The cofferdam was divided into three compartments for convenience in pumping, as previously explained. Both below and above these bulkheads the concrete was poured in a monolithic mass.

The walls of each compartment were pierced with four 4-inch holes through which was passed a 4-inch pipe with an elbow and a 7-foot length of pipe on the inside of the caisson, forming a swinging joint to control the inlet of water for slowly flooding the caisson after concreting, when each tide's work was completed. This stopped the green concrete from scouring when the incoming tide boiled over the top of the cofferdam.

The air chamber roof was pierced with three 36-inch shafts, one being a man-shaft located in the centre of the caisson, the other two for material, one at each end and spaced to handle material with a minimum of handling.

Air was supplied through two 4-inch pipes located at opposite ends of the caisson. Two more 4-inch pipes through the roof were used as blow pipes for blowing water and sand from the air chamber.

A 1-inch whistle pipe was used at each material shaft for signalling purposes.

Two 1¼-inch pipes were installed for supplying fresh water to the air chamber, but were not used for this purpose. They, however, served for supplying compressed air for pneumatic drills used in drilling boulders.

Electric lights were used on removable leads run through the man-shaft, but were removed at the end of each low-tide shift.

Launching.—Both caissons were launched sideways about three-quarters of an hour before high water. Four 12-in. x 12-in. launchways were used, set at a slope of one in ten. Had the slope of the beach warranted it, a lesser slope would have been better. Four 12-in. x 12-in. runningways were placed under the caisson resting on the launchway—each runningway had a 6-in. x 12-in. board bolted on for a guide. All four runningways were roped fast to the launchway at the shore side of the caisson and ropes cut simultaneously when ready to launch. In order to check one end going faster than the other, timber dogs were used with one end made fast to the runningway and the other ready to drive into the launchway, should one end of the caisson start before the other. In addition, a four-part rope tackle was used at each end with the end passing around a snubbing post. With these preventatives and a crew trained to work together, there appeared to be no difficulty in getting the caisson started properly, but after taking water and before becoming waterborne, the caisson in two cases gradually swung off the ways up river in the direction of the river current, indicating that the slight current exerted enough pressure to make the launching a failure. Had launching been attempted at high tide, there seems no reason to doubt its success, but as there is only about twenty minutes of still water, no time would have remained to tow and moor. In one case the caisson, after dropping off the runningways, became waterborne a sufficient time before high-water to tow it across to place and secure the moorings, but in the other case it was necessary to wait a few days for a high tide enough to float.

Tallow was used on the launchways as a lubricant.

The outer ends of the runningways were weighted with rails to clear them from the caisson when afloat.

Towing.—A 35-ton dinkey used in switching operations, was used to tow the caisson to position. A 1⅛-inch steel cable, 1,600 feet long, was stretched across the river previous to launching, passing through a heavy snatch block on a scow, which carried the permanent moorings; the slack of the cable was kept off the bottom of the river by passing over another scow. After launching, the cable was attached to the caisson and the dinkey started towing until the caisson was brought into position alongside the mooring scow, where the moorings were quickly transferred from the scow to the caisson.

Moorings.—The formula used in calculating the moorings was:

$$P = W K \frac{V^2}{2g}$$

W = weight of water per cubic foot — 65.
K = constant (1.47 for square-ended caisson).
V = current in miles per hour.
P = pressure in pounds per square foot on exposed surface normal to current.

Current records taken with a ship's log showed a velocity of 9 knots per hour at spring tides and 6 knots per hour on neaps. These calculations showed a maximum strain of 26 tons had to be taken care of in moorings and two 1⅛-inch wire cables were used up river, one attached to a rock-filled crib in the river and the other to a "dead man" on shore. The downstream mooring was a single 1⅛-inch wire cable from a rock-filled crib in the river and a second 1⅛-inch cable fastened around the old pier adjacent to the final position for the caisson. A socket was attached to the end of each cable and to this a five-part tackle of ¾-inch wire cable was hitched, running through 14-inch diamond blocks, the free end passing around one of the cross-timbers inside the caisson, where it could readily be payed out.

All upstream moorings were carried to a bridle fastened in the end of the caisson. The bridle consisted of four 1⅛-inch wire cables fastened at one end through 1½-inch eye bolts into the caisson and all hitched together to a common shackle at the other end.

In addition to up and downstream moorings, four breast lines were used at each corner of the caisson, consisting of four parts of 4-inch circumference rope through double blocks for adjusting the position sideways.

A framework was built out from the old wooden pier on the line of the new pier, to which the caisson was breasted hard and used as a guide in sinking.

Sinking.—An endeavor was made to level the pier sites by blasting out high spots and filling low spots with small stone but was not attended with any great degree of success, on account of the scouring action of the current. Soundings taken at No. 1 pier showed hard and soft spots alternately and when the caisson was finally sunk, it was out of level as much as three feet and bearing very unevenly. A diver was sent down to try and obtain a more even bearing under the caisson, but very little success attended these efforts. Meanwhile, pumping out and concreting was proceeded with until sufficient weight had been put on to keep the caisson from floating when under enough air pressure to enable the "sand hogs" to go to work levelling up. The locks were installed and eight pounds of air pressure put on at low tide, driving out the water from the air chamber and enabling the men to start work. The entire upper end of the caisson was found open to the action of the tide, the opening being as much as three feet. After finally getting the caisson on a fairly even keel, concreting the top was proceeded with until the right elevation was reached to correspond with the diamond drill borings. Two courses of granite were added, after which old car wheels were used for