the strain in the direction of the brace is \( \frac{20,000 \times 18}{10} = 36,000 \). The cross-section of the 2 braces is 84 square inches. The pressure, 480 pounds per square inch.

**Lateral braces.**

The greatest strain upon the lateral bracing of a bridge, would be that caused by the action of the wind in a violent tornado. It is probable that this force is far greater than it is usually estimated. The observations of the writer at the Susquehanna Bridge, during the tornado which caused the loss of six of the unfinished spans, led him to believe that the direct effect of the storm was increased by reflection from the surface of the water. It appears reasonable to suppose that if the direction of the wind is such as to strike the surface of the water at an angle of reflection, it must be thrown upwards, and its effect would be to augment the pressure upon any surface exposed to its action. In covered bridges particularly, it is probable that this reflected current acting against the underside, and in opposition to gravity, might so reduce the weight of the structure as to cause it to be blown off the piers. The possibility of this contingency we propose to examine after the direct effects have been considered. In the absence of positive information, the necessary data will be assumed.

The Pennsylvania Railroad Viaduct is designed to be left entirely open. The amount of side surface in the chords and braces is 688 square feet to each, and as the wind can act upon both trusses, the surface presented will be 1376 square feet.

There are two sets of lateral braces, one at the lower, the other at the upper chord. As the upper set is subjected to a greater strain than the lower, the calculation will be limited to it. The upper set of lateral braces may be considered as resisting the force of the wind on one-half the side surface of the truss (688 square feet), and the force of the roadway and railing \( 6 \times 160 = 960 \) square feet). Allow for obliquity of direction, which would increase the surface 352, making a total of 2000 square feet.