Basic Timber Framing Exposed

by H. Weber Wilson

The era before 1840 can be called the time of the hand-hewn house. It was a time when pre-cut dimensioned lumber was not readily available in most areas of the U.S., and when nails were still a rare and expensive item.

As a result, the basic method of building a house was radically different from the techniques used today.

The Basic Difference

These hand-hewn houses were started by completely framing up the structure with large, hand-cut timbers held together with wooden pegs ("tree nails"). The entire weight of the structure was carried on the massive beams, rather than through the whole wall as is the case with balloon framing.

The studs and boards added between the main framing timbers were merely fill-in materials to keep the wind and rain out. This method also was called "post and beam" construction.

Framing with massive timbers was a carry-over from medieval Europe, where the in-fill material often was bricks and stucco inserted between the beams. Sometimes it was just "wattle-and-daub"—a straw and mud mixture applied over crude lath. This frame plus in-fill gave the characteristic appearance to European "half-timbered" houses that we see imitated in Tudor-style homes today.

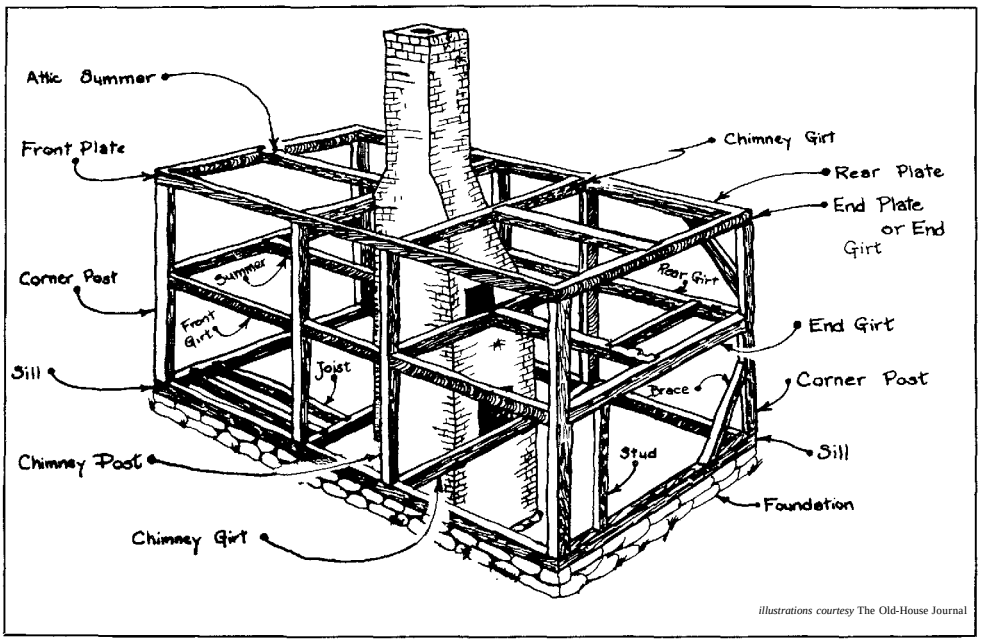
Settlers in the new world, however, found weather changes much more severe than those in Europe. This meant that structures expanded and contracted a lot more than they had in the old country. As a result, cracks tended to develop between the in-fill and the main framing timbers. The solution was to apply "weather boards" (we now call them clapboards) over the entire exterior to keep out the wind and rain.

Because of the boards covering the exterior, it's sometimes difficult to tell at a glance whether a Colonial home is a hand-hewn structure built in 1776 or a clever reproduction built in 1976. But if you could see the kind of framing underneath the skin, there would be no difficulty in making an instant identification.

Most timber-framed houses give themselves away inside, however. Many corners have tell-tale bulges where the big timbers pass through the walls. Originally, these timbers were very carefully encased with smooth, planed-boards. (Sometimes, alas, these casings are removed by people who prefer the "rustic" look of the hewn timbers.)

Framing & Joining Methods

In the era of hand-hewn houses, each builder solved the inherent problems of construction a little differently. That's why these old structures are so fascinating to study in detail. However, there were certain fundamentals that governed timber-frame houses.



illustrations courtesy The Old-House Journal

In New England, the building would be centered around massive hearths and a chimney. Normally there would be a cellar, and then an underpinning of stone that was laid in "shovel deep" to serve as a foundation.

After the foundations were built up to ground level, the sills were laid on. Remaining timbers were laid out on the ground, connected in sections, and then raised with the help of many hands (and the best liquid refreshment).

Tools of the Trade

Getting the timbers ready for assembly required many hours of arm-aching work. All the mortise-and-tenon and dovetail joints had to be carefully cut in advance. This required knowledge of several specialized tools—tools that are long forgotten now, but which were indispensible then.

The "adz," a razor-sharp, axe-like tool, was used to square off the tops of logs.

Another tool for squaring logs was the broad axe, a wide-bladed, short-handled axe used by a man standing alongside the log to be shaped. Before "broadaxing" (with the grain), the log was scored with a felling axe perpendicular to the grain.

When you examine an old hand-hewn beam, you usually can see the marks of these two types of axe trokes. But in the hands of an expert, the broad axe can shape a log almost as smoothly as a plane.

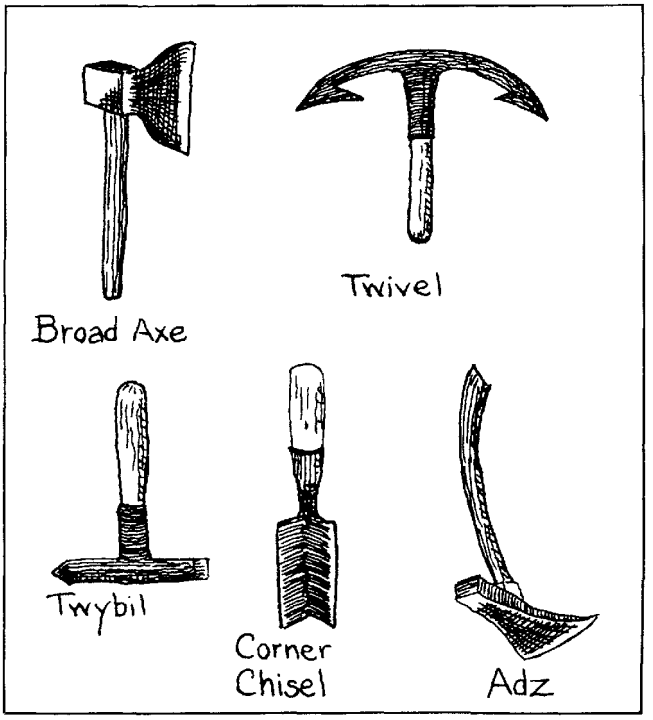
Tenons were relatively simple to form, since they could be sawn or split from the end of a beam. But forming a mortise required the digging out of a perfectly shaped rectangular opening from a stout timber.

To aid in this work, a couple of implements with the unlikely names of "twybil" and "twivel" were used.

The twybil actually was two chisels at each end of a single piece of metal with a handle in the middle. The blades were at right angles to one another, which enabled the joiner to cut both the ends and the sides of a mortise by merely reversing the ends of the tool. He didn't have to move.

The twivel was of similar construction, except that the two cutting ends were hook-shaped and sharpened. It was used to shave wood from the sides of the mortise with an easy chopping motion.

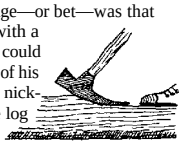
A corner chisel with a right-angled cutting edge was used to make square corners



The Adzman Cometh

In the days when neighbors gathered for a "house raising," there sometimes was a little contest between the "adzmen"—the fellows who stood atop a log with a razor-sharp, axe-like tool and moved steadily forward, chopping the top of the log smooth and flat just in front of their leading foot.

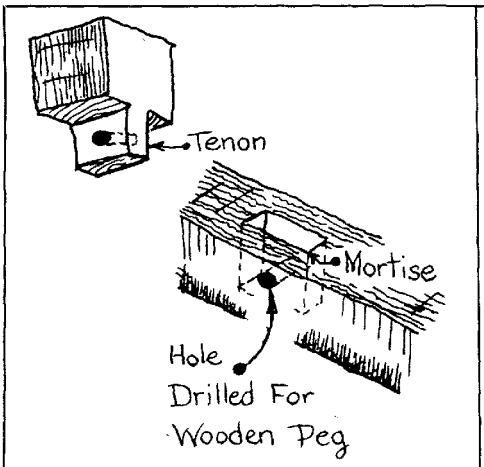
The challenge—or bet—was that an adzman, with a single stroke, could split the sole of his boot without nicking either the log below or his several toes above.

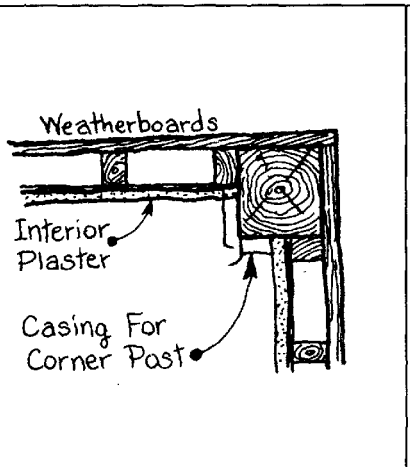


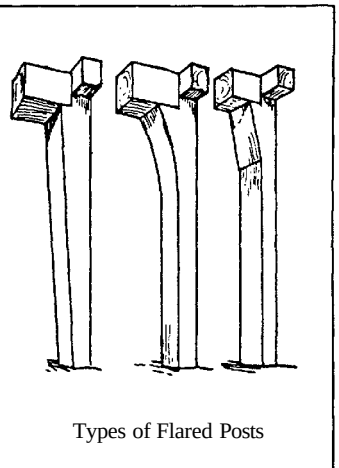
Other tasks of house building didn't require such stringent tests of nerve. But it still took a lot of skill and hard work to properly manipulate the special tools that fashioned rock-hard oak into the various building timbers.

By and large, the houses were well built; they have proved able to survive 200 years and then some. Those that have been lost usually have fallen not to structural defects, but to fire or the hand of man.■

—H. W. W.

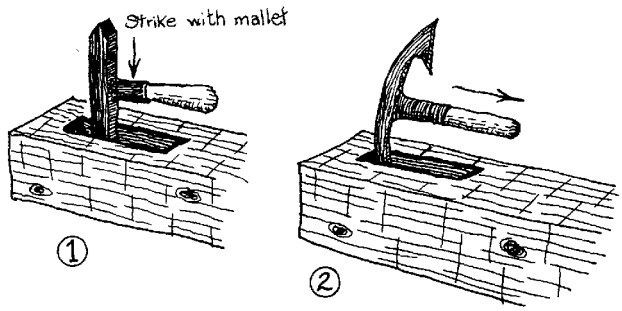




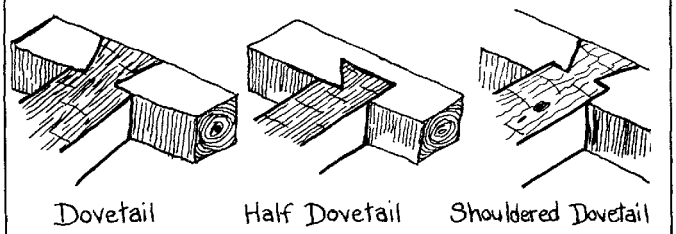


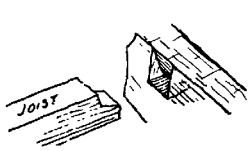
Types of Flared Posts

Cutting a Mortise

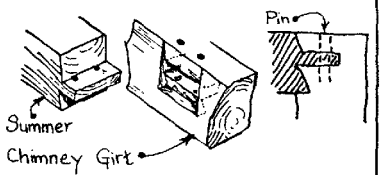


First, sides and ends of the mortise are shaped by striking the twybil. Blades at each end are at right angles to each other, so the user can form sides and ends merely by reversing the tool. In the second illustration, the twivel is pulled to shave the sides of the mortise.





TUSK TENON



TUSK AND TENON

in the mortise. Depending on the specific cuts to be made, other tools might come into play, such as the mortising axe and other specialized mortising chisels.

For final smoothing of joists and other small framing members, sometimes a "slick" was employed. This was a giant paring chisel, pushed from the shoulder, with a blade up to four inches wide and an overall length of three feet.

Putting the Pieces Together

Fascinating variations in timber-frame construction show up when you examine the ways that the posts and beams actually were connected. Individual housewrights would develop their own special ways of making joints and connecting timbers. Frequently one finds ingenious combinations of mortises, tenons and dovetails.

Wooden pegs usually were hammered through the connections. Often the builder would add to the rigidity of the frame by using a "draw-bore" tenon.

In this connection, the holes drilled through the mortise and tenon were purposely out of alignment slightly. This meant that the connecting oak pin would have to bend slightly to pass through the holes, thus ensuring the tightness of the connection.

This little trick of Colonial construction has caused great frustration to many modern-day disassemblers, who can't for the life of themselves knock out the pin holding the end girt to the corner post.

In the typical house, there were four corner posts and four chimney posts. These eight posts carried the entire weight of the floors, walls and roof, and they normally were two stories high.

In order to improve the load-bearing capacity, the posts usually were flared out where the girts connected. A typical 8" by 10" post would flare out three or four inches underneath each girt. Innumerable variations of this transplanted European building method are found because each builder had his own ideas as to what was the easiest, strongest and most attractive style.

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Most important among the internal framing timbers is the "summer beam," or "summer tree." This massive span of wood was laid between the end and chimney girts—and sometimes one also is found between the sills and the girts of the first floor as well.

Its purpose was to provide a midpoint at which to frame in the floor joists. Summers have been found as big as 9" by 17". ■

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