was simply to lift the water from three to four feet it was expected to work well, but it never did. Steam was then introduced in place of extra compressed air through the same pipes. This answered the purpose admirably, draining the trenches in a short time. It afforded an ocular demonstration of the operation of a Giffard injector, since the caisson simply corresponds to the interior of a huge boiler and steam under the same tension as the caisson pressure produced the desired result. One circumstance, however, led to its early abandonment. When the pump had worked a few minutes, the temperature would rise to a hundred degrees, driving the men from that particular chamber. Recourse was then had to a simple flexible suction hose, communicating with a pipe leading out of the caisson. The end of this hose was held in the water, so that about three-fourths of it was submerged. The compressed air rushing through the remainder of the opening kept the whole column of water in motion at a rapid rate. This mode is, of course, attended with a slight loss of compressed air, but it proved far simpler to raise the water forty feet out of the caisson than four feet inside of the caisson. Soft mud and fine sand passed out readily with water.

BOULDERS UNDER THE EDGE.

The occurrence of large boulders under the shoe proved to be the most serious obstacle to a rapid sinking of the caisson. As long as the water from without still had free communication with the air chamber, they had to be attacked under water, the most tedious part of the operation being the removal of the earth in which they were imbedded. When the stones extended more than two or three feet outside of the caisson, no attempt was made to haul them in, but they were slowly chipped to pieces, until enough had been removed to enable the edge of the caisson to clear them.

As soon as the dredges were at work, the excavated material was dumped around the outside of the caisson with a view of stopping the ready passage of water under the shoe. This was effected after a time. Then, by building a clay dam around the boulder on the inside, and filling up the adjoining