidden in the walls where it may be building up causing unseen damage (see "The Dews and Don'ts of Insulating Old Houses," p. 36).

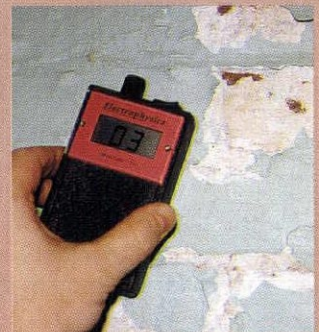
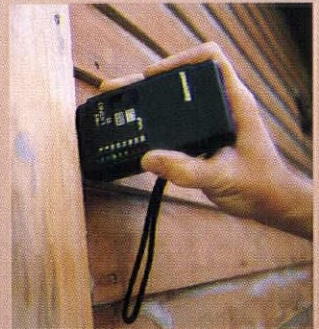
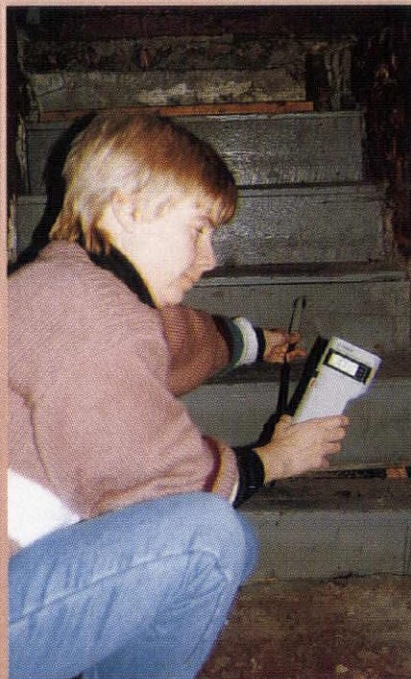
Another place to look for subtle clues of moisture is the attic. If moisture is rising from the living spaces, it will condense on the points of shingle or slate nails poking through the roof deck boards. In extreme



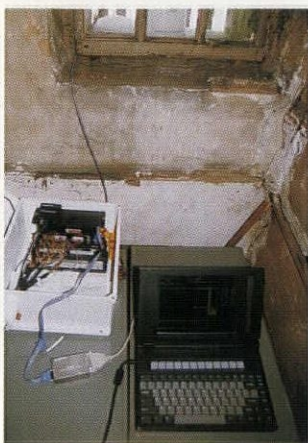
Sheet plastic (top) will detect general moisture presence and location when condensation appears on one side. Spalling brick (above) is a visual clue to high-moisture levels.

## A Survey of Field Meters

**BELOW:** Many cellar bulkhead stairs rot away due to a high-moisture environment. Here a relative humidity and temperature meter is used to measure moisture in the air space behind the stairs. **AT RIGHT:** Radio wave-type moisture meters risk no damage to the surface, but some work only on relatively flat surfaces. Readings can be taken quickly making this a very productive tool for assessment work where many readings are needed. **RIGHT, BOTTOM:** Pin-type meters can be completely hand-held too. They come in three models, for use with building materials of different hardnesses.







A datalogger (left) linked to a notebook computer. Note the cable leading to the sensor outside the window.

cases, frost may even form across the entire surface of the boards. Such evidence may mean that there's a moisture path into your attic that should be corrected or that your attic needs more ventilation.

### Moisture Measuring Equipment

VISUAL INSPECTION METHODS ARE SIMPLE AND low cost, but they can only detect moisture in gross terms. To gain a more detailed assessment of the potential problem, you have to be able to measure how much moisture is present and where. This requires sophisticated devices that are sensitive, reliable, and calibrated.

**FIELD METERS**—The moisture content of building materials, particularly wood

and masonry, can be measured using handheld, electrically powered meters. These devices help you determine the relative levels of moisture and their exact locations.

Standard pin-type field meters are designed to measure the moisture content of wood. They operate by inserting two probes into the wood and reading the electrical resistance between them. The meter then displays a value on a calibrated scale. This value can be used for comparative moisture readings or adjusted for factors such as wood species and temperature to provide actual moisture readings.

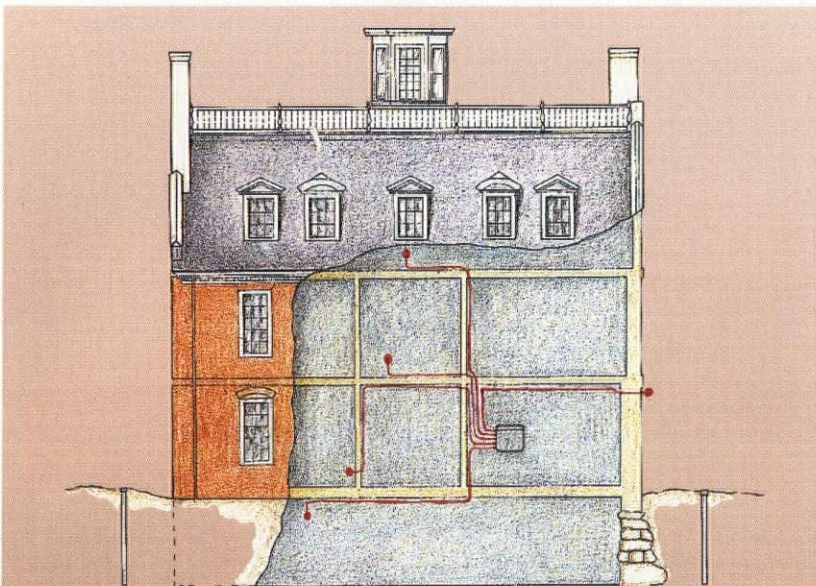
A newer type of meter operates using very low-power radio waves that detect subtle changes in density. Since moisture increases the density of porous materials, the meter can indicate moisture content without probes. Typically, field meters cost from \$100 to \$1,000. Accuracy varies from 8 percent for low-cost meters to within 1 or 2 percent for expensive meters.

Meters can help determine if the moisture source is currently active, where moisture is located and how extensive the problem might be. While a few spot measurements can give you an impression of relative moisture conditions, many measurements taken over a large area of, say, a wall can establish a pattern of moisture presence (see drawing, p. 45).

### Tracking Moisture Over Time

SO FAR, WE HAVE BEEN ABLE TO 1) IDENTIFY the presence of moisture and 2) measure the quantity of moisture. The last dimension to consider is time, so that we can 3) record the duration of moisture. Accurately checking and recording moisture levels at key locations can show, for example, higher and lower moisture levels in a brick wall at different times of year. If higher levels are not related to weather conditions, you might suspect a problem water source.

Accurate record keeping is a must for this kind of measurement, since patterns typically take at least a year to appear (often several years). Moisture level readings can be taken and recorded manually, of course. However, this method requires someone to do the logging, which means readings may not be frequent enough to document short-term patterns. There's the



## Moisture Monitoring in Practice

At the historic Warner House in Portsmouth, New Hampshire, we are in the last stages of a year-long moisture study that uses many of the methods I describe. We set up datalogging equipment and programmed it to collect temperature and humidity data 0.5 hours, 24 hours a day. The datalogger holds a month's worth of data, which I download to my notebook-sized personal computer.

So far we have learned that the basement is a continuous source of moisture throughout the year. Changes in the first-floor moisture levels parallel changes in the basement, suggesting that moisture is migrating up through the building. We intend to interrupt this flow by installing industrial dehumidifiers. If the pattern persists, we will then look at tightening up moisture paths between the floor levels. All of this specific knowledge helps us develop and prioritize cost-effective methods to mitigate the moisture.




opportunity for human error, too.

The optimum solution is a moisture monitoring system of electrical sensors that are linked to a device that automatically records readings. This equipment is much the same as that used by scientists to study weather and environmental conditions. When put to work in an old house, temperature and relative humidity sensors are installed at carefully selected locations throughout a building. One type of sensor works by measuring the electrical changes (in capacitance) in a microscopically thin plastic film as it absorbs water vapor from the air. Other sensors may employ mechanical principles, such as collecting rain water in a cup and weighing it.

These sensors accurately detect minute changes in relative humidity and air temperature. The best units have an accuracy of  $\frac{1}{10}$  of a degree (for temperature) or percentage point (for humidity). All sensors are connected via cables to a datalogger. The datalogger is a specialized computer that can be

programmed to collect temperature and humidity data at each location as often as needed, as well as store the data in its memory. With costs from \$1,000 to \$10,000, this type of detection is not for every old-house moisture problem. However, it provides high-quality data collected with a frequency and accuracy not possible with other methods.

Simply recognizing symptoms and taking moisture readings does not solve moisture problems. You have to know what the symptoms and meter readings mean. Seek tradespeople, contractors, and professionals who have experience dealing with moisture in old buildings. A good way to begin developing your own knowledge is by reading about moisture and tracking it throughout your old house. 

*John Leeke is a preservation consultant helping homeowners, contractors, and architects understand and maintain their historic buildings (26 Higgins St. Portland, ME 04103; 207-773-2306 or E-mail at johnleeke@aol.com.)*

## RESOURCES

Moisture monitoring & detection equipment, books.

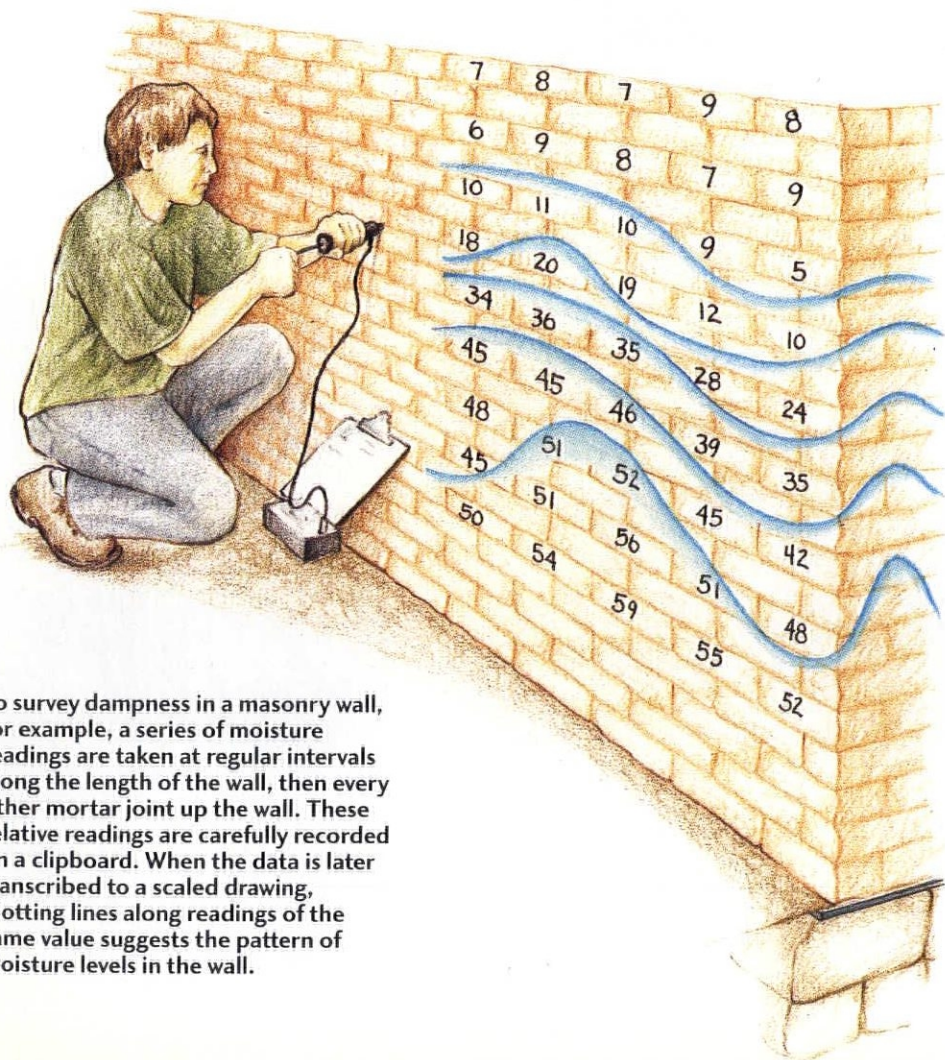
**DELMHORST INSTRUMENT CO.**  
51 Indian Lane East  
Dept. OHJ  
Towaco, NJ 07082  
(800) 222-0638

**ELECTROPHYSICS**  
Box 1143 Station B,  
Dept. OHJ  
London, Ontario  
Canada N6A 5K2  
(800) 244-9908

**LIGNOMAT USA, Ltd.**  
P.O. Box 30145, Dept. OHJ  
Portland, OR 97230  
(800) 227-2105

**VIASALA, INC.**  
100 Commerce Way,  
Dept. OHJ  
Woburn, MA 01801-1068  
(617) 933-4500

**WAGNER ELECTRONICS**  
326 Pine Grove Rd.  
Dept. OHJ  
Rogue River, OR 97537  
(503) 582-0541



To survey dampness in a masonry wall, for example, a series of moisture readings are taken at regular intervals along the length of the wall, then every other mortar joint up the wall. These relative readings are carefully recorded on a clipboard. When the data is later transcribed to a scaled drawing, plotting lines along readings of the same value suggests the pattern of moisture levels in the wall.



# Caring for Car

**W** E ALL APPRECIATE THE SPECIAL WARMTH AND AMBience that ornamental wood carving adds to an old house. The texture and character of the wood creates a unique glow, while the carved designs add style and three-dimensional richness to any surface. ■ Much ornamental carving is heavily detailed and geometrically complex, yet it is delicate as well. The numerous small pieces are susceptible to breakage, and the materials have finite bonding and protective abilities. As a result, many old homes contain carved woodwork that is in need of minor repairs. If you're handy with wood, these are repairs that you can do yourself by carving small replacement pieces and applying them to the originals. **BY KATIE GARDNER**



Relief Carving

## Prepare for Work

ANY RESTORER'S INITIAL JOB IS TO ASSESS the project and determine what kinds of repairs are needed. Look for chips, crumbled edges, and broken or missing features. Small chips and rough edges are fairly easy to repair and will not require additional wood. However, pieces that have broken off will need to be replaced in kind. Also carefully note the design; you will need a



A preliminary drawing is the first step in designing or restoring ornamental carving. Most important is the outline.

copy of the pattern to replace missing pieces. Most ornamental work is symmetrical, and a house often contains a design theme that is repeated throughout the rooms. Be sure to check fireplace mantels, entryways, and front porches for the design.

You'll also want to determine the type of carving you're facing—the typical old home may have more than one. *Relief carving* is a raised, ornamental design carved into a solid background. *Pierced carving* is similar to raised carving, but has the design cut entirely through the wood. *Carving-in-the-round*, which includes finials and other freestanding wood sculpture, is not as common in residential interiors.

Relief carvings are typically applied in some way to the architectural







Wings

A professional carver can have up to a hundred tools at his disposal, but repairing damage to residential ornamental woodwork takes only a few and the skills of a seasoned old-house restorer.

## How to Repair Interior Wood Ornament



## Adhesives

Modern woodcarvers have hide glue, white or yellow carpenter's glue, polyurethane glues, and epoxies to choose from. David Calvo recommends the latter as best for repairing ornamental work. Epoxies bond well, resist water, and they are quick to cure.

"Five-minute" epoxy



products are particularly good for small pieces that cannot be clamped; you can simply hold the piece in place until it is attached. If you are concerned with historical accuracy use hide glue, but keep in mind that it is more difficult to use.

Apply adhesive to the original detail and the new wood. Then clamp the wood into place, taking care to align the grain pattern with the original wood. Protect the existing carving from clamp marks by cushioning the jaws with small rubber or cardboard squares.



**For control and sensitivity, use proper carving technique. The wrist of the hand holding the cutting tool is always anchored to the work, acting as both a fulcrum and a pivot.**

woodwork, while pierced carving is frequently secured by mouldings in a frame. Consequently, you can often remove the entire carved section to make repairs. How pierced carving repairs proceed often depends on the size of the detail. If the damaged section is substantial, the replacement wood will be large enough to clamp to a level

work surface for shaping and later attachment. Very small pieces, however, cannot be clamped without slipping. Therefore, new wood must be applied prior to carving and repairs completed on the original panel. In these cases you want to remove the whole section of ornament for repair work.

### Dealing with Broken Details

IT OFTEN PAYS TO REMOVE BROKEN DETAILS—a step that is not as drastic as it sounds. Most carving is applied to the background woodwork with small finish nails, hide glue, or both. These are easily removed, after which the detail should pop off. Simply wedge a chisel between the carving and its background or moulding, then tap the chisel with a mallet to dislodge the ornament. If the detail does not loosen easily, leave it on. Instead cut off the broken end so that a new piece of wood can be added.

It's rare that a break will be even. More likely, it will leave a jagged edge that has to be straightened before new wood can be attached. Use a small saw or chisel to cut back and even all edges. If the break is in a corner, the two sides must also be squared. If you are working with relief carv-

**The basic woodcarving set includes a mallet, V parting tool, and a selection of gouge sweeps. Edges should have double bevels so the carver can use both sides of the tool.**





ing, the background needs to be flattened so that the new wood can be properly glued. Use a chisel to scrape or cut away any wood that remains against the board.

### Copying the Design

IF YOUR ORNAMENTATION REPEATS THROUGHOUT the house and you were able to find a complete pattern, use tracing paper to copy it. Outside lines are most important because they create a "framework" that highlights the design. If you cannot determine a pattern, consult one of the several design books that include traditional carving patterns. (*The Styles of Ornament* by Alexander Speltz is one of the most comprehensive.) If all else fails, trust your own creativity and make a freehand drawing. It does not have to be perfect; all you need is a rough outline to follow.

Use carbon paper to transfer the design onto the new wood. Lay the carbon paper on the wood, then tape the design over it so that it will not slip. Trace the design, taking extra care with the outline.

### Tools and Tool Handling

YOU ONLY NEED A FEW TOOLS FOR SIMPLE carving: several sizes of gouges (to establish the outline of the carving and shape the body of the design), and a V parting tool (used to excavate wood within field of the carving and add pencil-like details, such as leaf veins). Woodworking stores sell standard sets of 12 gouges adequate for your needs.

Proper tool handling is vital for effective control and precision when carving. Hold tool handles with your writing hand—the hand that will supply the carving "muscle." Wrap the fingers of your other hand around the middle of the tool, positioning them evenly over the steel shank and the handle. The palm rests on the wood, guiding the tool and acting as a fulcrum.

Cutting with the grain of the wood is one of the most important skills in carving. Wood grain reflects the growth pattern of the tree, often curving and changing in the space of a wood block. So it may not always be possible to follow the shape and line of a design by cutting with the wood grain.

Examine the grain pattern to determine the cutting direction. The best way to get a feel for grain orientation is practice. (Here's

where an extra piece of wood comes in handy.) You are carving properly if the wood cuts easily and smoothly, and the tool leaves a neat, shiny edge. If, on the other hand, the tool catches and digs into the wood, you are probably working against the grain.

### Repair Techniques

THE DAMAGE THAT MOST OLDER CARVINGS have suffered is relatively minor: wear marks, crumbled edges, and similar injuries to the outline. The only attention that may be required is to clean and even-up outside edges. Position the gouge over the outside line and, using the mallet, cut straight down to clean away rough edges. Use this technique to straighten all crumbled and rough edges, and to redefine the entire outline. When work-



This bracket—an example of pierced carving—will be attached to some larger woodwork in the room.



BLACK WALNUT



MAHOGANY



WHITE OAK



BASSWOOD

## Looking for Woods

It should be fairly easy to determine wood species for your particular region. In New England, for example, there are three common woods that predominate for relief and pierced carving: white oak, pine, and black walnut.

Black walnut is known for its rich, dark-brown color and tight grain pattern. It is the most prestigious of all carving woods and the least common of the three. Oak has always been popular for carving because of its handsome character, as well as its exceptional durability and strength. The grain pattern was thought to add a special depth to carving, and it was considered very desirable. When matching, look for a white-colored wood and a strong, even grain pattern. Pine is soft and easy to carve. Its abundance made it cheaper than the regal oak, and it is very common in residential woodwork. Pine, a yellow, warm-looking wood, is noted for its lack of grain patterns though swirling sap lines are often visible.

After you've determined the wood species, measure the area that needs to be repaired, adding a few extra inches on either side for waste. Although the original wood was almost certainly air-dried, kiln-dried wood is acceptable. Likewise, a flat-sawn or quartered cut will do. It is possible that a salvage yard will have the appropriate wood. If not, buy new stock at supplier of cabinet or boat hardwoods. Either way, order extra for practicing your carving techniques.





To repair this finial knob, David Calvo first saws out a block of wood as close in shape as possible to the original.



With the sample as a model, Calvo next roughs out the form using a variety of chisels. Clamps hold the wood.



Broken surfaces must be planed flat before gluing. Note that the new necks are still oversized.

ing on relief carving, follow the same procedure, but cut deeper and into the wood.

When the damage is more severe, pieces of wood or entire elements of the carving are missing. In these cases, you have to create a whole new piece (see photo series above). Use a saw to cut out the outline and shape of the element. Once the outline is "set-in" (established), or you have the newly cut shape, use the parting tool to draw and etch in the interior lines. Like a pencil sketch, this step outlines the inside pattern.

After the design is outlined, the inside

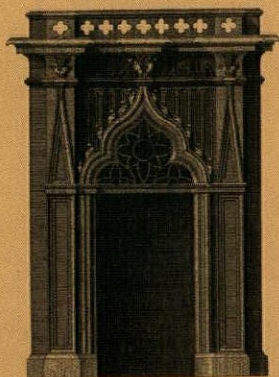
shape is ready to be carved. Use a gouge to rough out interior forms by cutting out the shapes. Leave the detailing for a later step. First cut out hollow shapes, starting from the center and working out. Carve in long sweeps, holding the rounded side of the gouge down. Carve forward—that is, away from you—when making hollow or concave forms. For convex shapes, carve down and inward, holding the hollow or rounded side of the gouge up. You may need to go over the work three or four times before all the shapes are formed. When the body has

## Carving Over the Centuries

**T**raditionally, ornamental carving was an indulgence of the wealthy, appearing in entryways, hallways, and dining rooms. However, it was not confined to large or expensive homes, and many modest old houses have some type of carving.

Until the Gothic Revival of the mid-19th century, most residential carving was classical in design. North Americans generally followed the styles that were popular in Europe, and Europeans favored classical Greek and Roman motifs like grape leaves, acanthus leaves, and volutes (the swirls that form Ionic capitals). These carvers copied patterns that appeared in planbooks, adding little innovation or new design. Thus many homes built prior to the 1850s have similar "by-the-book" classical patterns.

The Gothic Revival period brought looser, more creative styles that were influenced by medieval symbolism, as well



Inspired by medieval church architecture, the Gothic Revival made much use of carved woodwork.

as natural patterns. Gargoyles, angels, devil's heads, and foliage patterns became popular at this time.

It was the Victorian period, however, that made carved woodwork an inherent interior element. The ornate, often excessive decor of this era lent itself well to the intricate patterns, and most Victorian homes have some type of wood carving. Animal and human forms, as well as oak leaves, acorns, and foliage designs, are common to the Victorian home.

Towards the end of the 19th century, other architectural styles continued to utilize ornamental carving, and many Art Nouveau-inspired, Arts & Crafts, and Tudor homes have some ornamental work. By the 20th century, though, the craft was decreasing as house styles moved towards greater simplicity and away from rich interior decoration like carving.





After the epoxy is cured, repaired necks are trimmed back to the lines of the original ornament.



A close-up of the finished detail. Note that the glue line is straight, thin, and almost invisible.



The repaired finial is just one part of the Memorial Hall Restoration at Harvard University.

been roughed out, use a smaller gouge to refine the cuts and fill in detail. This procedure will sharpen the design and give it a sense of continuity and flow.

Lightly sand the surface of your new creation in order to smooth out sharp edges. Don't worry about getting into the crevices; they are too delicate to withstand heavy sanding. Traditional woodcarvers left chisel marks on their work, so you can even skip this step.

### Finishing Touches

THERE ARE THREE MAIN OPTIONS FOR WOOD stains. Water-based stains give a deep, even tone to wood. However, they are not ideal because the water causes the wood to expand and raise the grain, which in turn alters the smooth, even texture of the carving. Alcohol-based stains, like water stains, emphasize the wood grain, but they will not lift the grain as aggressively. Oil-based stains add the most depth and warmth to carving by sinking deep into the grain and bringing out the natural wood highlights.

If you have a large job and cannot find the exact shade you need, bring a small piece of the broken element to a hardware store where the stain can be custom-mixed. If the job is small, your best bet is to purchase several different stain colors in half-pint cans or packages of dry powder (for alcohol and water stains). Blend the colors and test on scrap wood until a match is found.

Stains can be used alone or in combination. One method, which is helpful when an exact color match is needed, is to even the wood tone first by applying a wa-

ter or alcohol stain. Then, after this coat has dried, apply an oil stain to bring out highlights and add luster to the new work. For greater control of absorption and color tone, combine an alcohol stain with liquid shellac in a 1:1 ratio. The shellac seals the wood so that the stain can easily be wiped off when the desired shade is reached.

As you stain allow the color to soak into the wood for 10 to 15 minutes before wiping it off with a cloth. The longer the stain is left in place, the deeper the tone and highlights it brings to the wood.

Traditional carvers used varnish to seal the stain and protect their work. Today, varnishing remains a necessary procedure that can ensure a long life for new woodwork. Polyurethane finishes, although very resilient, give a slightly synthetic appearance to wood. Instead, try one of the old-time oil varnishes that are still available. These varnishes are made with natural resins that will complement your artistry, help restore the wood's original luster, and give the carving its characteristic charm. 🛠️



The mallet comes into play when extra force and control is needed. Even with the mallet, however, the wrist is still anchored to the work.

*Thanks to woodcarver David Calvo for technical help with this article. He specializes in carving restoration and classes at Calvo Studios, 17 Mill Lane, Arlington, MA 02174; (617) 648-5589.*



Roofs make an immense contribution to the identity of a house, particularly any house built before 1940. Depending upon the building's form, the roof can command more than a third of the exterior area. This surface becomes a broad canvas for architectural statements made with colors, textures, and especially shapes. ♦ The basic vocabulary of roof shapes is practical in origin, the product of traditional carpentry skills and materials. Geometric triangles and cones worked best to span walls and support loads (such as snow and the weight of the roof wood, slate, or tile) while making maximum use of the space under the roof. When a house was expanded or amended in some way, additional roofs were usually necessary. These often took a different, even less ambitious form.

## Gambrels Are Alive & Well

Understanding the Shapes of Old-House Roofs **BY GORDON BOCK**



Incorporated into this hipped roof are a gable dormer and a hipped dormer, as well as a conical tower. Note, too, the eyebrow set in the hip.

Throughout the 19th century, however, house builders and their architects were increasingly excited by the opportunities in complex roof shapes. As the parade of romantic and eclectic house styles moved through the Victorian era, the basic shapes were often combined to create complex shapes and hybrids—an architecture, if you will, all its own.

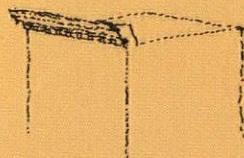
### Simple Roofs

THE VAST MAJORITY OF OLD-HOUSE ROOFS stick to one of these basic shapes.

**FLAT ROOF**—Though truly flat roofs are common today for commercial structures, in most historic buildings a flat roof means one with a single plane that is pitched at a low angle to shed water. Flat roofs appear most frequently on row houses.

**GABLE ROOF**—Give two flat roofs a decent pitch, place them back to back, and you have a gable roof. The gable is the triangle of wall

## ROOF SHAPES



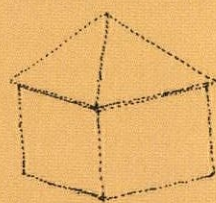
FLAT ROOF



GABLE ROOF



HIP ROOF



PYRAMIDAL ROOF





at the ends, and it is this form—the most stable in geometry—that gives the gable roof impressive strength with a minimum of engineering. The gable roof became a favorite in the Greek Revival era.

**HIP ROOF (HIPPED ROOF)**—Suppose you take a gable roof and bend the gables in towards each other so that there are four sides to the roof, all with similar pitches. The edges where these sides meet are called hips, and this is a hip roof. Though more complicated to build than a gable roof, and less generous with the space it leaves in the attic, the hip roof has a refined appearance that suited rectangular houses from the Georgian and Italianate styles to the Prairie School.

**PYRAMIDAL ROOF**—When a hip roof is built on a square base and all four eaves are

the same length, the roof becomes a pyramid. These roofs are a signature feature of the Foursquare.

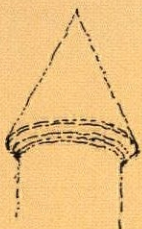
**CONICAL ROOF**—If you take triangular section of a gable roof and rotate it within its own space, you have pretty much described the construction of a conical roof. These shapes are rare as major roofs on old houses, but their unique, fanciful appearance works well on outbuildings and towers.

**This house has a steep cross-gable plan. The tower wears a pyramidal roof with gable dormers, and shed roofs protect the porch and rear extension.**

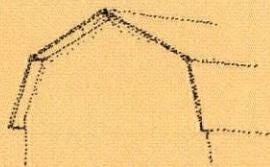
### Double-Pitch Roofs

CHANGING THE PITCH AT SOME POINT IN the roof's incline, though trickier to build, has practical advantages.

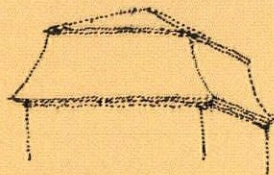
**GAMBREL**—The archetypal double-pitch roof is the gambrel, essentially a gable roof with breaks in the continuity of the planes.



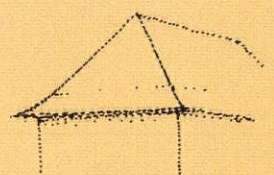
CONICAL ROOF



GAMBREL ROOF



MANSARD ROOF



KICKED EAVES



The practical advantage of the mansard roof is to maximize the usable space of the attic or, depending upon your interpretation of history, make a three-storey house look a storey shorter.

## Pitch Versus Slope

There are two ways to describe the incline of a roof in numbers. Slope—the expression most commonly used in carpentry—is a ratio of vertical rise or fall to run (the horizontal distance across the incline, from eave to ridge). For example, a roof 8' high with a run of 16' would be inclined 8 to 16, which is a slope of 1 to 2 in lowest terms (also written as 1:2). Pitch is incline expressed as an angle in degrees. Pitch is calculated by dividing the rise of the roof by the span (the horizontal distance across the roof, from eave to eave).



The classic gambrel has a gable-roof pitch until its upper third or so where it flattens out. Gambrel roofs are intimately associated with 17th- and 18th-century houses of English or Dutch origin, but they found new popularity with Shingle Style and Colonial Revival architects in the 1890s.

**MANSARD (FRENCH OR CURB ROOF)**—Apply the double-pitch concept to a hip roof, and you have a roof that shows two planes on all four sides. This is what French architect François Mansart did in the 17th century, refining an inimitable roof shape that now bears his name. The lower faces of a mansard roof can be straight or concave, convex, or compound curves. The upper faces are almost flat and nearly invisible from the

ground. Mansards defined a whole generation of French-style houses after 1860.

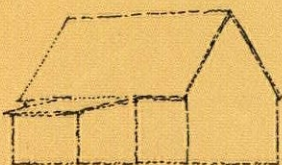
**BROKEN RAFTERS (“KICKS”)**—Almost any of the roof shapes outlined up to this point can be enhanced by lifting the plane near the lower edges so that the eaves “kick” for a brimlike effect. This feature is a classic addition to gambrel-roofed houses of the early 1800s, but it was also fashionable to add to the hip roofs of Queen Annes and Foursquares nearly a century later.

### Combination Roofs

CROSSING THE MOST COMMON ROOF SHAPES produces some popular hybrids.

**SHED ROOF**—While a flat roof can be the sole covering on an old house, most often

## ROOF SHAPES



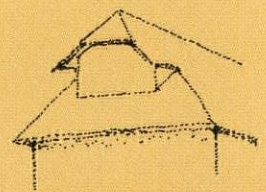
SHED ROOF



SALTBOX



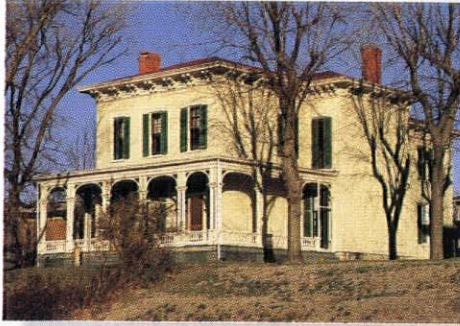
HIP-AND-GABLE ROOF



HIP-ON-GABLE ROOF



it is attached to the building somewhere below the primary roof. The typical case is a single-storey, flat-roofed extension at the rear of the building. This shed roof starts at the eaves of the existing roof and continues at a lower pitch.



**GABLE-AND-SHED ROOF ("SALTBOX")**—Very common, but not so obvious, is the shed roof that is built

onto a gable roof at the same pitch and width. The early New England saltbox, of course, is the prime example of this roof, but it shows up on many vernacular—and even high-style—houses.

**HIP-AND-GABLE ROOF**—When you meld these roof shapes in such a way that the hips end halfway up the gable walls (leaving only a gablet), you have a hip-and-gable roof—just one of the effects popular in the late Victorian era.

**HIP-ON-GABLE ROOF (CLIPPED GABLE, JERK-IN-HEAD)**—You can also apply a partial hip roof to the peak of a gable roof. The result creates a facetlike detail. Hip-on-gable roofs were used to vivify the exteriors of Queen Anne houses and were popular through the early-20th century on bungalows.

### Combined Forms

**MATING TWO OR MORE BASIC ROOF SHAPES** not only makes a more elaborate roof, it creates interesting new features, such as valleys.

**PARALLEL GABLE ROOFS ("CAT'S EARS")**—An uncommon way to combine roof shapes is to build them side by side. This pops up in Victorian and some post-Victorian houses or their wings.

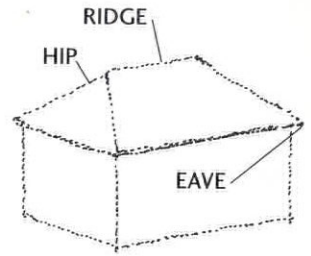
**CROSS GABLE ROOFS AND CROSS HIP**

**ROOFS**—Far more often, pairs of gable or hip roofs are set at right angles to each other. Two intersecting gable roofs on a square house plan yield a cross roof. When the plan is extended, the whole house becomes cruciform. If the gable or hip roofs cross on only one side, it produces an L-shaped roof—one of the most basic and widespread plans in North American

housebuilding

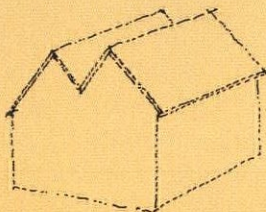
**HIP ROOF WITH CROSS GABLES**—Perhaps the most successful assembly of different roof shapes is the central hip roof with cross gables, the staple of the Queen Anne house.

With the right mix of carpentry and design skills, builders created unlimited variations on these classic shapes.

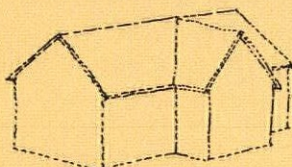


**CENTER:** For the Italianate style, hipped roofs were often pitched so low that they almost disappeared from view.

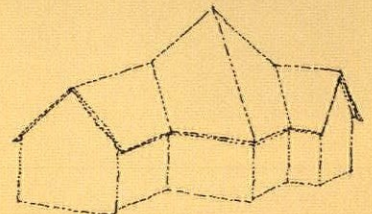
**BELOW:** The simple cross-gable, L-shaped roof was a mainstay of the Gothic Revival. Gable dormers provided additional space for decorative vergeboards.



PARALLEL GABLES



CROSS GABLES

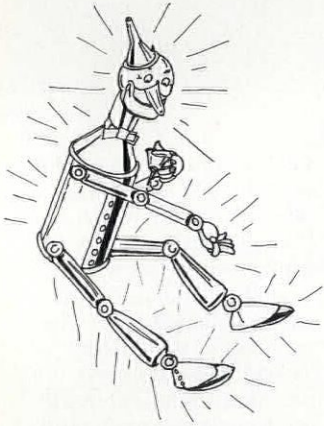


HIP ROOF WITH CROSS GABLES

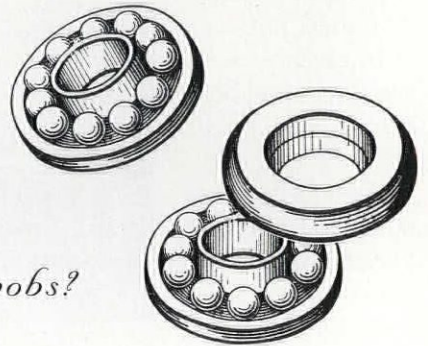


# JUST LUBE IT!

BY NEAL A. VOGEL



**ABOVE:** The Tin Man of Oz wanted for a heart, but what he really needed was a good oiling. **TOP RIGHT:** The advent of sealed ball bearings early in the 20th century was supposed to spell the end of maintenance lubricating. It didn't.



*Annoyed by squeaky hinges?  
Frustrated by sticky locks and knobs?  
Irritated by rusty cranks?*

**I**F YOU ANSWERED YES TO ANY OF THESE questions, just lube it. Lubricants free stuck mechanisms, clean working parts, and displace corrosion-causing moisture. They also help protect hardware from friction and wear.

Why is such a simple job neglected by owners who otherwise go to great lengths to restore an old house? Perhaps it's because selecting the proper lubricant for a job is a bit of a mystery. With so many products to choose from, deciding what to put on a jammed transom lifter can be puzzling. And using the wrong product can actually worsen problems. The type of lubricant required depends on the design, material, and operation of the hardware.

## The Low-Down on Lubricants

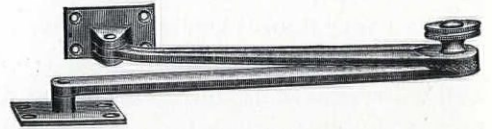
A LUBRICANT IS A SUBSTANCE THAT IS PLACED between moving parts to reduce friction. Generally, these are oils and greases made from petroleum or organic sources. There are three classes of lubricant for use on most old hardware.

*Synthetic grease* (often called white grease) is made by dispersing a thickening agent, often soap, into a synthetic oil. Grease is used where a thick, long lasting lubricant is required, such as between gears.

*Penetrating oils* are thin oils with additives that make them effective cleaners as well as lubricants. They loosen dirt and rust, and can be used to open "frozen" hardware. Some penetrating oils even remove varnish and paint.

*Dry lubricants* are made from solids that have been suspended in an oil-based carrier.

Some of the solids commonly used are wax, graphite, molybdenum disulfide, Teflon, and silicone. When a dry lubricant is sprayed into hardware, the oil loosens moving parts. Then, the oil evaporates and leaves behind a dry, low-friction film. This coating lubricates and protects without leaving an oily residue to attract dirt or metal filings—a big



**For hardware with exposed moving parts, such as this casement adjuster, a dry lubricant will reduce friction without any mess.**

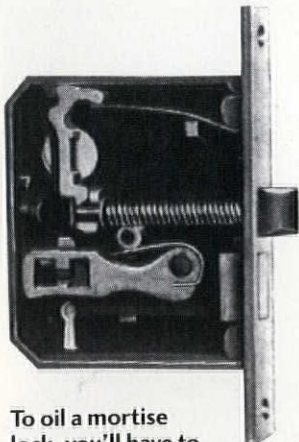
advantage in many applications. Some hybrid products combine the benefits of a dry lubricant and a penetrating oil, cleaning and freeing hardware and then drying into a lubricating film. This means longer-lasting lubrication.

The local hardware store should have all of these lubricants. Shop where sales people give informed advice, and carefully read product labels to determine appropriate applications. When in doubt, check with the manufacturer or a locksmith.

## What to Use

**LOCKS:** Perhaps the most important hardware to lubricate properly is the lock. Use only dry lubricants in a lock; oily products can gum up the small parts by attracting dirt and metal filings. Some dry lubricants are specially marketed for locks and are clearly labeled as such.

**HINGES:** Hinges are everywhere around



To oil a mortise lock, you'll have to remove it from the door and open it up.

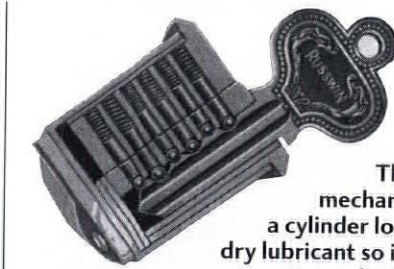
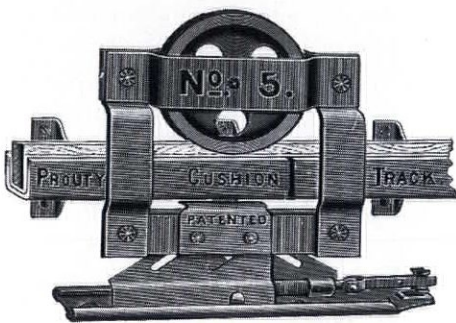


any old house. In general, the older they are, the more important regular lubrication becomes. For 18th- and early-19th-century, wrought- and cast-iron hinges (and their reproductions), lubricate at least yearly with a penetrating oil. The same goes for later loose-pin butt hinges. By the late-19th century, more-advanced hinges with steel bushings (washers) were in common use. Penetrating oils can also be very effective on bushed hinges. Many feature notched pins or slight indentations on the top of the bushing to hold oil longer.

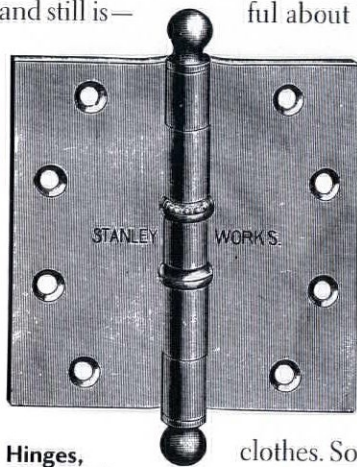
By the 1920s, most quality doors (particularly heavy doors) swung on hinges with enclosed ball bearings. A lot of hardware from this period was—and still is—promoted as maintenance free. However, a 1925 report by the federal Builders' Hardware Committee agreed that, although ball bearing butt hinges are superior to others, "lubrication is an important feature in all types of butts and should be provided throughout the life of the butt by systematic inspection." Even ball bearing hinges can benefit from a good penetrating oil, although the bearings themselves are typically enclosed and impossible to lubricate.

**CRANKS, STAYS, AND CLOSURES:** Intricate mechanicals for such applications as pocket doors or casement, transom, and jalousie windows will vary widely and must be addressed carefully. Sometimes a com-

**Grease heavy moving parts that are not exposed, such as pocket door mechanicals.**



The delicate mechanism inside a cylinder lock needs a dry lubricant so it does not attract dirt from keys.



Hinges, whether they have bushings, ball-bearings, or plain, loose pins, need a good penetrating oil.

bination of lubricants are most effective. Hardware that's exposed to the weather may require grease, which adheres better and generally lasts longer. Grease is also best for cranks and other geared systems that are enclosed by a cover. However, be careful about lubricant residue left on any

hardware that might contact hands, arms, or sleeves.

For exposed hardware, such as a slide bar on a casement window, a dry lubricant is best because it's not messy and it doesn't attract dirt. Graphite and molybdenum products, however, will leave a black residue that can easily wipe off on your skin or

clothes. Some synthetic lubricants, such as Teflon and silicone can resolve this problem. Hydraulic door closures are not common in old houses, but are found in many old apartment buildings. Most closures operate on hydraulic oil and should be kept full for better longevity and smoother operation.

**WOOD WINDOWS AND DRAWERS:** It's not only hardware that has to be lubricated. Drawers, double-hung windows, and other places where wood moves against wood are affected by friction too. They cannot be treated with oils or greases. Instead, spread dry wax or soap on the surfaces.

Lubrication may be the most rudimentary form of maintenance, but it's important. Lubricate your hardware as an annual ritual. It's also an excellent time to check for loose hardware and perform minor adjustments as needed. Just lube it!

*Neal A. Vogel maintains and restores historic buildings in his role as director of technical services for Inspired Partnerships, in Chicago.*

## Suppliers

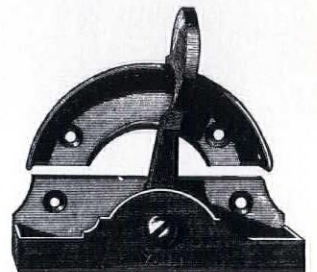
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**Master Lock Oil**  
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**Tri-Flow**  
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 A hybrid product, it's a penetrating oil with Teflon.



Since sash latches are always under the thumb, a dry lubricant is the best choice.



# Saving Time in a Bottle

BY JOHN G. FOX

**A** FEW DAYS AGO, I GOT TO ENJOY SOME SERIOUS demolition work in my 1888 house by tearing down a recent partition to re-create a big room. One of the pleasant surprises was a message left more than fifty years ago in bold carpenter's pencil: "John A. Rohrbeck, April 9, 1942." I wish he'd said more.

Each time I open up an old wall, I secretly hope to find a message from the past. Such discoveries are always exciting, yet their condition is often disappointing. Ancient newspapers are yellowed, brittle, and flaky; marriage licenses and birth certificates are water-stained and mouse-munched. In most cases, the treasure troves amount to accidental time capsules—items, such as hammers, casually stashed and then forgotten. If only those folks had been more careful about preserving time capsules for the future.

## Making Time-Proof Capsules

EVEN TODAY, FEW OLD-HOUSE RESTORERS DEVISE LONG-lasting time capsules for messages to future residents.

For whatever reason, durable time capsules are almost exclusively filled and put away by institutions, corporations, and governments. Modern time capsules are traditionally tubular in shape. For the 1939 World's Fair in New York, the Westinghouse Electric Corporation buried an 8'-tall, torpedo-shaped

**For each of his children, Rhett Hailey of Tennessee purchased time capsules, to be opened on their twenty-first birthdays.**

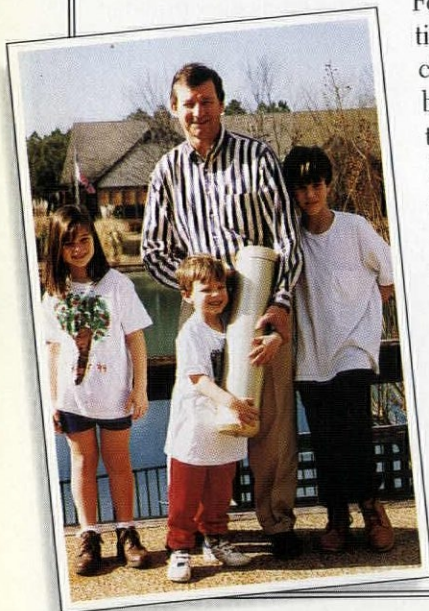
tube containing 35 "small items of common use" and microfilm records of 100 great books. Its creator, G. Edward Pendray, infelicitously dubbed it a "time bomb" that would be sealed until the year 6938. Happily, "time capsule" is the more benign term that stuck.

Old-house owners can fabricate their own low-tech time capsule, but it takes more than a tin can and duct tape. Coffee cans quickly rust, glass canning jars break, and plastic freezer bags don't keep out moisture under the weight of dirt above. A short section of 4" plastic waste pipe can work well, however, when fitted with a cap at one end and a threaded plug at the other. Sewer pipe keeps waste water in so, carefully sealed, this assembly also keeps out moisture.

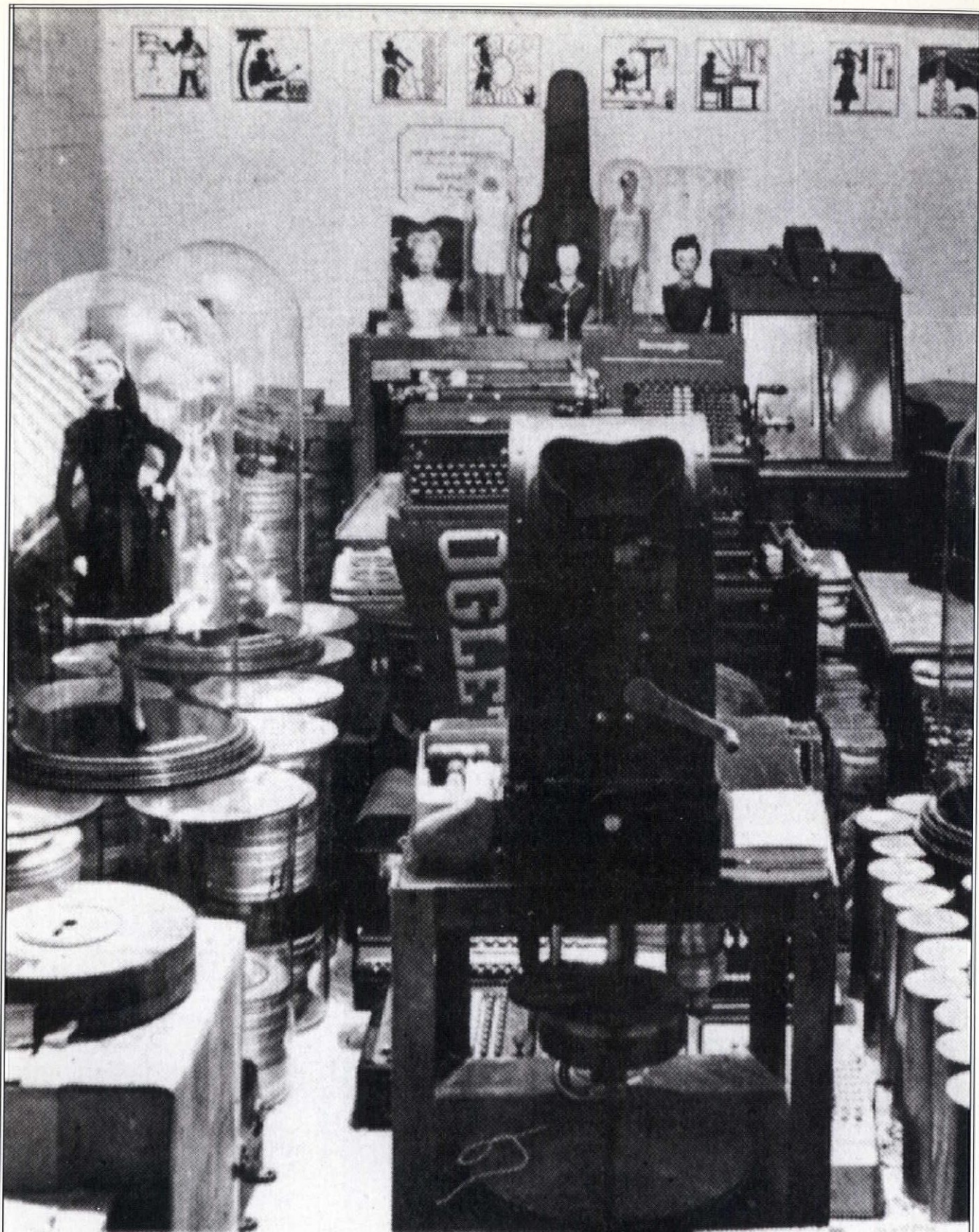
Air is another archival enemy. A homemade time capsule contains oxygen, which over time decomposes paper. Manufactured time capsules have tiny valves to allow all but 2% of the oxygen to be driven out by an inert gas, such as argon or nitrogen. (Residual oxygen prevents brittleness.) Suppliers charge little for the small quantity of gas needed. Paper can be protected from decomposition with preparations used by professional archivists. Neutralizing agents and acid-free boxes, envelopes, and specially designed containers are available for books, tapes, film, and other records.

## Lost & Not Found

TODAY A GROWING NUMBER OF TIME CAPSULES ARE NOT buried or hidden behind a wall, but displayed in a prominent place. This avoids the top time capsule problem since the days of the pharaohs: finding the capsule once it's underground and forgotten. Estimates are, over 10,000 time capsules have been buried, yet the location of only a small fraction is known for sure. Sleuths are still looking for the cornerstone buried in 1793 by George Washington, as well as for a time capsule buried

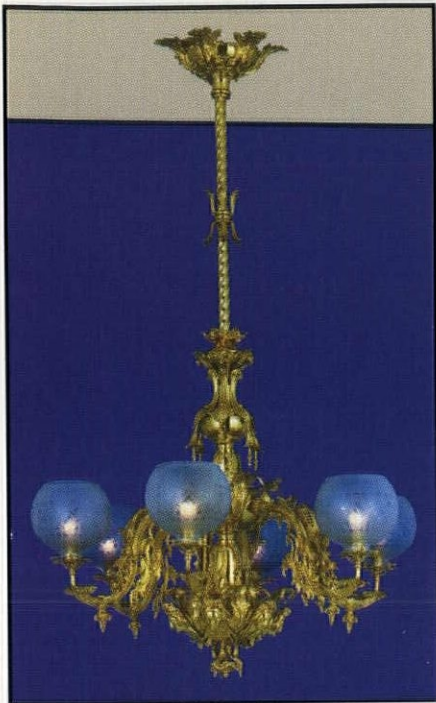






Some 6,000 years from now, daylight will again enter the "Crypt of Civilization," illuminating a Donald Duck doll. A picture/sound/word teaching device is provided in case no one understands 20th-century English then.





**Top Picture:** Rococo Chandelier by Starr, Fellows, New York C: 1857

**Center:** Deer's Head sconce by Gibson Gas Fixture Works, Phila., PA C: 1890

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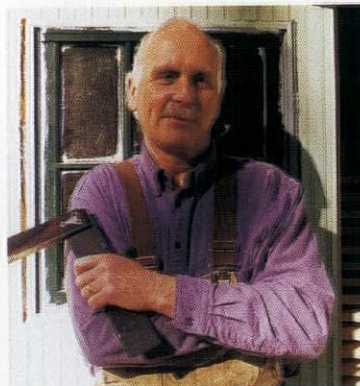
Campbell, CA. 95009

Phone: 408-246-1962

in 1983 by the cast of the TV series M\*A\*S\*H. Both George Washington and Alan Alda forgot to mark the location of their time capsules (preferably with permanent above-ground plaques).

To the rescue comes The International Time Capsule Society (ITCS). Founded in 1990, the ITCS ambitiously tries "to maintain a registry of all known time capsules." The six-page registration form requests the precise position of the capsule in map form.

The ITCS is situated at Oglethorpe University in Atlanta. The original university, a casualty of the Civil War, was revived in 1915 by Thornwell Jacobs. Trained as a historian, Dr. Jacobs promoted the notion of a giant "Crypt of Civilization" time capsule. By early 1940, the Crypt had been loaded and sealed with 640,000 pages of microfilmed material, hundreds of newsreels and recordings, and an original copy of the script of *Gone with the Wind*. Also archived were voice recordings of Franklin D. Roosevelt, Hitler, Stalin, Popeye the Sailor, and a champion hog caller. Representatives of late 1930s culture include a set of Lincoln Logs and an ampule of Budweiser beer. The Crypt of Civilization is scheduled to open at noon on Thursday, May 28, 8113.



My good luck was to find this fine try square in a church wall—a typical tool time capsule.

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c/o Oglethorpe University  
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Free registration of time capsule locations.

**TIME CAPSULES, INC.**  
12698 Lewis Lane, Dept. OHJ  
Nampa, ID 83868  
(208) 466-8712  
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In sharp contrast, old-house owners tend to seal up personal fragments of contemporary civilization in time capsules. Included might be a brief history of the building (with black and white photographs) and the names and photos of those who worked on the building (added in the cornerstone tradition). Of special interest to the future would be properly preserved documents including itemized costs of restoration. Don't forget to put in a copy of a current tax bill—in a hundred years that alone should make finders pine for "the good old days!"

In the next few days, the room will be finished. Inspired by John Rohrbeck's message, I'll sign my name and add in some other items in a homemade capsule. So future homeowners will understand how everything came to be tucked in a wall, I'll also include a copy of this essay. 🏠



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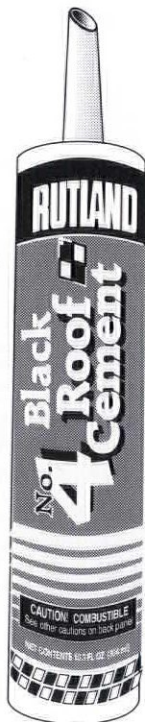
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2. Apply saturant to area to be covered.



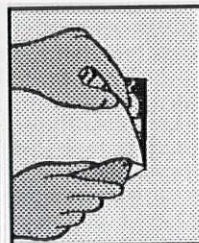
3. Apply fiberglass mat to wet surface.



4. Trim excess mat where wall meets ceiling.



5. Trim mat at baseboard and window.



6. Trim mat at outlets, switches, etc.



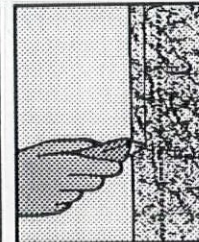
7. Apply second coat of saturant to wet mat.



8. Apply 1st coat of saturant to adjacent area.



9. Apply mat to 2nd area, overlapping by 1".



10. Cut down center of overlap (both layers).



11. Remove mat strips on both sides of cut.



12. Apply 2nd coat of saturant (include seam)

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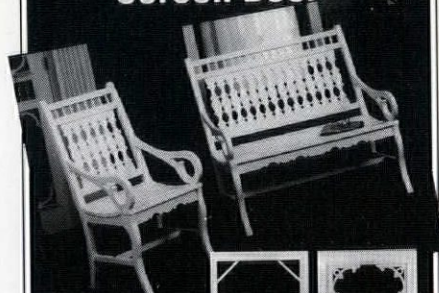
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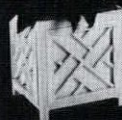
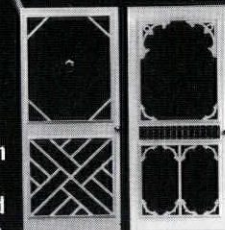
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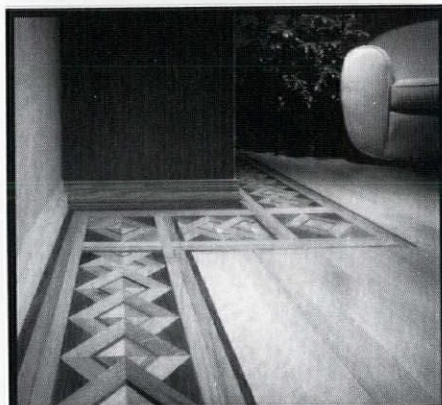
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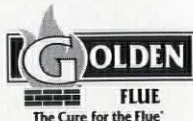
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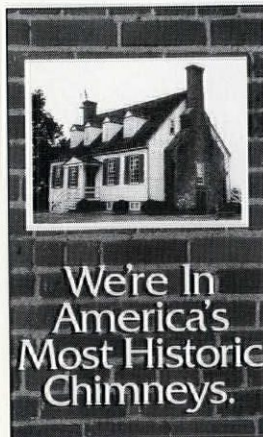
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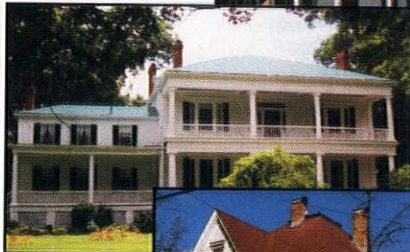
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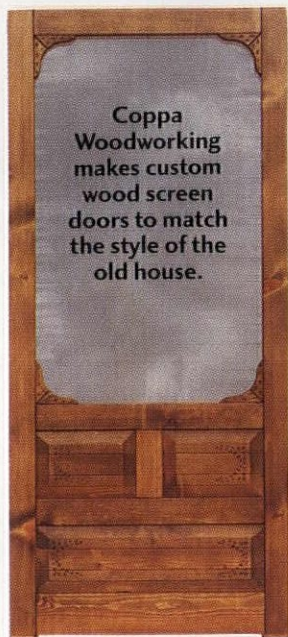
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ADDING A SCREEN DOOR improves ventilation in the summer. To be true to your old house, you can select wood units that match the building's architecture. Duplicate the panel design of the main door or decorate the new door with details found elsewhere on the exterior. One good manufacturer of quality wood screen doors (and window screens) is Coppa Woodworking. They have many stock designs and do cus-

tom work. Prices vary, but the door shown costs roughly \$75 in  $\frac{3}{4}$ " pine and ranges up to \$213 in  $\frac{1}{8}$ " oak. Coppa Woodworking, 1231 Paraiso Avenue, Dept. OHJ, San Pedro, CA 90731; (310) 548-4142.

## VICTORIAN GARDEN EDGING

ACCORDING TO GARDEN designer and OHJ author, Michael Weishan, this reproduction garden edging is a dead ringer for the Victorian examples he's seen in books of the period. He recommends the clay edging for surrounding gardens, walks, and driveways on the grounds of late-19th-century houses. In addition to the rope style shown, a scalloped pattern is available. Manufactured in England by a company established in 1819, they are suitable for any North American climate. Corner posts and 9" sections of edging cost \$6. The Northern Roof Tile Sales Co., 4408 Mile Strip Road, Suite 266, Dept. OHJ, Blasdell, NY 14219; (905) 627-4035.

**This imported clay edging is perfect for use around gardens or walkways at Victorian houses.**

## SLAKED LIME

AS OLD-HOUSE JOURNAL has preached for years, modern portland cement should not be used to re-point historic lime-mortar masonry (common until 1900). Lime mortar is not as hard as portland-cement mortar, so it accepts the expansion and contraction of early soft brick. (Portland can actually cause soft brick to break apart.) Problem is, making lime mortar

\$12.50 per gallon. GenLime Group, L.P., P.O. Box 158, Dept. OHJ, Genoa, OH 43430; (800) 537-4489.



**GenLime's new lime putty was used in the restoration of the 1895 Genoa, Ohio, town hall.**

has always meant slaking (hydrating) the lime, a lengthy process where the chemical reaction causes the mixture to boil. Well, now someone is finally selling pre-slaked lime. This start-up company was still organizing its distribution network at press time, but is selling by mail order. Their slaked lime has a suggested retail price of

## CUT-OUT SAW

A NEW POWER TOOL HAS hit the market. It's basically a souped up laminate trimmer with a cutter that looks a lot like a drill bit. The simple tool does the work you have always left for a jig, reciprocating, or hole saw. It'll cut outlet holes through plaster and lath. It'll cut pipe holes in ceramic tile. It'll cut sink holes in Corian or laminate countertop. The Spiral Saw comes in two models. The 3.6 amp unit



# PRODUCTS

by Josh Garskof



Capital Cresting's cast-iron roof toppers reproduce Victorian styles.

## ROOF CRESTING

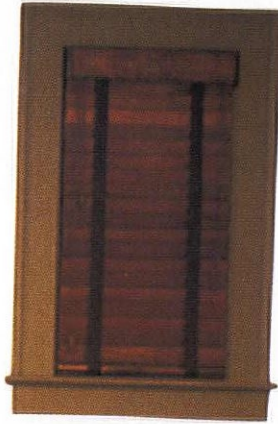
has a suggested retail price of \$89 and the 4 amp model—recommended for most old-house uses—has a suggested retail price of \$99. For heavy duty cutting, you'll need one of their carbide bits, which cost \$6 for a 1/8" bit and \$12 for a 1/4" bit. For a local distributor, contact Roto Zip Tool Corporation, 1861 Ludden Drive, Dept. OHJ, Cross Plains, WI 53528; (800) 521-1817, extension 2.

CAST-IRON CRESTING IS the ultimate Victorian embellishment for a roof. Unfortunately, on many old houses it hasn't survived decades of weather or lack of maintenance. If your crestring is missing or damaged, check out Capital Cresting Company. They offer a product line that includes some six Victorian crestring designs made to order in steel or cast iron. They'll also custom reproduce your original crestring from a remnant, sketch, or photo. Cresting comes in 4' lengths that cost between \$100 and \$180. Custom set-ups are additional. Capital Cresting Company, P.O. Box Q, 101 Ironwood Court, Dept. OHJ, Milford, PA 18337; (800) 519-7733.

## WOOD BLINDS

WOOD VENETIAN BLINDS date back to colonial times and were popular window treatments well into the Victorian era. The slats

are hand finished to order with authentic paint colors (or custom colors), whitewash, or walnut stain. The operators are not plastic. They're steel and brass pinion-and-worm gear hardware. Herringbone weave cotton tapes, available in an array of colors, control the slats. For a standard 32" x 52" window, the wood



Before 1840, wood blinds were made locally, while drapery was still imported from Europe.

blinds cost \$215 painted. Other finishes are extra. DeVenco Products Inc., 2688 E. Ponce de Leon Avenue, Dept. OHJ, Decatur, GA 30030; (800) 888-4597.

## FURNITURE KIT

FREE-STANDING KITCHEN furniture can give an otherwise modern room a period feel. The Country Pie Safe is

inspired by early-19th-century cupboards. Punched tin panels ventilate the shelves inside. The unit stands 58" tall and 36 3/4" wide and has three shelves inside. It's constructed with pegged mortise-and-tenon joinery and comes in a ready-to-assemble kit. It costs \$765 in cherry and \$629 in maple. This and many other kits for making traditional furniture are available from Bartley Antique Reproduction Furniture Kits, 65 Engerman Avenue, Dept. OHJ, Denton Industrial Park, Denton, MD 21629; (800) 787-2800.

The Country Pie Safe's tin panels are punched with a traditional German-American decorative motif.



Roto Zip's spiral saw is an excellent tool for cutting outlet and pipe holes.



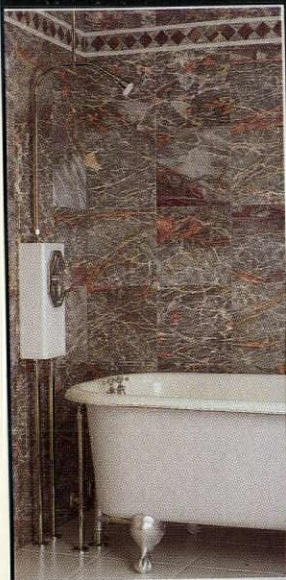
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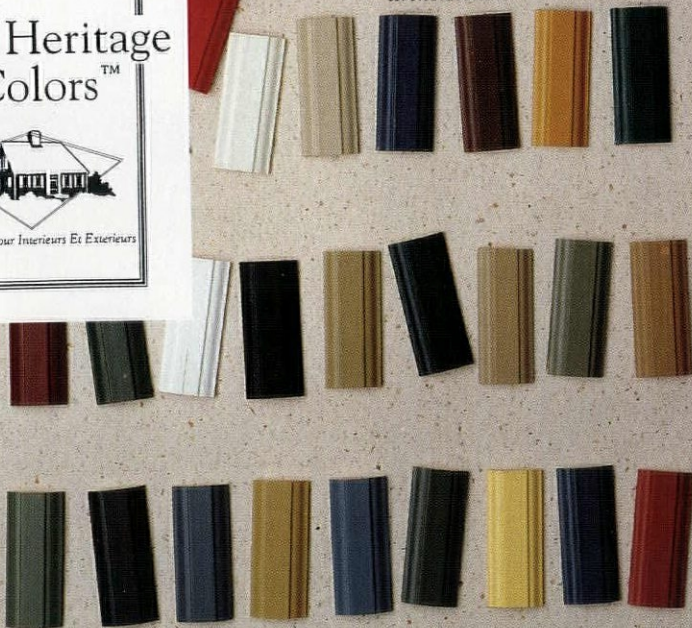
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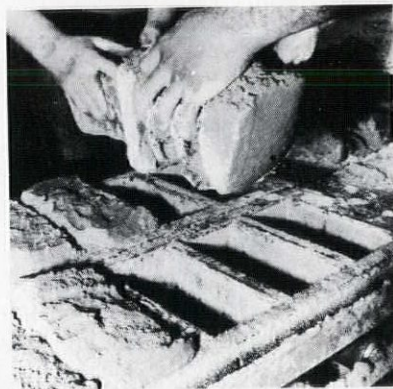
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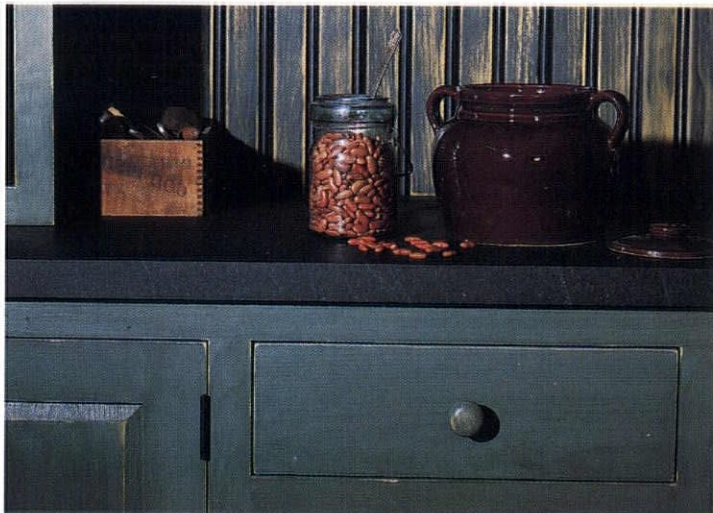
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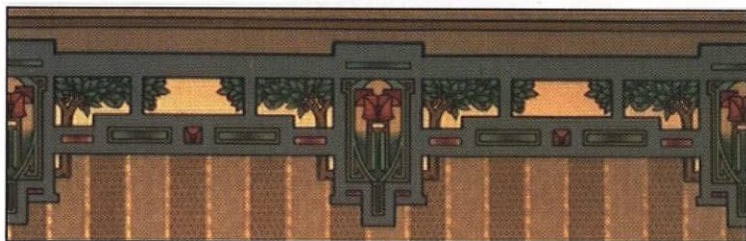
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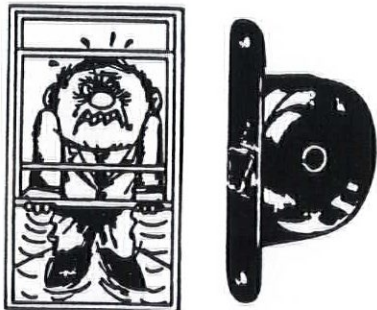
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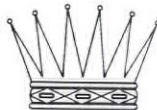
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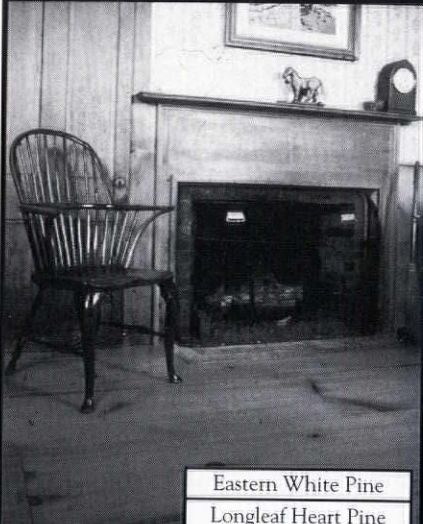
The floor plan incorporates a large family room with a cathedral ceiling and a Rumford fireplace, two porches, three bedrooms, and 2½ baths. Built-in, glass-fronted china cabinets are a decorative touch in the formal dining room; the window seat is a welcome addition to the breakfast room, adjacent to the kitchen. Note the ample closet space in the master bedroom.



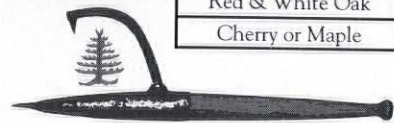
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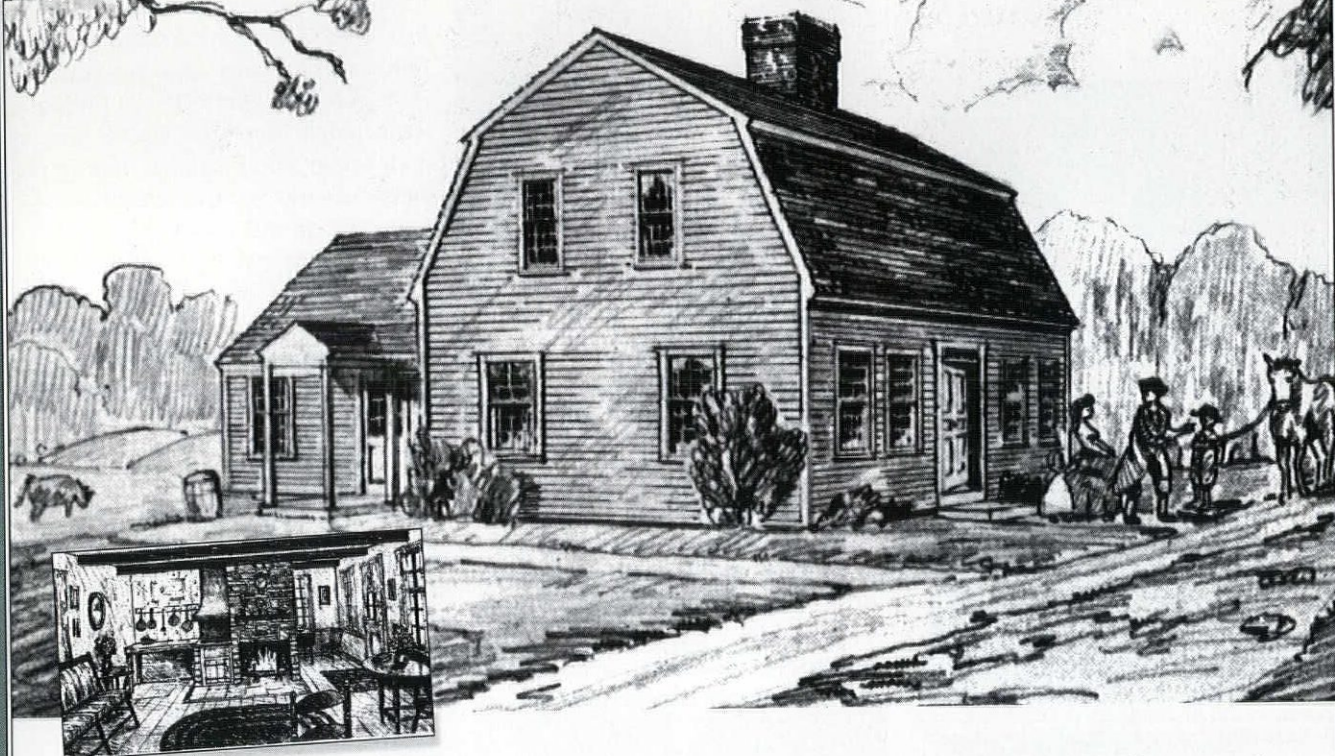
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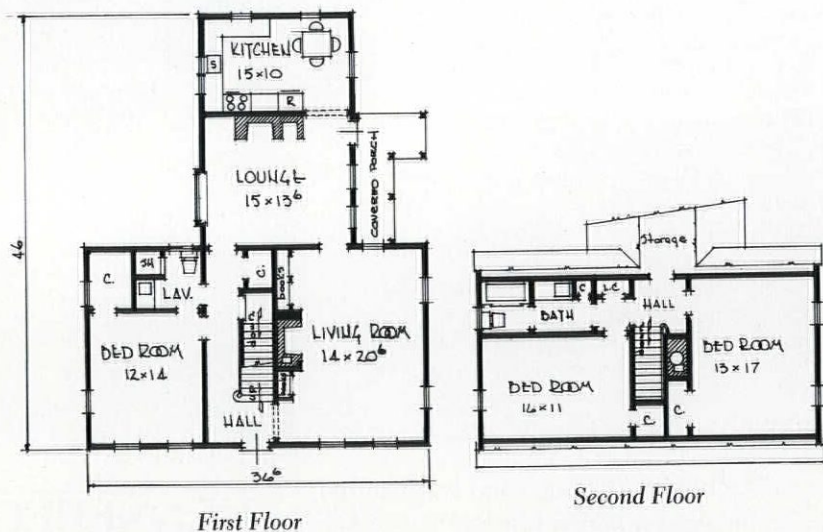


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chimney dominates the structure, with a second chimney in the ell. Though modest in size, this house has three large first-floor rooms, a kitchen, two upstairs bedrooms, and 1 1/2 baths. The downstairs bedroom would be a nice spot for a study. A separate garage plan is also available.



### Plan EP-17-EA

Cost .....	\$200
Set of 5 .....	\$260
Set of 8 .....	\$300
Bedrooms .....	2-3
Bathrooms .....	1.5
Square Footage .....	1834'
First Floor .....	1177'
Second Floor .....	657'
Ceiling Height	
First Floor .....	7'4"
Second Floor .....	7'4"
Overall Dimensions	
Width .....	36'6"
Depth .....	46'



# EMPORIUM

Catalogs · Products and Services



For Sale/Swap · Real Estate · Events

## Real Estate

**SUWANEE, GA**—Terry-Settle House, ca. 1830. Possibly oldest house in Forsyth County. 1 1/2 storey, enclosed log dogtrot w/additions, 4 porches. Clapboard exterior, tongue-and-groove board interior. 3 frplcs., fieldstone chimneys. Log smokehouse. Requires extensive rehab, roof, all systems. 1.5 acres, \$50,000. Anne Catherine Christian, Georgia Trust for Historic Preservation (404) 881-9980.

**CLINTON, IA**—Italianate 1871 home, Clinton landmark, horse barn 1970, 12 acres within city limits. Restored 1963. 2 BRs w/dressing rms, bath, master BR w/bath, utility rm upstairs. 2 parlors, DR, kit., FR, powder rm, porch, patio, garage attached. If interested write to: Sylvia at 1458 Main Ave., Clinton, IA 52732-1921.

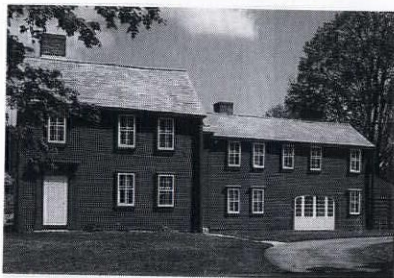
**WEST CHICAGO, IL**—1892 Parsonage on corner lot. Beautifully restored. Wonderful wood moldings throughout. Updated kit., WBFP, pocket doors, beveled glass, much more. 3 BRs. Master BR has sitting rm. 1 1/2 baths. In excellent condition. Serious buyers only, \$162,000. (708) 293-0405.

**BUCOLIC BURLINGTON, KS**—3-storey Victorian, built ca. 1875, outstanding location for B&B, inn/restaurant/road house, etc., Master & servants stairs, oak and cherry woodwork, 3 frplcs. Antique shop in addition. P.O. Box 29, Burlington, KS. 66839.

**EMPORIA, KS**—Beautifully restored 1910 shingle/stone B&B in historic area. 6 BRs, 4 1/2 baths, pocket doors, leaded glass, oak stairway, garden w/pond, 2-car garage. Strong tourist/university trade, 3 yr. repeat bus. \$295,000 or B.O. (316) 342-6881.

**WEST ORANGE, LLEWELLYN PK.**—Ca. 1883 renovated carriage house including 4-car garage, enchanting 2 BR cottage w/greenhouse, artist studio, antique gazebo. Situated on 1.4 acres, adjacent to Edison's Glenmont Estate on 18 acres. Rental income. 24 hr gated community. Only 20 min. to NYC. asking \$565,000. Call Bernice G., Murphy Realty BH&G, (201) 773-3395.

**BOLTON, MA**—This rare double saltbox dwelling, ca.1700, has been authentically restored. Located on 75 acres, this potential horse property offers extensive riding trails



and an oversized barn adjoining conservation land. Add'l property available. \$695,000. Contact Eileen Fitzpatrick, at the PRE-VIEWS Harvard office (508) 456-4160.

**BLADENSBURG, MD**—Bostwick, historic 1746 brick mansion. Home of Benjamin Stoddert, first secretary of the Navy. 8+ acres. 5 BRs, frplc. in every room, over 8,000 sq. ft. Outside kit. ideal for guest quarters. Country atmosphere. Mins. from D.C. \$500,000. (301) 927-1226.

**ADDISON, ME**—Ca. 1840 sea captain's cape in far downeast fishing village. One acre lot w/old perennial gardens and saltwater views. Short walk to deepwater mooring. Needs renovation/restoration. Owner financing. \$49,000. (207) 567-3707.

**EASTPORT, ME**—Former neighborhood general store (1850 sq. ft. ). Second-floor apartment. Many Victorian features remain: Storefront, counters, shelves, pendant light fixtures, beaded pine walls & ceiling. Some harbor views. Excellent summer/year-round residence and shop/studio. \$35,500. Brochure. (207) 282-6252.

**SEARSPORT, WALDO COUNTY, ME**—Ca. 1795 historic Maine coast cape w/ 12 rooms, 4 1/2 baths and 59' gl. encl. porch overlooking Penobscot Bay. Attached 3-storey barn w/ 7 wainscoted rms. on 2nd floor. 3 1/2 landscaped private acres. Great B&B/Commercial potential on U.S. Route 1. Poss. owner finance avail. 1-800-698-6575.

**HILLSDALE, MI**—1887 frame Italianate in charming college town. Beautiful interior trim, huge pocket doors and curved staircase. 2700 sq. ft., 10 rooms, 2-car garage. Restoration begun, liveable now, show-place potential. Photos available. \$49,000.

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**SEDALIA, MO**—1895, Ornate, National Registry, Queen Anne. 14 rms, 2 1/2 baths. Original woodwork and gas/electric light fix. Parquet floors, pocket doors, six frplcs. and six stained glass windows. Ballroom on the 3rd floor. \$165,000. (816) 827-4171.

**ASHEVILLE, NC**—7200 sq. ft. Tudor on 6 acres. Oak & walnut panelling. 10.5 foot ceilings, slate roof, 5 frplcs., 6 BRs, 4.5 baths, elevator, slate patios, screened porch. 3-car garage. \$1,750,000. (704) 274-1188.

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**MURFREESBORO, NC**—National Register Brick Federal, ca. 1820, restored with 3 BRs., 2 1/2 baths. Located in quiet college town 50 miles from Norfolk/Virginia Beach, VA Call (919) 398-8162 for brochure. By Owner, \$278,000.

**BARNSTEAD, NH**—Old 1792 cape w/attached civil war era ell. 3 BRs w/room for expansion. 5 acre field w/additional acreage available.

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**ELIZABETH, NJ**—Lovely 1917 Arts & Crafts/Tudor cottage, 95% restored. 3 bdrm, half-timbered frplc. w/leaded glass cabinets, extensive natural

chestnut trim including beams and window seats lr/dr, diamond-light windows, french doors. HW floors, 3-season porch, fully landscaped. New roof, plumbing, furnace, kit., & bath. Detached garage. 40 minutes to NYC, low taxes, quiet neighborhood, corner lot, Asking \$175,000. (908) 232-3579.

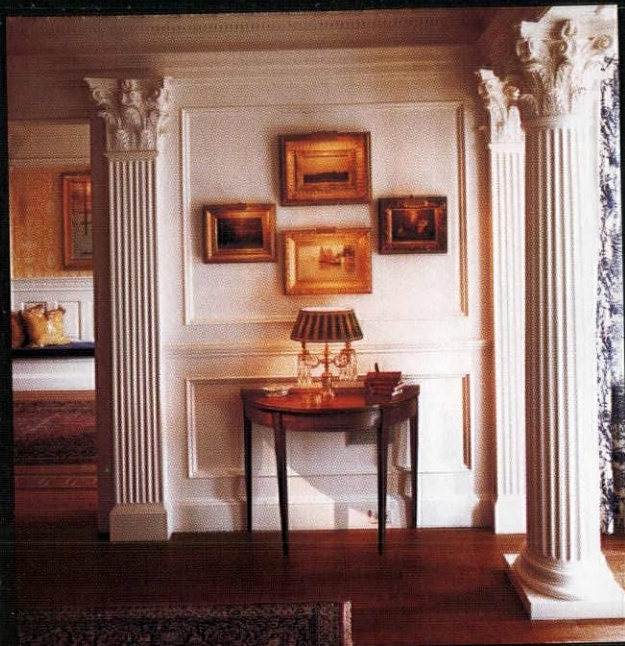
**FRANKLIN LAKES, NJ**—Dutch colonial sandstone & wood "Long House" ca. 1710 on 3/4 acre, 2 attached houses, 7 BRs., 2

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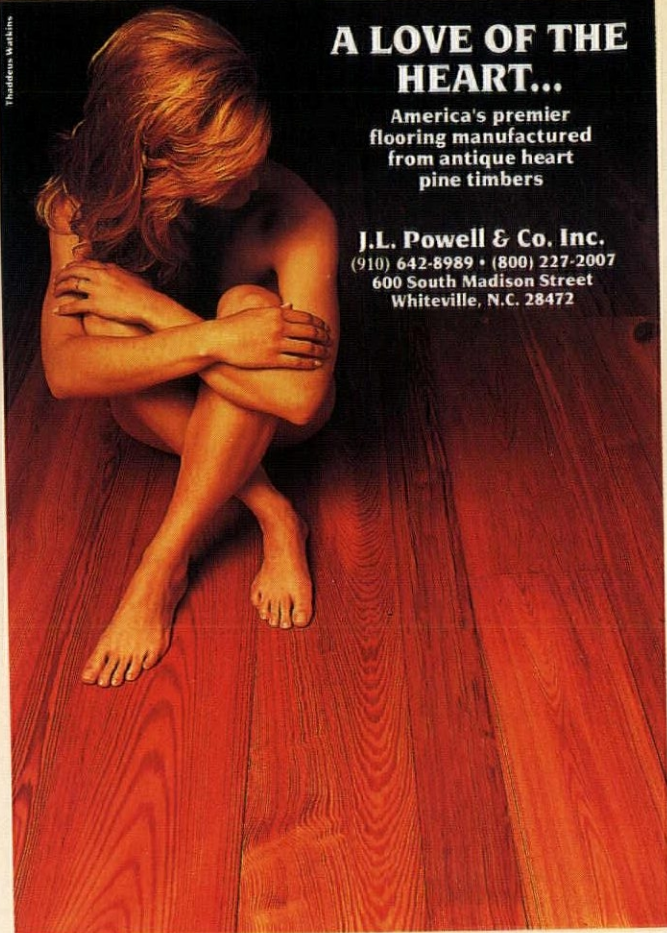
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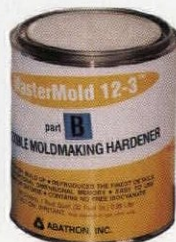
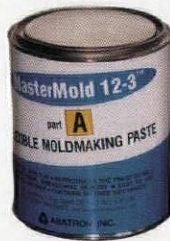
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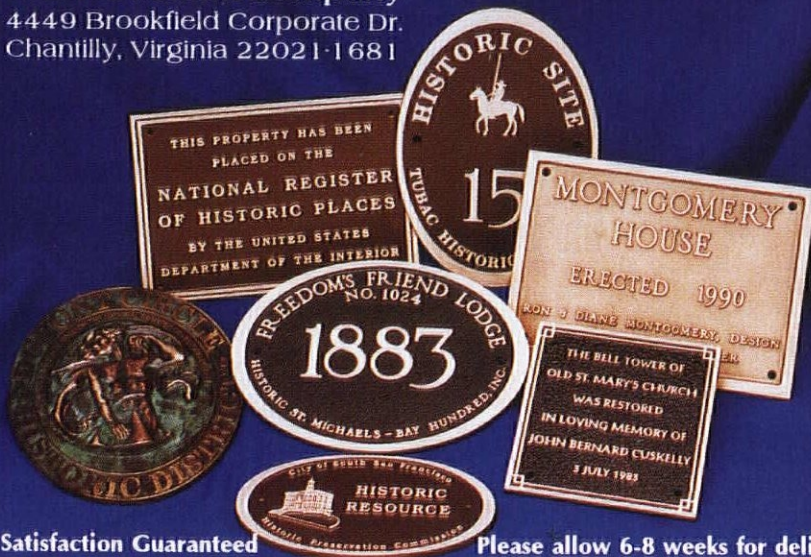
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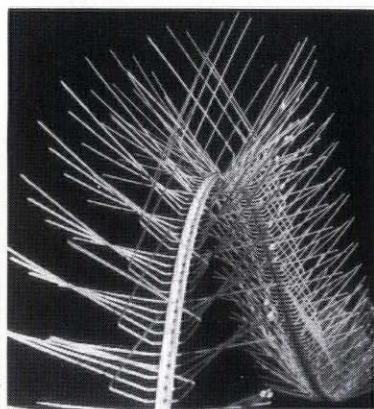
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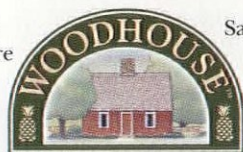


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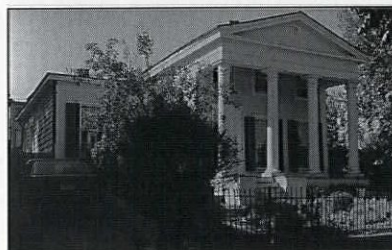
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Real Estate (continued)

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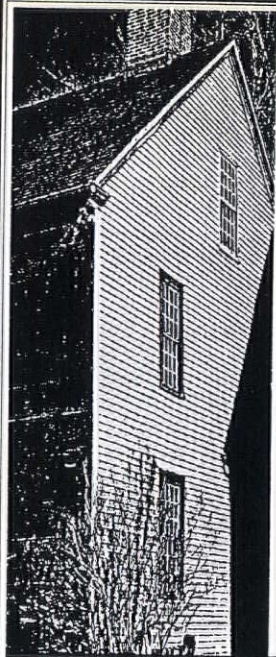
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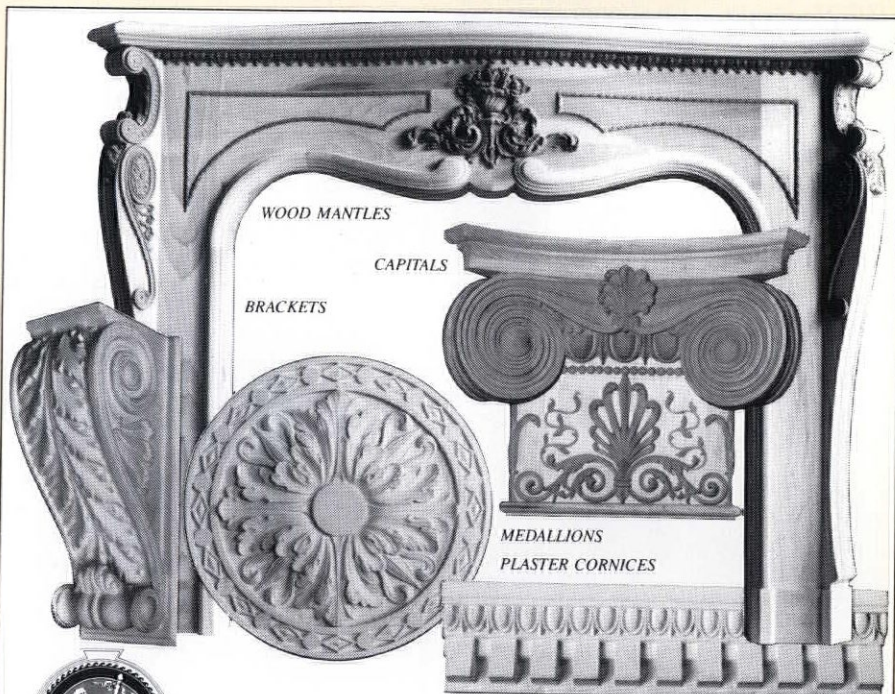
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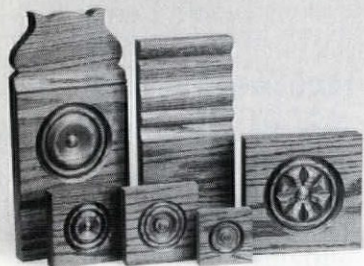
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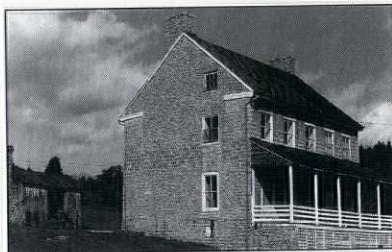
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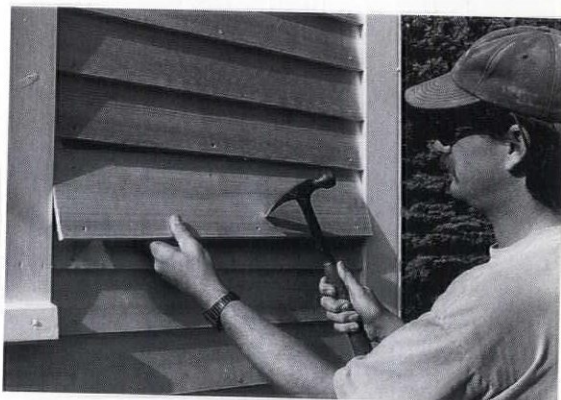
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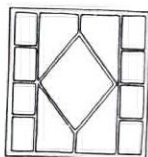
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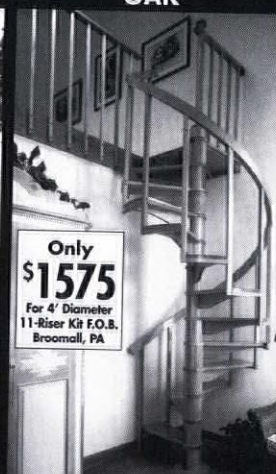
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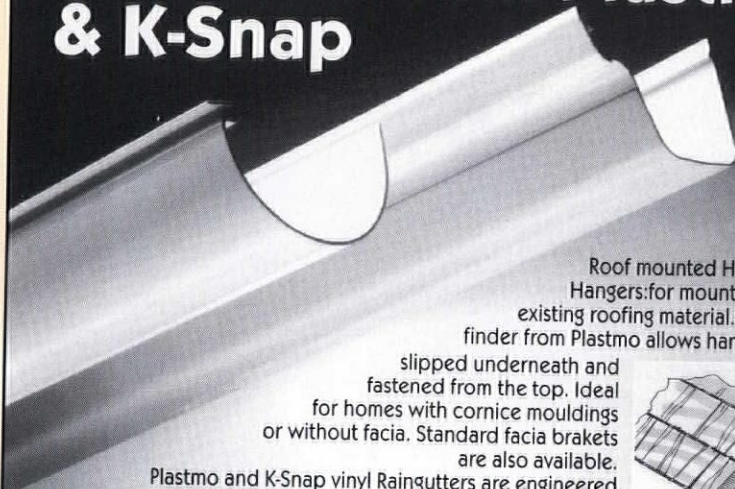
held on June 7, 1996 from 9 a.m. to 1 p.m. The cost is \$55. Contact the Preservation Institute, (802) 674-6752.

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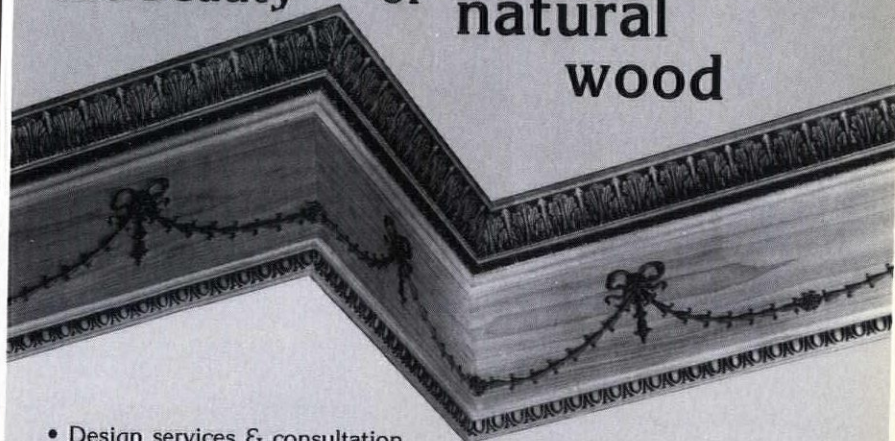
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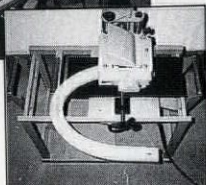
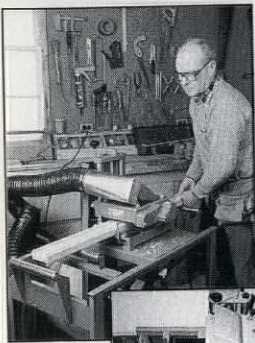


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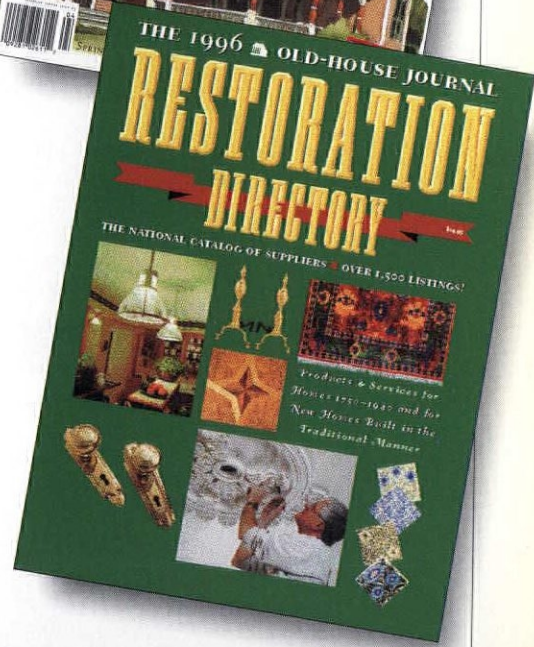
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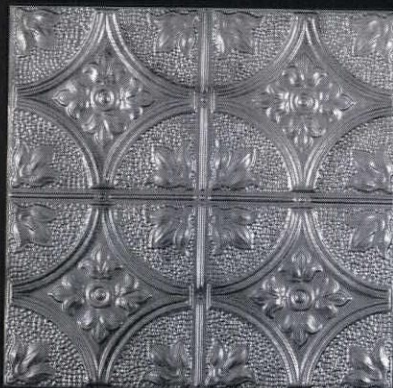
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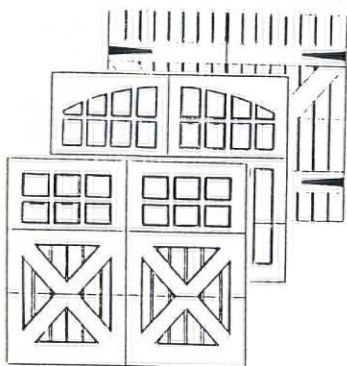
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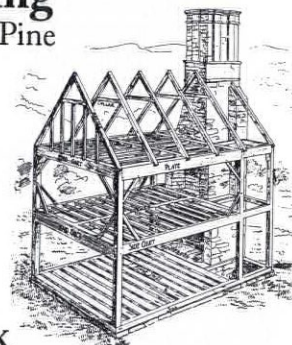
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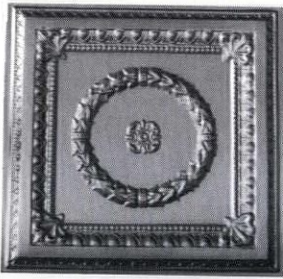



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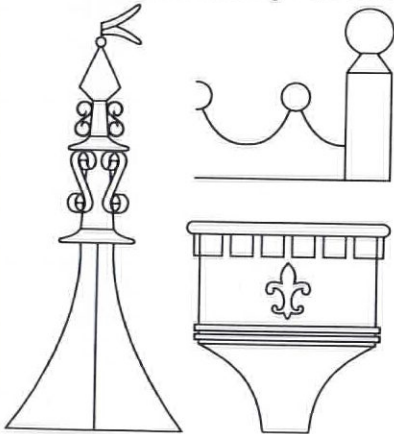
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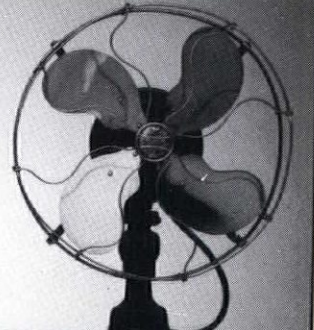
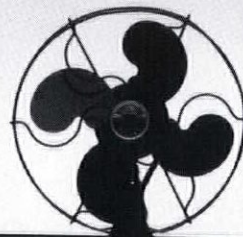
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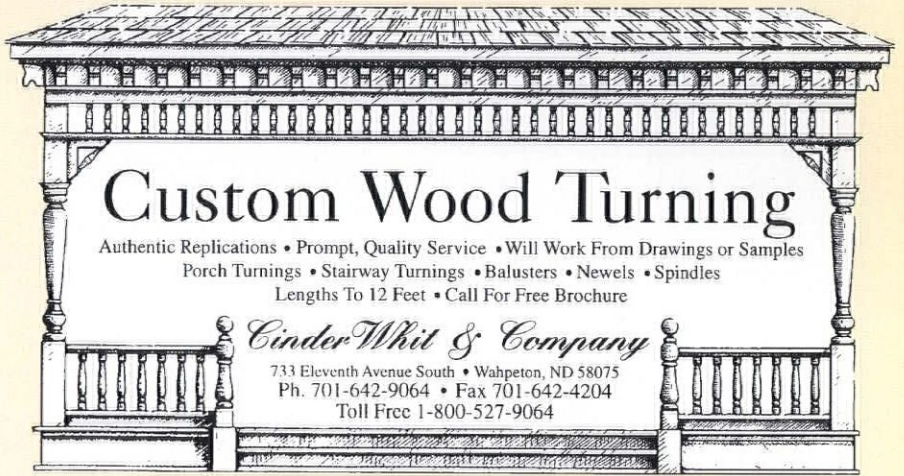
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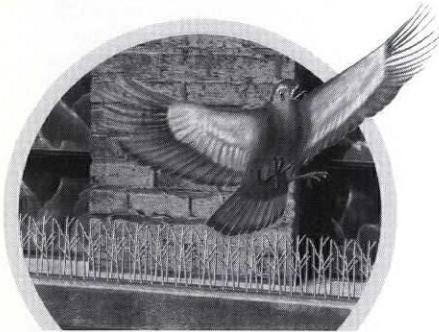
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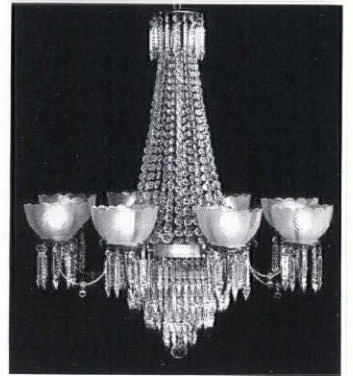
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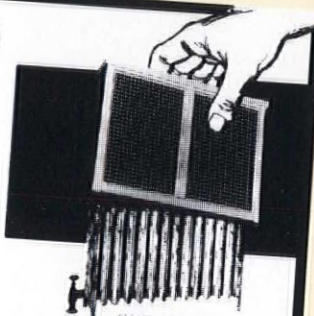
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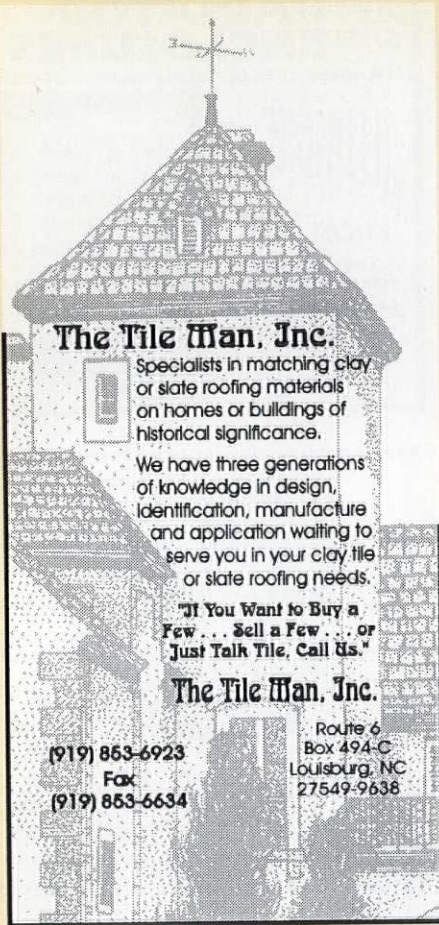
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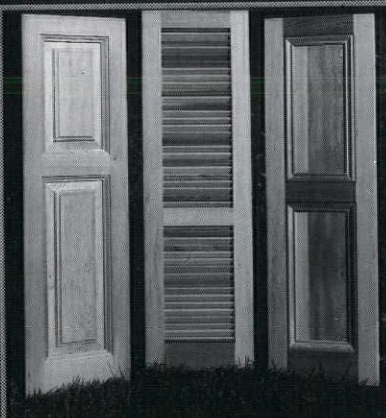
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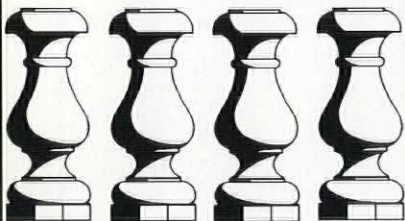
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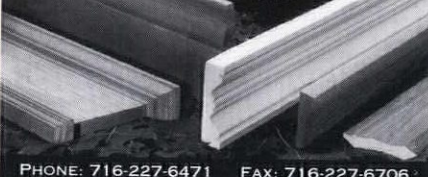
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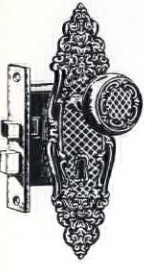
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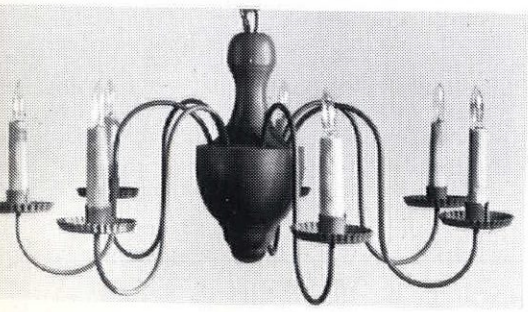
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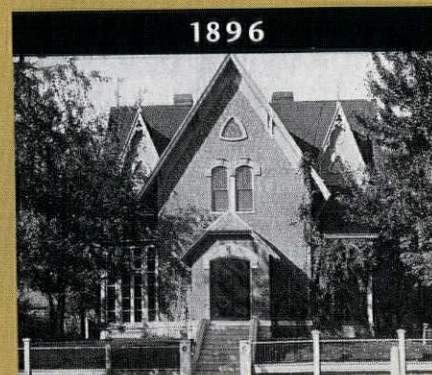
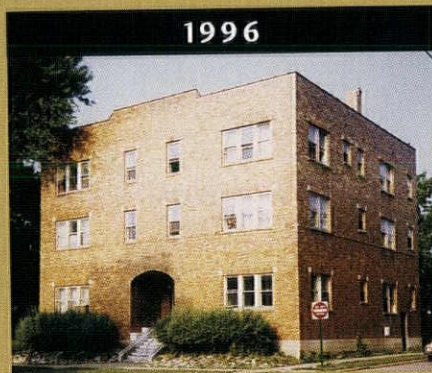
## Hide and Seek

**W**OULD YOU BELIEVE THAT A DEPRESSION-ERA APARTMENT building could conceal half an ornate, 19th-century Gothic Revival mansion? Sound impossible? Look closely at the stone steps in the 1996 photo (at right). They're the same ones you see in the 1896 photo. In fact, the original front doorway—complete with mailboxes and carved stone lintel—remains intact inside the new entrance!

When viewed from the side street, the game becomes clearer (above). For some reason, the brick addition only encloses the front wing of the house, leaving the rear portion exposed and unchanged—aside from decades of neglect. Nancy Toller, who lives nearby and sent in these photos, tells us that much of the original Victorian woodwork and Lincrusta finishes survive inside the apartments.

Back in 1896, this Gothic Revival mansion was distinguished enough to be featured in a survey of Richmond, Indiana's architectural gems.

Now much of it is secreted under a squared-off, monolithic facade. Like a child at play though, the mansion peeks out of its hiding place, waiting to see who will find it.



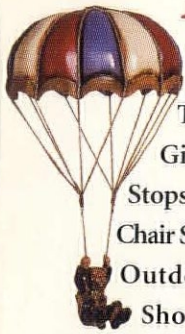
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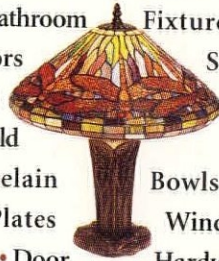


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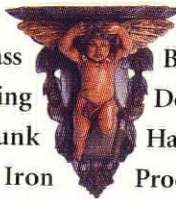
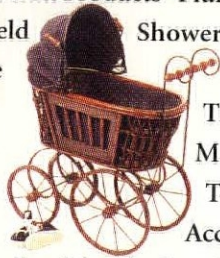
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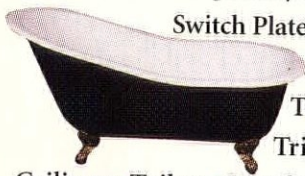
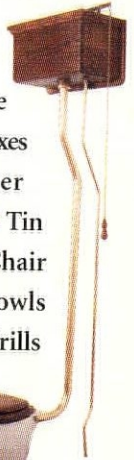
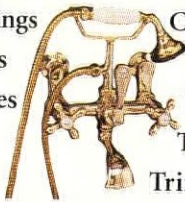
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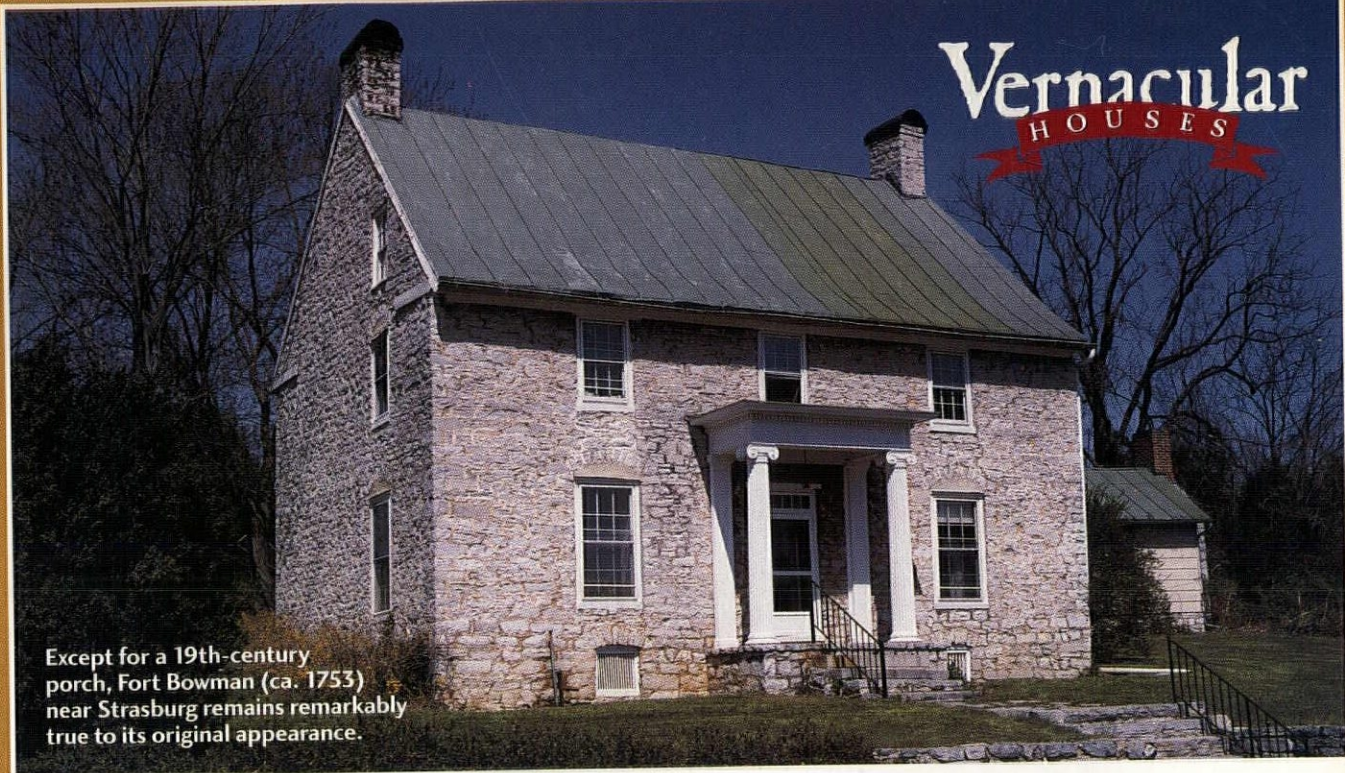
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Except for a 19th-century porch, Fort Bowman (ca. 1753) near Strasburg remains remarkably true to its original appearance.

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**I**N THE SHENANDOAH VALLEY—Virginia's western frontier in the 1750s—a German-speaking population built sturdy houses that blended Germanic features with up-to-date English Georgian plans.

Drawing on building traditions from various parts of western Europe (including Switzerland and the Netherlands, especially the Rhine and Palatinate areas), these settlers constructed two-and-a-half storey houses, preferably of the Valley's readily available limestone. Their houses had heavy timber framing and exceptionally steep gable roofs (up to 45 degrees) that turned up in a "kick" at the edges. Frequently the houses were "banked", or built into a hillside, so that the basement entrance was at ground level. This provided up to four storeys of living space (basement, first floor, second floor, and attic). The houses often shel-



Note the massive timber framing and basement entrance in this cross-section plan of Fort Bowman.

tered a spring or water course that ran through the basement. Except for low-arch stone lintels above the doors and windows, they had almost no ornamental detail.

Yet despite these Germanic characteristics, the homes of Valley

Germans often resembled those of their English neighbors because they borrowed the fashionable Georgian floorplan. They are nearly symmetrical, with end chimneys and a central front door (as opposed to a traditional Germanic center-chimney plan). What finally distinguished them from their English counterparts was the meticulous stonework, precipitous rooflines, and arched window and door heads.

Since Indian attacks were still a menace to Valley settlers, some of the largest houses were surrounded by tall palisades and used as "forts" where settlers could gather in times of danger. About 30 of these houses, some with names that recall their once-defensive roles, still survive in the Lower Shenandoah Valley.

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