result of the motion of each single part. If not, the former equilibrium of forces is disturbed, and one or the other part is overstrained, or performs no work.

3. Motion of Saddles.—This takes place theoretically when the horizontal tension of the cable on one side of tower exceeds that on the other. But the friction of rollers counteracts this motion.

All formulas on rolling friction, as given in books, are based upon the supposition that it stands in direct proportion to radius of rollers and to the pressure. But this does not agree with actual experiments, on which alone a certain reliance can be placed. In general, our knowledge of rolling friction is small, and therefore, calculations based on it are more or less liable to errors.

W. Nordling (Mémoire sur les Piles en Charpente Métallique des grand Viaducs), experimenting with rollers of ten centimeters diameter, found the friction for a pressure of 1,000 kilo. to