Transverse Strength of Wood.

XLVII. Pine will bear a transverse strain of 1500 lbs. to the square inch of cross section; i.e., the projecting end of a beam will sustain, at a distance from the fulcrum equal to the depth of the beam, 1500 lbs. for each square inch in its cross section. Or what amounts to the same, a beam 1 inch square upon supports 2 inches apart, will sustain in the middle, a weight of 3000 lbs.

I have therefore, adopted 250 lbs. to the square inch, as the safe load for pine when acting transversely; and to calculate the safe load for a projecting beam, this quantity must be multiplied by the cross section and the depth, and divided by the distance of the load from the fulcrum.

For the safe load in the middle of a beam supported at the ends, take four times the above amount, or 1000 lbs., multiply by the cross section and the depth, and divide by the length between supports.

In order that a piece of timber may act by tension, it is necessary to cut off a portion of the fibres, so as to form a head, or shoulder reversed from the end, for the stretching force to act against; and that the strength of the piece may be made available for as great a portion of the length as may be without having the shoulder split off, it is important to know the power of the material to resist that kind of action.

Let \( ab \), Fig. 27, Pl. 6, represent a shoulder by means of which the stick is made to act by tension. The area \( ab \) should contain about 1 square inch for every thousand pounds to be applied to it. Now if \( ab \) be too light the end of the stick, the part \( abcd \) will be split and thrust off from the end. I find by experiment, that, to produce this effect upon straight grained pine, requires a force of nearly 600 lbs. to the square inch in the area of cleavage, \( efcb \). I would therefore, in practice, allow 1 square inch for every 100 lbs., which would require \( ef \) to be equal to 10 \( ae \).

If the shoulder be in the central part of the stick, as