

the darkness, and other obstacles were sufficient to prevent the majority of the men from making their escape by the airlocks, no matter how ample the facilities. If the water entered as rapidly as the air escaped there would then be the same pressure of air during the whole time of escape. Now it so happens that the supply shafts project two feet below the roof into the air-chamber; as soon, therefore, as the water reaches the bottom of the shaft it will instantly rise in it, forming a column of balance and checking the further escape of air. The remaining two feet would form a breathing space sufficient for the men to live, and even if the rush of water were to reduce this space to one foot, there would be enough left to save all hands who retained sufficient presence of mind.

#### FILLING UP THE AIR-CHAMBER.

The operation of the two supply shafts has already been described. Their capacity proved ample for all requirements. Concrete was laid at the rate of one hundred yards per day of sixteen hours. As the space became more contracted, this quantity was reduced. A great saving in time as well as amount of concrete was effected by letting the edges of the caisson sink into the ground three and a half feet deeper than the average level of the bottom. This reduced the height of the air chamber from nine feet six inches to six feet, and diminished the amount to be filled in about one-third.

The concrete consisted of one part of Rosendale cement, two of sand, and four of small-sized gravel. The sand and cement were mixed above and passed through one shaft, the gravel through the other. The gravel came from the Long Island beaches, where the action of the waves had washed it absolutely clean, and sorted it in layers of uniform size. During most of the time the weather outside was so cold that the concrete had to be mixed below. At a later period it was mixed above and sent down directly. No trouble was ever experienced from its setting before it was spread out and rammed, nor did it ever set in the supply shafts; much labor can be saved thereby in the air-chamber. The gravel being