Excavation of Material.

Three courses of masonry were sufficient to prevent any further rise from the effects of the tide. By this time the force of men had been increased to over one hundred, and work could be carried on continuously.

Although the preliminary dredging had arrived at a uniform level of eighteen feet below high tide, there had been enough boulders overlooked to reduce this to sixteen and one-half feet. Several weeks were occupied in removing boulders and reducing the level to eighteen feet, before the excavating machinery was ready. In the pits under the water shafts were several large boulders, below the inner water level, upon which the lower edge of the shafts rested. These were a source of considerable anxiety, until removed by the tedious process of chipping them to pieces with long steel bars.

The material now became sufficiently exposed to enable us to arrive at the conclusion that it was of a very formidable nature, and could only be removed by slow, tedious, and persistent efforts. This had indeed been the expectation, from our previous experience in the dredging and blasting under water. But the work being under water, and therefore out of sight, did not impress us so much at the time, as now when we were face to face with it.

Nature of Material.

In the two middle chambers of the caisson the ground was composed of trap boulders, large and small packed together so closely as to touch, the space between being filled by a natural concrete, composed of decomposed fragments of green serpentine rock. The boulders were coated with this natural cement, which adhered so strongly as to defy the action of steel wedges. A steel pointed pick had no effect whatever. It was only by using a steel pointed crowbar, and driving it in the crevices with heavy sledges, that any of this material could be piled up and removed. In chambers No. one and two adjoining the Fulton ferry slips the boulders were equally as large and as numerous, but the