The Advantages of Balloon Frame
Exam #2 • Question #1

Rachel Johnson
American Building Construction History
March 1, 2007
“The invention in 1832 of a new system for erecting wooden buildings called Balloon Framing helped to make possible the phenomenal growth of American cities in the treeless regions west of Chicago during the 19th century.”

- Paul Sprague

Balloon framing is a system of construction that utilizes lighter wooden elements than traditional braced framing, and a version of it (platform framing) continues to be employed as the main method of wooden frame construction in the US today. In this essay I will describe the history of balloon framing, define the elements of balloon frame construction, and explain some of its advantages over traditional timber construction.

According to architectural historian Paul E. Sprague, balloon framing was first used by George Washington Snow in the construction of a warehouse in Chicago in 1832. Previously, historian and architecture critic Siegfried Giedion believed that the first use of balloon framing was by George Washington Snow, but in 1833—not 1832—on St. Mary’s Church in Chicago. Sprague disproved Giedion’s theory in his 1981

---

The use of the term “balloon” construction was originally derisive, “presumably by persons who expected his [Snow’s] lightly built structure to be blown away in the first storm.”

According to historian Kingston Heath, “The balloon frame is clearly a product of the American Industrial Revolution.” It is characterized by its use of thinner, standardized sawn framing members and machine-made nails, as opposed to the heavy timbers and complicated joinery used in traditional wooden construction methods. Balloon framing utilizes continuous vertical framing members, called studs, which carry an equal distribution of the building’s vertical compressive load. The studs are usually 2x6 or 2x4 inches and are placed approximately sixteen inches apart. (See Figure 1) A major difference between balloon frame and previous wood framing techniques is its lack of girts, the horizontal framing members that held together the individuals bays of traditional framed buildings. Instead of girts, balloon framing utilizes the outer sheathing to make the buildings rigid, and the floor joists of upper stories rest on ledgers that are nailed horizontally across the studs. Before balloon framing was “invented,” traditional wood frame buildings, or braced frame buildings, had “diagonal

---

3 Sprague, “Chicago Balloon Frame,” p. 36.
5 Ibid., p. 899.
members between the posts, sills, and girts to brace the structure against wind pressure.”

“The principal advantages that the balloon frame had over the traditional jointed frame were that it used one third the volume of lumber, involved less construction time and required less skilled labor. As a result, the balloon frame cost c.40% less to construct.” The use of the machine cut nails was much less expensive than hand-wrought nails, and because the nails were used to attach all parts of the frame, no time-consuming mortise and tenon joinery or skilled carpenters were needed. Dell Upton succinctly explains the industrialization of the building process, “After about 1790, nails could be cut rapidly and mechanically from sheets of iron. Forty years later, the invention of a machine to form heads on cut nails gave nailing the edge over joinery in speed and labor costs. The invention of fast steam-powered circular saws augmented balloon framing’s advantages after 1840.”

The cheap balloon frame buildings could even be prefabricated and shipped out via the railroad to the rapidly developing American West. Upton describes the mechanization of the building process, “the individual carpenter or building worker who devoted a variety of subtle skills to creating a unique building on site gave way to the off-site machinist. Whose equally subtle skills created a machine that could make many parts for many buildings at once. In short, building skill

---

were not eliminated so much as centralized." The prefabricated balloon frame buildings were obviously an innovative technological breakthrough because one Chicago-style balloon frame “Illinois cottage” was displayed at the Paris Exhibition if 1867. Homes and other buildings could now be bought through catalogues!

Balloon framing evolved into several variations, including “western” or “platform” (See figure 2) which eventually led to modern wood framed construction. Balloon framing was certainly an innovation derived from necessity that almost perfectly fit the industrial and social climate in the United States during the second half of the 19th century. It allowed for rapid growth in western towns, and provided affordable housing for many Americans. Sprague explains his esteem for the man who made it possible, “For a technological innovation that has had so vast an influence on the structural characteristics of wooden buildings in North America during the last 150 years, it is really quite remarkable to think that balloon framing was invented by one individual and worked out in the construction of a single building . . . . It was an achievement of such a magnitude as to insure for George Washington Snow a

---

9 Ibid., p. 154.
10 Sprague, “Chicago Balloon Frame,” p. 42

Figure 2 - Isometric drawing of the Western Frame, from Paul E. Sprague’s “Chicago Balloon Frame,” p. 48.
significant and permanent place in the annals of building technology history."\textsuperscript{11}

\begin{footnote}
\textsuperscript{11} Ibid., p. 49.
\end{footnote}
Bibliography


