

tional time to harden before exposing it to the full weight, while the summer flood, now close at hand, made it desirable to postpone any further work at this site. On the 10th of August the work was resumed, and the pier rapidly built up to completion.

PIER No. 4.

Work was begun upon this foundation on the 2d of September, 1867, four days later than at Pier No. 3. The water was then twenty feet deep, and piles could be driven only with great difficulty; no less than six were pulled out by the current. It was at first designed to scour out a deep pit by the use of wing dams, but before the plan could be carried into effect, the current, which is more variable at the site of the pier than at any other point on the line of the bridge, slackened to almost nothing, making wing dams wholly impracticable. A caisson of rectangular form was then built in position, 67 feet long, 30 feet wide, and 22 feet high. It was put together without spikes or pins, the planks being secured between cleets on the sides of the posts, and the whole caisson bound together by iron rods passing from the bottom of the sill to the top of the plate. It was proposed to sink this caisson about twenty feet, drive a pile foundation within it, cut off the piles at the level of the base of the caisson, build the pier on a suspended grillage, and lower it upon the piles. Then upon unscrewing the nuts and withdrawing the long rods, the caisson would fall in pieces and a riprap protection could be thrown close around the pier.

The slackening of the current was accompanied by a rapid deposit of sand, and before the caisson could be completed there remained but eighteen inches of water at the site of the pier; in eight days only, from the 18th to the 26th of September, a deposit twelve feet deep was formed. On the 26th of October the caisson was done, when it was tripped to the bottom by striking the braces which supported it. The change in the level of the river bed made a corresponding increase in the distance which the caisson must be sunk by excavation. This excavation was shortly begun by means of the steam siphon and hand dredge, and continued until the tools were transferred to Pier No. 3, the caisson having then been sunk about nine feet. During the winter an inner wall was