

SECTION III: TIMBER BRIDGES

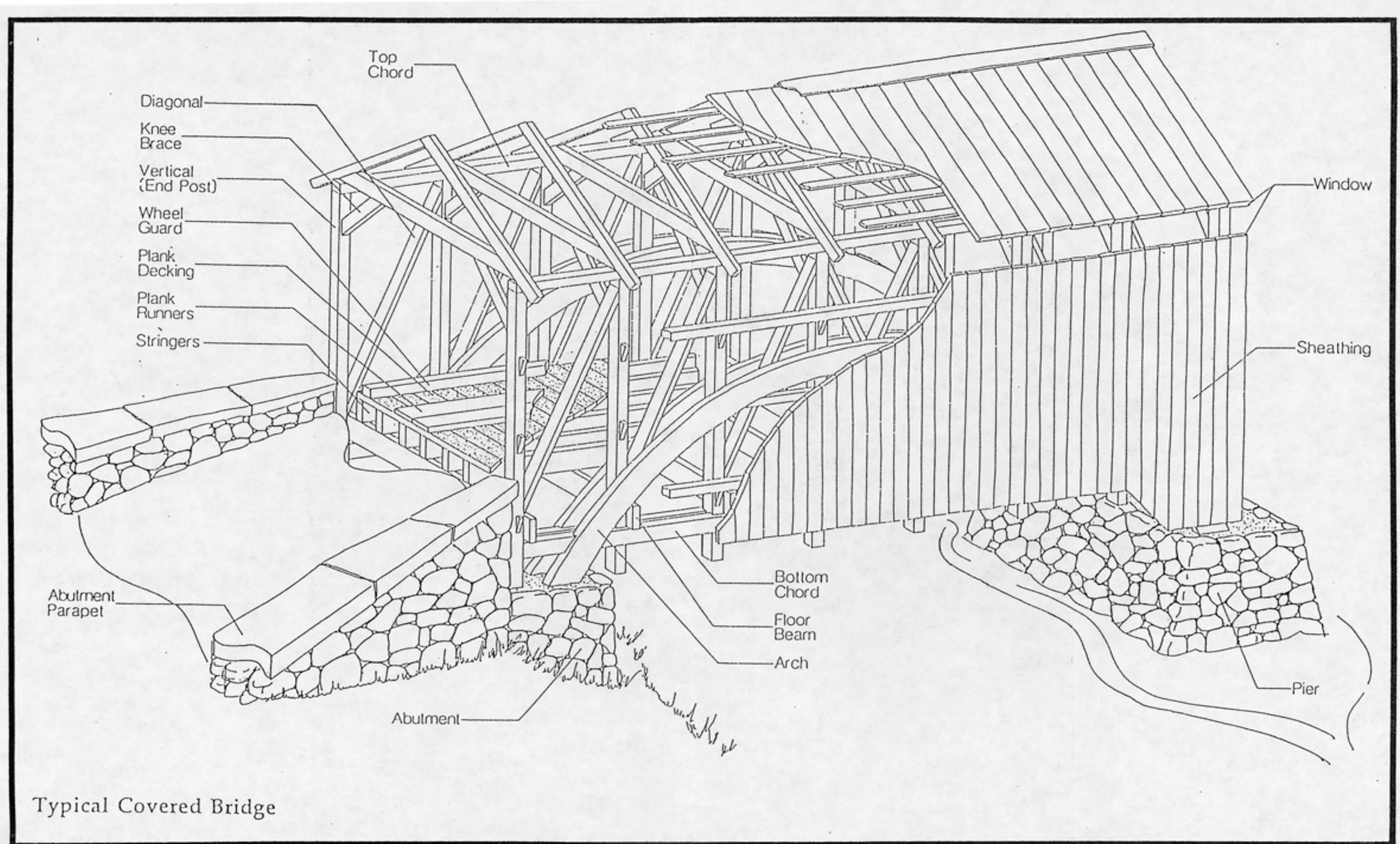
HISTORICAL DEVELOPMENT

The earliest bridges built in North America were timber bridges. According to one account, European settlers at first utilized the bridges constructed by the Native American populations, which consisted of tied timbers laid across upturned forked tree trunks (American Association of State Highway Officials 1953a:19). This design was adopted by the settlers, who then modified the design by hewing the upper portions of the timbers to provide a flat surface and by adding a handrail to one side (American Society of Civil Engineers 1976:143). Where crossings exceeded the length of the available timber, short spans were joined and supported on wood piles or on timber cribs filled with earth or stone. In fact, the earliest recorded timber bridge-like structure built by European settlers in America was most likely this type of design. Constructed in 1611 on James Towne Island, Virginia, this timber bridge extended approximately 200 feet into the water and provided docking facilities in the 12-foot-deep channel (American Association of State Highway Officials 1953a:19).

These early techniques of timber beam bridge building were utilized extensively in the seventeenth and eighteenth centuries, with varying degrees of sophistication. In 1662, a timber crib-type bridge, known as the "Great Bridge," was constructed over the Charles River between Old Cambridge and Brighton, Massachusetts. In 1761, a 270-foot-long timber bridge was constructed over the York River in York, Maine by Major Samuel Sewall. It was supported by thirteen bents consisting of four piles each and had a center draw span that "provided a sufficient way for sloops to pass and repass through the bridge" (American Society of Civil Engineers 1976:149). One of the largest early bridges constructed with a draw span was the Boston-Charlestown bridge over the Charles River. It was 1,503 feet long and 42 feet wide, resting on 75 pile-type piers. The bridge had a six-foot-wide railed-in pedestrian walkway and was illuminated by forty "elegant" lamps (American Society of Civil Engineers 1976:150).

These examples illustrate the pinnacle of this simple, timber beam bridge construction in America. Needing to increase the length of individual spans, master carpenters and builders soon began to experiment with new bridge designs that utilized timber arch and truss forms, as well as combinations of the two, with varying degrees of success (Figures 5 and 6; Plates 1 and 2).

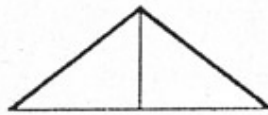
Timothy Palmer (1751-1821), a carpenter from New England, was one of the earliest American pioneers of timber arch building. In 1794, he designed the Piscataqua Bridge,



Typical Covered Bridge

FIGURE 5: Typical Covered Bridge

SOURCE: Pennsylvania Historical and Museum Commission and Pennsylvania Department of Transportation 1986

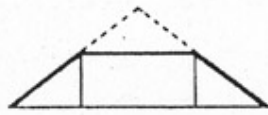


KING POST

(WOOD)

A TRADITIONAL TRUSS TYPE WITH ITS ORIGINS IN THE MIDDLE AGES.

LENGTH: 20-60 FEET
6-18 METERS

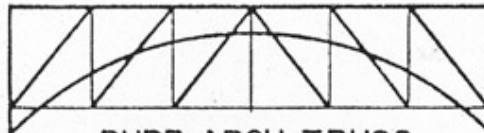


QUEEN POST

(WOOD)

A LENGTHENED VERSION OF THE KING POST.

LENGTH: 20-80 FEET
6-24 METERS



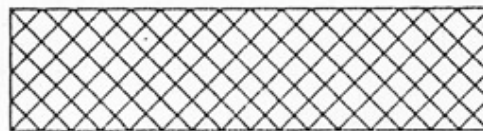
BURR ARCH TRUSS

1804- LATE 19TH CENTURY

(WOOD)

COMBINATION OF A WOODEN ARCH WITH A MULTIPLE KING POST. (ARCH ALSO COMBINED WITH LATER WOODEN TRUSSES).

LENGTH: 50-175 FEET
15-50 METERS



TOWN LATTICE

1820- LATE 19TH CENTURY

(WOOD)

A SYSTEM OF CROSS-HATCHED WOODEN DIAGONALS WITH NO VERTICALS.

LENGTH: 50-220 FEET
15-66 METERS

FIGURE 6: Wood Truss Types

SOURCE: Allen and Jackson 1975