To find deflection due to this elongation, apply the formula for $X$ in appendix C.

$$X = \sqrt{\frac{3}{4}(Z^2 - Y^2)}$$

Substitute for $Z$ - - - 416.3211
and for $Y$ - - - 410.6666

Therefore $X = \sqrt{\frac{3}{4}(416.3211^2 - 410.6666^2)}$

or $X = - - - 59.25$ ft.

deduct deflection at 0° - - - 57.00

difference arising from 100° - - - 2.25 ft.

Therefore a change of temperature of 100° causes a difference in the level of the floor of two feet three inches, which calculation very nearly agrees with my observations.

The lower floor or river stays have enough of slack or deflection to adjust themselves under these changes. The only difference will be, that they are tighter in winter, than in summer, consequently that the equilibrium of the bridge will be less affected by passing trains in cold weather, than in warm.

**EFFECTS OF HIGH WINDS.**

The destruction of the Wheeling bridge by a high wind on the 17th of May last year, the greatest disaster of the kind on record, has naturally given rise to doubts as to the safety of Suspension Bridges generally. One of the scientific journals remarked at the time, that the failure of this bridge would appear to be conclusive evidence against the practicability of large spans. Although I would much prefer to leave this subject alone, I cannot conscientiously do so. It is my duty to establish the safety of the Niagara Bridge, which has already,