



Lighthouse at Spectacle Reef, Lake Huron.

struction scow, with tools, &c., on board, was towed with the crib. At 2 a.m. next morning, six hours after starting, the fleet hove to off the reef awaiting daylight and the abatement of the wind, which had again freshened up. At 6½ a.m., it having moderated, the pier, with considerable difficulty, was placed in position, and after being secured to the temporary pier and the moorings previously set for the purpose, all hands went to work throwing the ballast stone into the compartments, and by 4 p.m. succeeded in getting into it about 200 cords (1200 tons). By this time the winds was blowing freshly and the sea running so high as to make it necessary to stop work for the time, but early next morning all the reserve stone was put into the compartments.

The tugs Magnet and Stranger were discharged as soon as the pier was in position, but for fear of accident the Champion, (a steamer of great power) was retained until all the stone

was in place, when she was discharged, and started for Detroit with the barges Ritchie and Emerald in tow. The Table Rock was retained in service until the 30th July, when she was dispensed with. After the pier was in position the schooner Belle was moored on the reef to serve as quarters for the working force, which proceeded to build up the pier to the required height above water (12 ft.). The Warrington having gone to Detroit to receive a new boiler, the tug Hand was retained to tow the scows carrying the ballast stone used in completing the filling of the compartments, until the return of the Warrington on the 12th of September, when she, too, was discharged. By this time the pier had been built up to its full height, and by the 20th of September quarters for the workmen had been completed upon it, which were at once occupied, and the Belle returned to the harbour. By means of a submarine diver the bed rock within the opening of the pier was then cleared off, and the work of constructing the cofferdam was taken in hand. The cofferdam itself consisted of a hollow cylinder, 41 ft. in diameter, composed of wooden staves, each 4 in. by 6 in. and 15 ft. long. The cylinder was braced and trussed internally, and hooped with iron externally, so as to give it the requisite strength. It was put together at the surface of the water, and when complete was lowered into position on the bed rock by means of iron screws. As soon as it rested on the rock (which was quite irregular in contour), each stave was driven down so as to fit as closely as it would admit, and a diver filled all openings between its lower end and the rock with Portland cement. A loosely twisted rope of oakum was then pressed close down into the exterior angle between the cofferdam and rock, and outside of this a larger rope made of hay. The pumping machinery having meanwhile been placed in readiness, the cofferdam was pumped dry, and on the same day (14th October) a force of stone-cutters descended to the bottom and commenced the work of levelling off the bed rock, and preparing it to receive the first course of masonry.

The bed rock was found to consist of dolomitic limestone (confirming the previous examinations), highest on the western side toward the deepest water), and sloping gradually toward the eastern. In order to make a level bed for the first course of masonry, it was necessary to cut down about 2 ft. on the highest side, involving a large amount of hard labour, rendered more difficult by the water forcing its way up through seams in the rock. But the work was finally accomplished, the bed being as carefully cut and levelled as any of the courses of masonry. The first course of masonry was then set, completing it on the 27th of October. While setting this course much trouble was caused by the water, already referred to as forcing its way up through seams in the rock, which attacked the mortar bed. For this reason water was let into the dam every evening (and pumped out next morning) to give the mortar time to harden during the