as available for tension. This reduces the safe practical strain for timbers sustaining tension, to from 500 to 700 lbs. to the square inch, for the whole cross-section; and the proper point between these limits should be determined by the mode of forming the connections in specific cases.

**PINS OF WOOD AND IRON, FOR CONNECTING TIMBERS IN BRIDGE WORK.**

CXLV. Perhaps no more suitable place will occur for making a few general remarks upon the merits and use of pins for connecting pieces of timber.

While it is readily admitted that the plank lattice girder, put together exclusively with wooden pins, answered an excellent purpose in affording cheap and serviceable bridges in this country when timber was abundant, and the iron manufacture in its infancy, it is nevertheless believed that the use of wooden pins in bridge construction, is not destined to a long continuance. Where pins are required in wooden bridge work, it is thought that iron may be used with a decided advantage over wood — not in the lattice bridge of the usual form, composed of a great number of diagonals, and a legion of connecting pins; but in a modified form (as in Figures 13 and 19), with a greatly reduced number of pieces, and points of connection.

Wooden pins for the purpose under consideration, do not possess sufficient strength in proportion to the surface, unless made so large as to require too much cutting of the timber. Moreover, the action upon the pin tends to crush it laterally, in which direction the hardest timbers available for pins, scarcely offer as much resistance as the ends of fibres to which they are opposite.