Restoring Antique Masonry

BY GLADYS MONTGOMERY JONES

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This is a fireplace in trouble. Bricks are mounded in front of the hearth, and the firebox is a tattered puzzle of holes. Someone visible from the jeans down is standing inside, illuminating the smoke chamber with a work light. A large man stoops and exits.

"It looks like it's mostly there," he says. "There's the Victorian fireplace out front, behind that is a Rumford probably 1810 or so, then another of earlier brick, I'd say before 1750."

He shines the light into a hole in the firebox's side wall. "See? The original parging, or stucco. Dyed red."

"Can you restore the earliest one?"

He nods. "Yup. The chimney looks sound too."

If Richard Irons is confident where other masons might throw in their trowels, it is because he has learned from experience. Irons's expertise in antique masonry—using salvaged antique bricks and mortar formulas that date from the eighteenth century—may be one of the rarest specialties of all. He is one of few people who can look at a brick and tell you when it was made.

Irons, a mason since 1969, started in the trade to make extra money while teaching school and supporting a young family. His first moonlighting jobs were with a mason in

On a job in Gloucester, Massachusetts, antique masonry expert Richard Irons holds a fragment of filler made of early clay mortar mixed with clam and oyster shells. In coastal New England during the first part of the 18th century, when limestone for making lime mortar was relatively rare and costly, clam and oyster shells were often burned for their lime and crushed for the filler used inside the chimney.

PHOTOGRAPHS BY CRAIG BECKER

Salem, Massachusetts, a town with a lot of historic houses—and chimneys. "I saw an awful lot of mismatched work, 200-year-old fireplaces with small mortar joints patched with modern brick and thick gray joints," he says. Irons soon developed an interest in antique masonry. He estimates he has worked on more than 500 homes and house museums dating from 1650 to 1850 in northern New England in his thirty-year career. His sons work with him, including his eldest, Rick, whom he describes as his equal in knowledge and enthusiasm. What Irons calls his "gradual process of learning" was recognized in 1997 with an award for his contribution to historic preservation from Maine Preservation. He is the first person in the building trades to be thus honored.

"A structure that is 200 years old has proved itself," Irons says. "It's important to understand that these chimney structures do not need to be ripped out to get safe, workable fireplaces. It's also important to understand what period the chimney structure is, what the area's practices were, and what materials and techniques will work best in restoration."

Topped by an early, charred lintel fragment, bricks line up. Top and bottom rows show different sides of the same type of brick, left to right: large clay brick c. 1630-1730, smaller, harder Federal Period brick c. 1780-1820, almost modern Greek Revival brick c. 1840, modern brick. In the 1730-40s, bricks were generally about 8¼" x 4" x 2". Between 1750 and 1780, bricks diminished in size, with the smallest 18th-century brick being about 7¼" x 3¼" x 1¼". Modern bricks measure about 7⅞" x 3⅜" x 2⅛" inches.

Hearth and Home

The development of chimneys and fireplaces from the early 1600s through the mid-1800s, Irons says, is a story of technological advancement that produced greater safety, efficiency, and convenience.

The circa 1625 chimneys in the one-room dwellings of Plimoth Plantation were simply holes in the ceiling, sometimes with chimneys of wattle and daub covering interlocked green saplings. At one end of the room, a section of floor was marked off as a dirt hearth and surrounding walls were parged with clay. Bake ovens, not considered safe enough to be inside, were communal outdoor affairs. In New England, which was in the throes of a mini-ice age in the seventeenth century, they were brought inside fairly early.

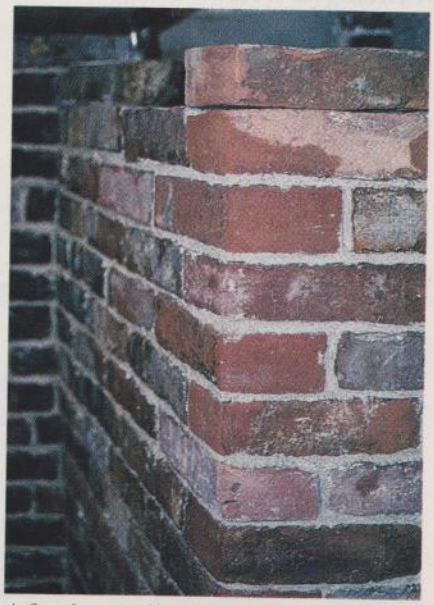
By 1629, brick works were operating in Boston, Salem, and other towns; rural masons were making bricks on site. Almost anyone with access to clay, sand, water, and wood had the materials to make brick. Public law decreed the size of bricks, what times of year clay could be dug, how long it had to cure before being formed into bricks, and when bricks could be fired. These codes helped ensure safety: if frozen clay is fired, its moisture content causes the bricks to explode in the kiln. Codes also ensured the safety of chimneys and fireplaces, which were subject to freezing and high temperatures and were in virtually continuous use.

Once survival became more secure, colonists built sturdier homes, using the post and beam construction methods they brought from England. Most First Period houses began as one large room, called the hall, where the family ate, slept, and lived. It was typically eighteen to twenty feet long and perhaps sixteen feet deep, with a chimney at one of the gable ends. Often, houses were one-over-one, with the space above the hall used for storage or as a bedchamber. Rhode Island's stone enders are one example of this design; elsewhere in New England, end chimneys were commonly concealed under clapboards.

"In early houses, the single most important architectural feature was the chimney. It literally gave them life," Irons says. In New England kitchens during the winter, fires were kept going day and night, and "brick chimney stacks retained some heat through the night, keeping at least a portion of the rooms through which they passed somewhat warmer than the outside walls," notes Jane Nylander in *Our Own Snug Fireside*.

These cooking fireplaces were very large—generally seven to nine feet wide, between four and five feet high and three and a half feet deep. Because of their size, they did not draw well or radiate much heat. Sometimes an indented rectangular smoke panel, centered on the firebox's rear wall, with a bottom lip that ran the length of the rear wall, served as a "smoke shelf" that projected cold air coming down the chimney out into the heat, which then rose up the chimney. Lintels of oak beams a foot or more square were installed "green." The hearth seldom extended more than two rows of brick into the room.

One or two bake ovens, sharing the flue



A fireplace under construction replicates an early corner: one clean angle between the front face and the side wall, another between the side and rear walls.

In Gloucester, a new fireplace, re-creating the c. 1740 one removed when the house's central chimney was gutted in the 1800s. The parging, or stucco, around the firebox, a common practice from 1650-1780 among those who couldn't afford to purchase imported tiles for their fireplace surrounds, was usually of the same lime plaster used on interior house walls, minus the hair binder. A common mistake in restoration and re-creation is to expose the brick.

A notch in the brick at the right edge of the bake oven opening is designed to hold the wooden door in place.

with the main firebox, were on the rear wall, or fireback, which rose straight up, and the back corners of the fireboxes usually formed 90-degree angles. Cooking pots were suspended from hooks hung on trammel rods laid across lugpoles (both of green wood), which rested in indentations in the chimney several feet above the lintel.

These fireplaces supported nearly every household function—cooking, cleaning, washing, soap and candle-making, yarn-dying, and more. On the inner hearth, several cooking fires were kept going at one time.

Houses literally grew up around their chimneys. In the eighteenth century, the south-facing center-chimney house became common in New England because either a house with an end chimney was added to or a new house was built as a two-over-two with a center chimney. Usually there was one cooking fireplace; however, joint ownership of houses—between a widow and her grown children or between two brothers, for instance—was common, so many parlor fireplaces were modified for cooking. In urban areas, some houses were built as multifamily dwellings and had bake ovens in the upstairs fireplaces.

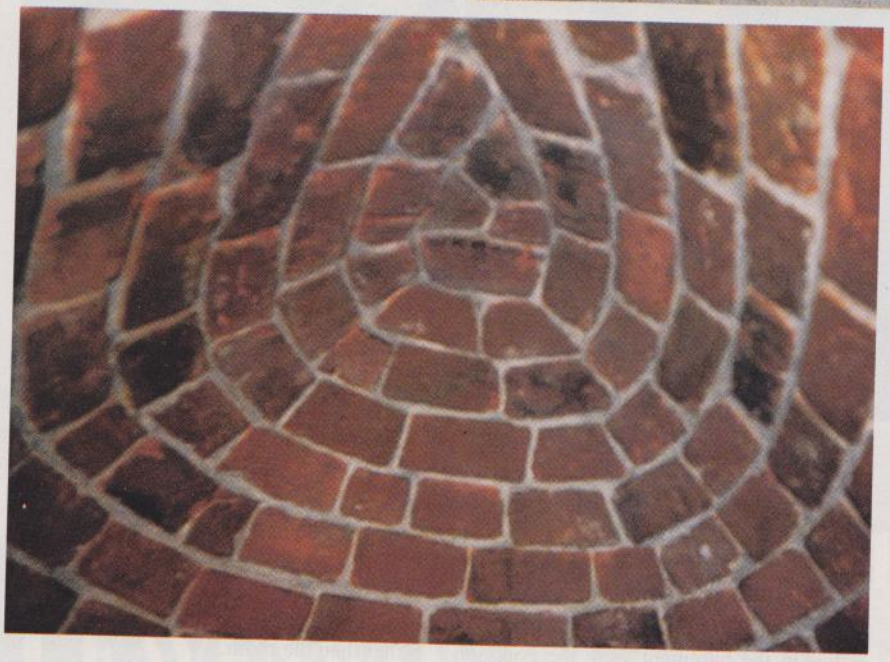
A house with a two-over-two design was sometimes expanded with a lean-to along its rear wall, creating a saltbox profile and a house with five or six fireplaces. Often, the kitchen was moved to the lean-to. If a lean-to fireplace was added to an existing chimney later, Irons says, its fireplace flues might be spliced into the side of the existing chimney. If a lean-to with a fireplace was built at the same time as the main house, the chimney appears more square and more centered on the roof ridge.

As New England prospered, builders adopted new designs. From 1750 to 1830, houses of the well-to-do were often built in a four-over-four plan with the chimneys

centered between the rooms and the fireplace openings parallel to the front of the house; a three-story house might have twelve fireplaces. Variations on this design placed chimneys on the gable ends or centered on the outside walls of each room. End chimneys were more common in the South, where qualities of heat retention in winter were not so important. Whatever the design of the house, the kitchen fireplace was typically the largest, followed by the other first-floor fireplaces, then progressively smaller ones on the second and third floors, which corresponded to lower ceiling heights there. Only occasionally was a fireplace in basement or attic rooms.

After 1750, bake ovens gradually moved to the front of the fireplace, while iron cranes that hung on the firebox's side wall gradually replaced the overhead trammel and hook system. The angle at the juncture of the fireplace's rear and side walls gradually widened, heating fireplaces continued to decrease in size, and the size of earlier fireplaces, particularly the large walk-ins, was reduced by building smaller fireboxes within them. "I've seen as many as five fireplaces stacked like bowls inside an original walk-in," Irons says. "The archaeology—probing into a fireplace structure and solving the puzzle—is the part of my work I like best."

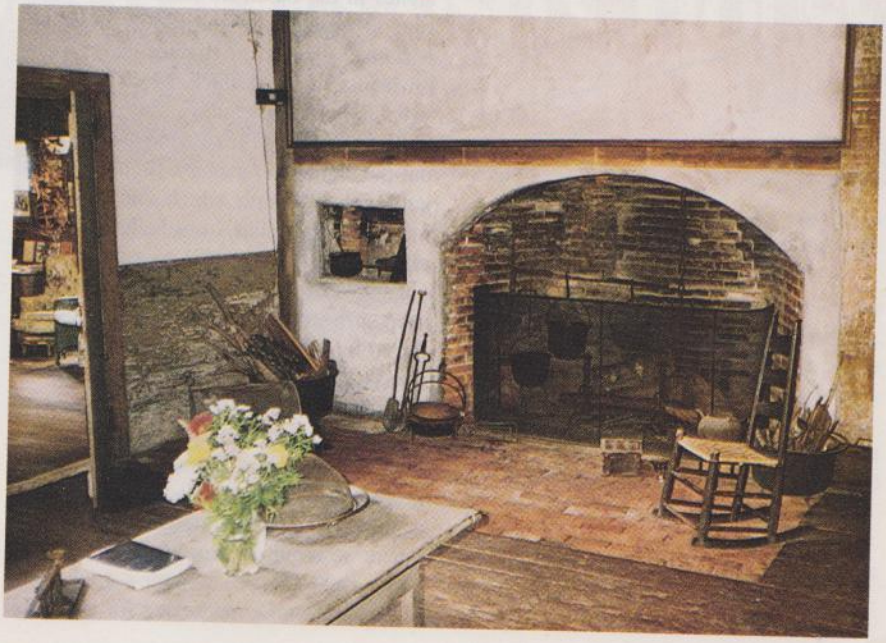
By the mid-1700s, bake ovens, still with their tin and wood doors and using the flue from the main firebox, began to be placed in a step about halfway between the fireback and the front of the fireplace. By the last quarter of the eighteenth century, new bake ovens, sometimes with their own dedicated flues, were being built at the front of the fireplace. By the 1830s, the bake oven door



To create a replica of an early chimney, a configuration of back-to-back cooking and parlor fireplaces is laid out in brick. The circular bake ovens will both open from the cooking fireplace.

The inside of a bake oven, showing the domed shape that gives them the nickname "beehive."

This fireplace in the 1762 Pownalborough Court House in Dresden is something of an anomaly for Maine. Both the arched opening (often associated with 20th-century Colonial Revival designs) and the fully parged front are believed to be original, as is the bake oven at the front of the fireplace.



PHOTOGRAPHS BY RICHARD AND RICK IRONS

A row of "soldier," or standing, c. 1780 bricks are the starter course for a bake oven in the construction of a new central chimney to replace one removed from a c. 1740 house in Gloucester, Massachusetts.

was cast iron with a small sliding air intake window and damper.

Chimney footings also evolved. Through the first quarter of the eighteenth century, chimneys had fieldstone bases, sometimes measuring as much as twenty by eighteen feet. By the 1740s, big brick arches in the basement were the common support structure; by the 1830s, these supports had evolved to straight piers, sometimes just one brick thick, which can cause structural problems today.

Starting in the First Period and throughout the eighteenth century, fireplaces were built with an ash pit, which sometimes had a trap into the cellar. Irons believes the ash pit may have been used to store smaller quantities of the fine ash used for making soap or to store the smaller, select logs preferred for firing the bake oven. Less common was a chamber for smoking meat, sometimes built in beside the front staircase, which hugged the center chimney, or in the attic, where it could operate on the heat from the main fireplaces; occasionally, a smoke chamber is found in the basement, where it required a separate fire. From about 1800-45, the set kettle—a tub made of tin, brass, or copper used for steaming, washing, and other chores—was inset into a brick structure at the corner of the hearth above an ash pit with a flue connecting it to a fireplace flue. And, to improve their draw, some fireplaces had a brick-sized hole in a side wall near the hearth, enabling the fire to draw oxygen from the cold basement rather than the room.

In 1795, Count Benjamin Rumford, a Woburn, Massachusetts, inventor, published a treatise on fireplaces that represented a technological breakthrough. The Rumford fireplace included several key features. First, twelve inches above the lintel, a three- to four-inch smoke shelf, indented toward the back of the chimney, circulated the downpour of cold air into the fire, hot air into the room, and smoke up the chimney. Second, the fireback began to slant inward fifteen inches above the hearth. Third, the length of the fireback equaled the depth of the firebox. Fourth, the width of the firebox opening equaled two to three times the depth of the firebox, as measured from the midpoints of the opening and the fireback, meaning that the sides of the firebox slanted to form a wider angle of about 135 degrees with the fireback. Finally, the height of the

CONTINUED ON PAGE 66