SECTION V: METAL TRUSS BRIDGES

HISTORICAL DEVELOPMENT

Truss bridges built in either iron or steel constitute a large number of Maryland's known historic bridges. These bridges, designed and constructed in a wide variety of types during the nineteenth and twentieth centuries, are among the most familiar historic bridges in the state. The type is widely recognized, taking second place only to timber-covered bridges and stone arch spans in their attractiveness to feature writers for newspapers and magazines. Metal truss bridges possess a significant technological history directly reflecting the evolution of Maryland's transportation network.

Prominent American highway and bridge engineer Milo S. Ketchum in his 1908 work *The Design of Highway Bridges and the Calculation of Stresses in Bridge Trusses* offered the following, succinct definition of a truss bridge:

> A truss is a framework composed of individual members so fastened together that loads applied at the joints produce only direct tension or compression. The triangle is the only geometrical figure in which the form is changed only by changing the lengths of the sides. In its simplest form every truss is a triangle or a combination of triangles. The members of the truss are either fastened together with pins, pin-connected, or with plates and rivets, riveted [Ketchum 1908:1].

Whereas a simply supported beam bridge spanning between abutments is subject to direct bending, with one structural member carrying both compressive and tensile stresses, the members of a truss individually carry only tensile or compressive stresses. The distribution of tensile (pulling a member apart) and compressive (pushing a member together) forces varies with the many types of trusses (Figures 8 through 11; Plate 5).

As presented in the Timber Bridges section of this report, construction of truss bridges in the United States originally began in the late eighteenth century utilizing timber as the basic building material. Renaissance architect Andrea Palladio's pioneering discussion of trusses was translated and circulated here as early as the 1740s, while in Europe during the late 1700s such innovative builders as the Grubenmanns erected covered wooden truss bridges in mountainous areas (Pennsylvania Historical and Museum Commission, and Pennsylvania Department of Transportation 1986:109-126).

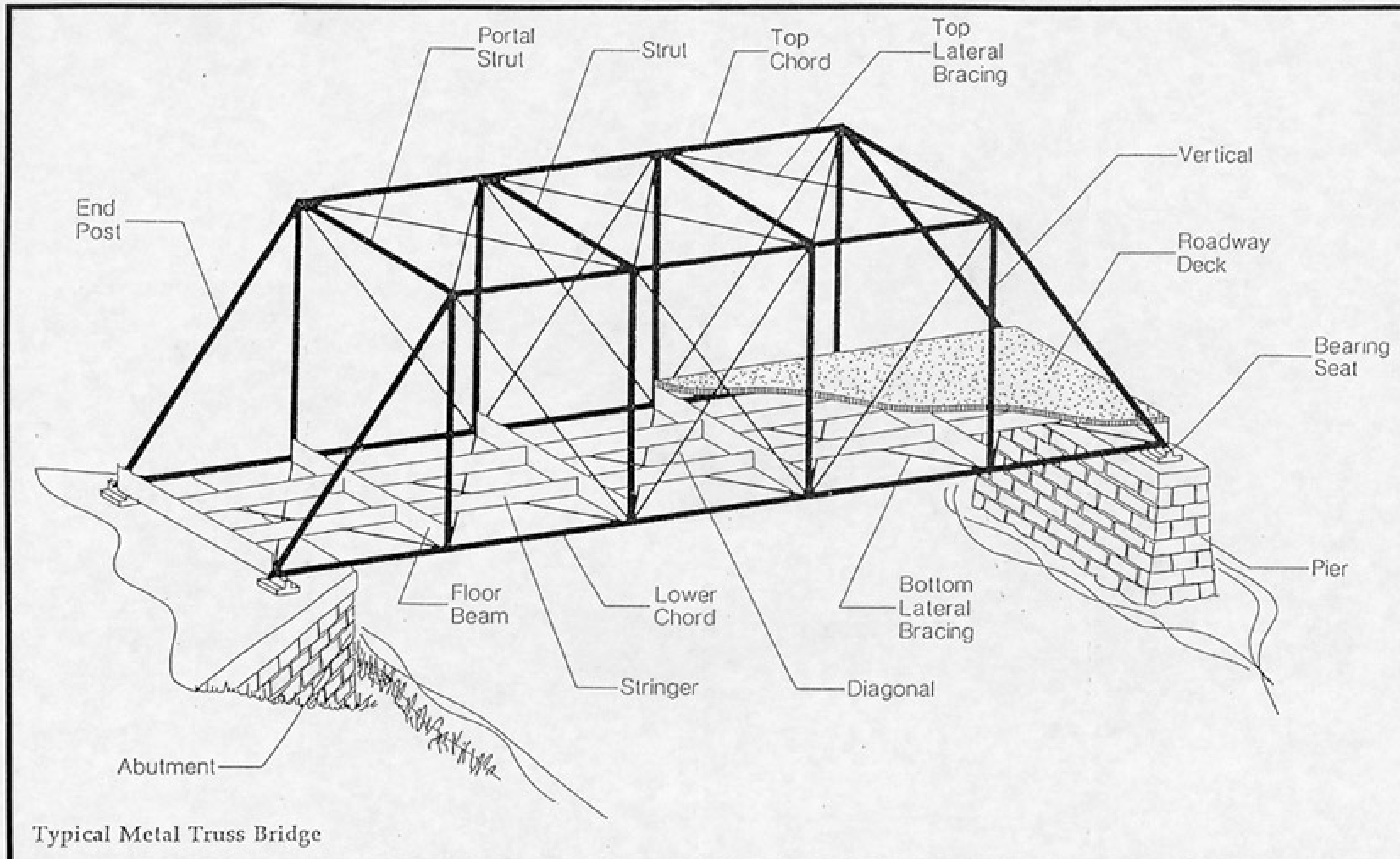

FIGURE 8: Typical Metal Truss Bridge

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

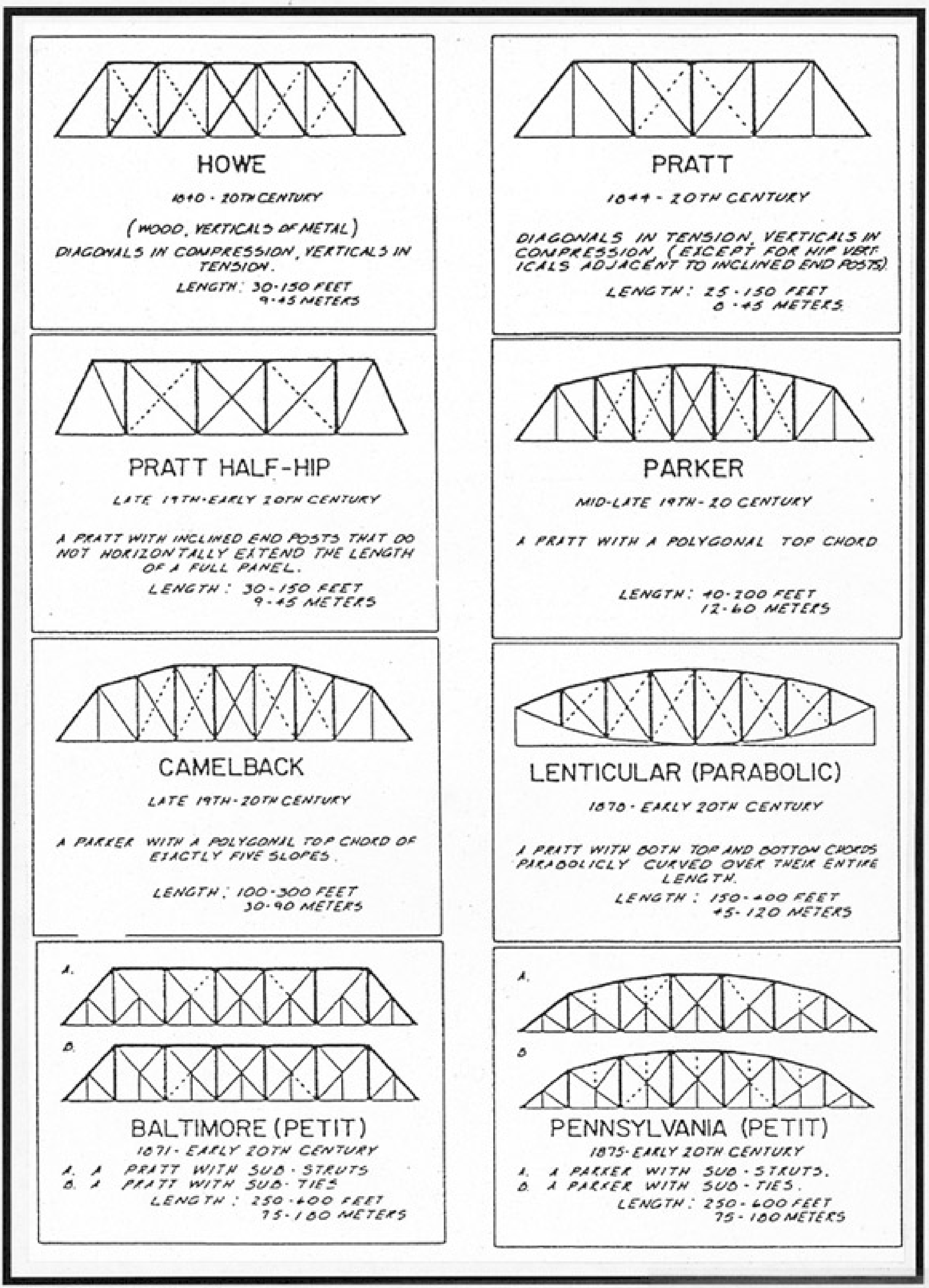

FIGURE 9: Metal Truss Types

SOURCE: Allen and Jackson 1975

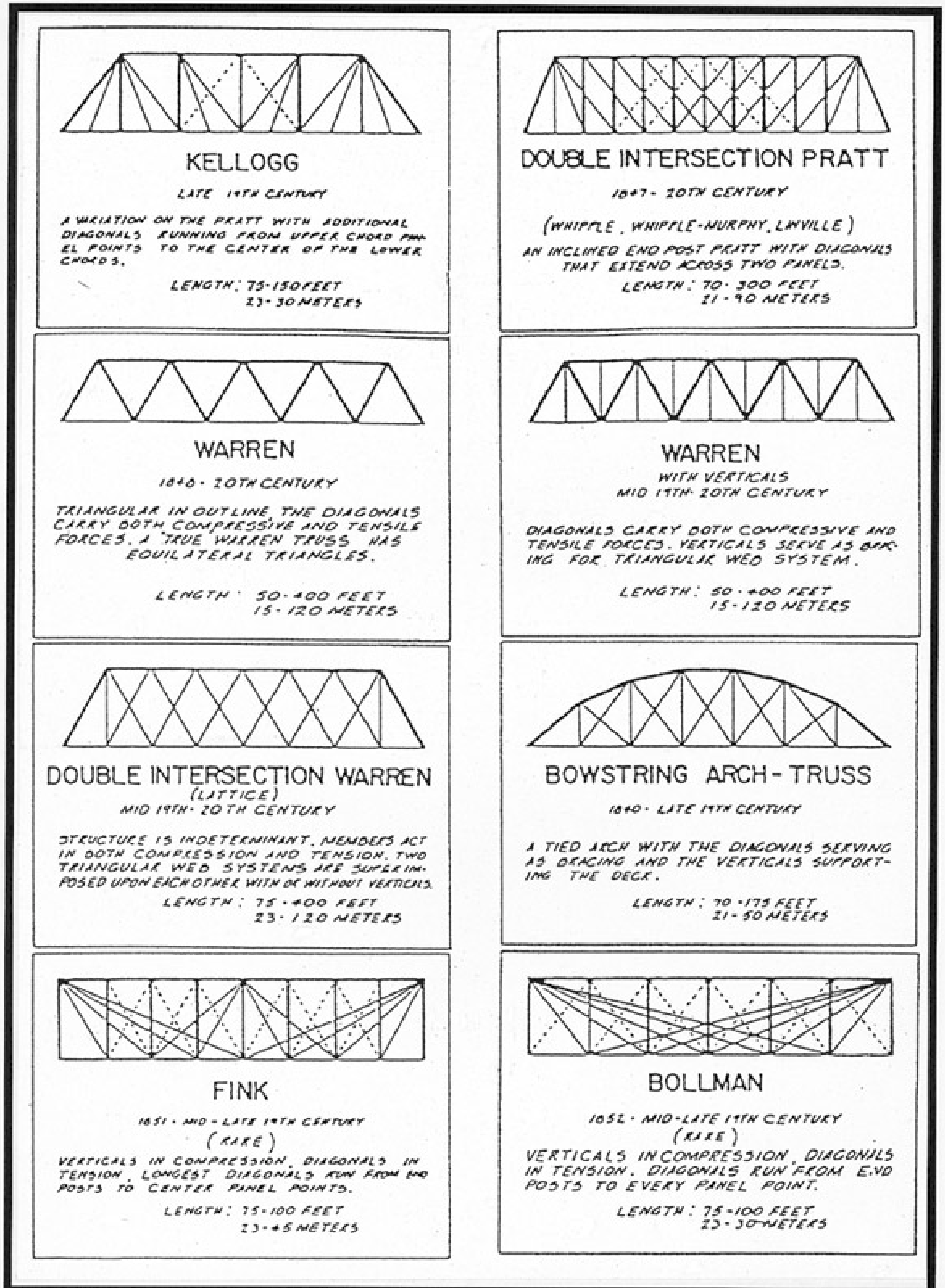

FIGURE 10: Metal Truss Types

SOURCE: Allen and Jackson 1975

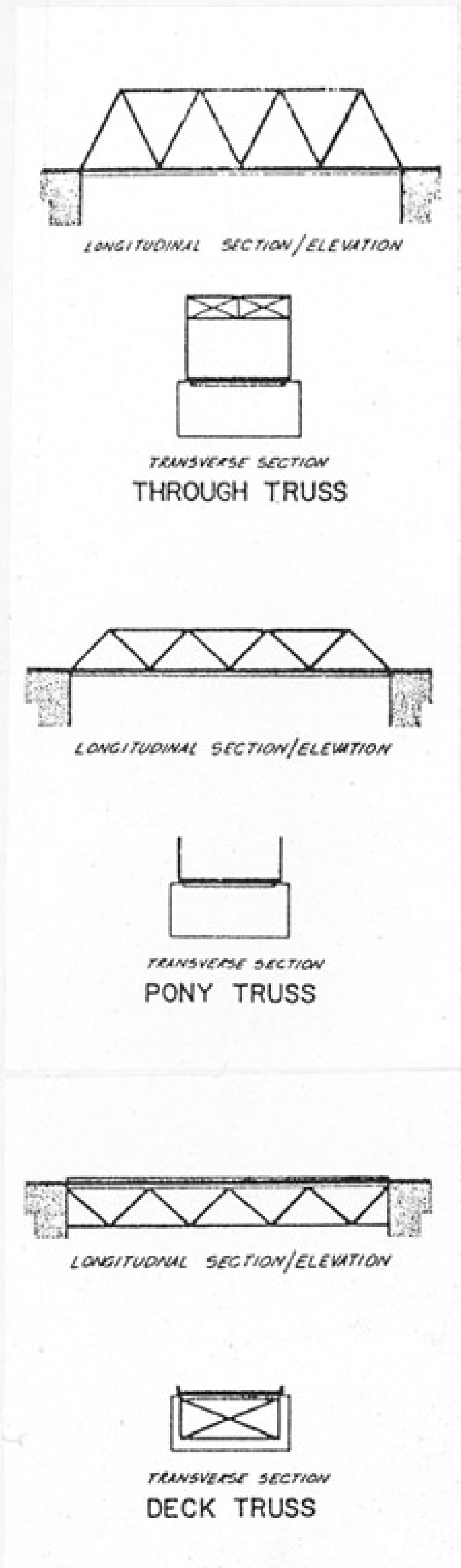

FIGURE 11: Types of Metal Truss Bridges SOURCE: Allen and Jackson 1975