

CHAPTER VII.

CALCULATED STRENGTH.

THE many plans prepared during the construction of the Kansas City Bridge involved a proportionate amount of mathematical calculation ; much of this was of a simple and elementary character, devoid of general interest ; but no account of the work would be complete which did not embrace a review of the stresses in the foundation works, the pressure upon the several foundations, and the strains in the superstructure, these being the points in which the computations were carried into the greatest detail, and which have the most important bearing on the general structure.

The foundation works embrace both the caissons, which were exposed to the pressure of the sand and water, and the upper works, which carried the suspended weight. The strains in the latter were of a simple character, and need not be enumerated here ; those in the former arose from the pressure of the water, due both to the current and the depth, and the pressure of the sand, including also the friction caused by this pressure on the sides of the descending caisson. The effects of the current was computed, but, though important in determining the strength of the cables used in anchoring the water-deadener and placing the round caisson, it was too slight to influence the general results elsewhere.

WATER PRESSURE.

The greatest water pressure occurred when the caisson for Pier No. 1 was pumped out. The surface of the water was then 101.4, about a foot and a half above the ordinary low-water stage, and four feet and a half above the extreme low-water ; the elevation of the rock was about 84, so that the pressure corresponded to a depth of very nearly 17.5 feet ; this made the pressure on each horizontal foot of caisson 9,570 pounds, and the total pressure, estimating the