

anchors by means of $1\frac{1}{4}$ -in. galvanized iron cables with double wire rope blocks and tackles so as to adjust it in position and hold it against the current.

The caissons were sunk through the mud and sand by dredging in four of the pockets with a clamshell bucket. False bottoms were placed in the other six pockets, sixteen feet above the cutting edge, and these pockets were weighted with sand while the dredging was going on. For one hundred years the Miramichi River has been a lumbering centre and many of the logs have become waterlogged and sunk. Many of these, sometimes twenty feet deep in the mud, were encountered in sinking the caissons, and were either taken out by the clamshell bucket or had to be cut off by a diver. High-power jets were also used by a diver under the cutting

After completing the pile driving, 12 feet of concrete was placed, entirely filling the bottom of the caissons. This concrete was put in with a bottom dump bucket working through the water. When the concrete had set the caissons were pumped out and the pier shafts constructed in dry space. Rail grillages were set vertically in the under-water concrete by a diver while the concrete was being placed and after pumping out, additional rails are connected to these by splice bars to reinforce the pier shafts. A view of the work four months after starting is shown in Fig. 6. The work was begun the latter part of May, 1913, and will be completed early in the coming winter.

The Hon. John Morrissy is Chief Commissioner of Public Works; A. R. Wetmore is Provincial Engineer,

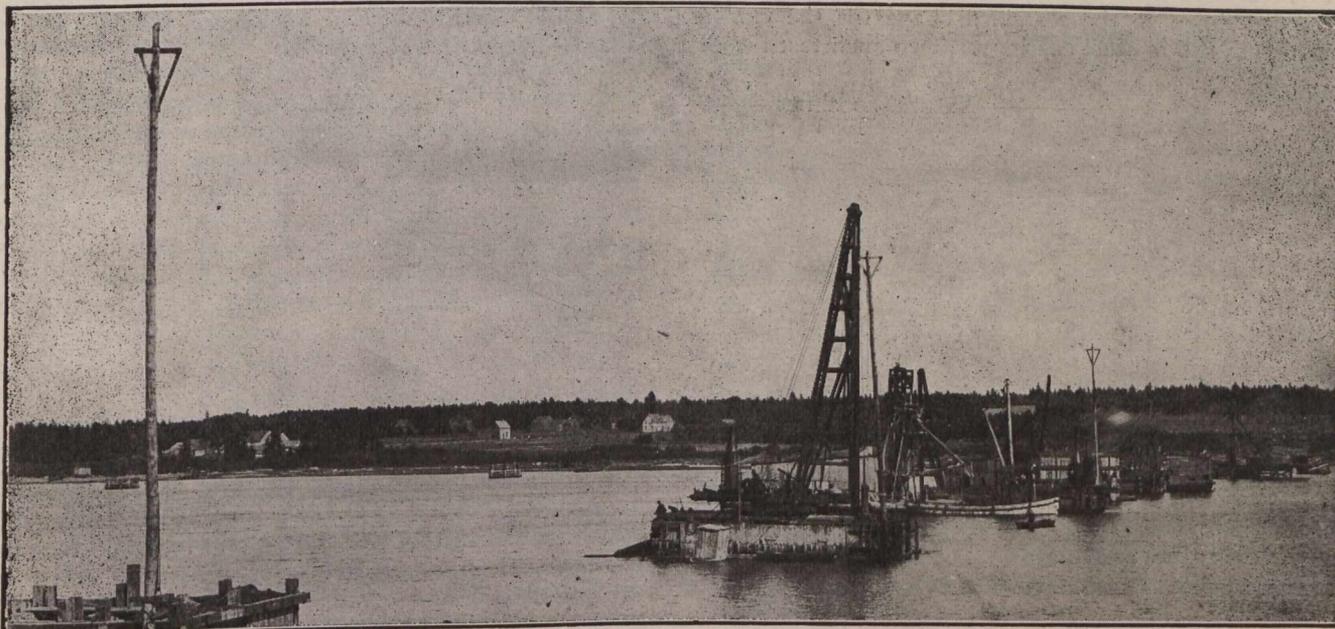


Fig. 6.—General View Four Months After Beginning Work.

edge of one caisson to sink it through a strata of clay. In addition to the sand pocket method of weighting, pig iron was also used. All of the caissons have now been sunk and the maximum variation of any caisson is 15 ins. from the actual to the located centre line.

The hard strata of sand, clay and gravel on which the caissons rest might be sufficient support for the piers, but it was considered advisable not to rely on this, but to use a pile support. The heads of the piles had to be driven to a depth of over 60 feet below the top of the caissons in some cases. A sixty-five-foot extension lead pile driver was built and provided with a steel tube which worked in these leads. The piles were placed in this tube and driven by a 5,100-pound drop hammer working through the water. The piles were cut to length and driven until their heads were at the cut-off grade with a few exceptions. These were cut off by a diver. The pile driver was mounted on a turntable, the leads and engine turning on conical rollers on a circular track secured to a bed frame. A $2\frac{1}{2}$ -in. steel king bolt fastened the sills to the turntable. With this driver it was possible to reach every part of a caisson, while the weight of the driver, tube and hammer, amounting to over 25 tons, was supported along the centre line of the caisson. This pile driver is shown in Fig. 5. When the piles were driven in one caisson the pile driver was rolled on a scow and floated to the succeeding caisson.

and A. R. Sprenger is Resident Engineer. The Foundation Company, Limited, are the contractors, and C. A. Wentworth is superintendent.

The new harbor at Emden, Germany, which has taken three years to build, was opened recently with a good deal of ceremony. The sea sluice of the Emden harbor is the largest in the world; it is 260 meters long, 40 wide and 13 deep. Sixteen torpedo boats can pass through simultaneously within 15 minutes.

The Governor of New York, after consultation with the commissioner of highways, the attorney-general and the commissioner of efficiency and economy, has decided that hereafter asphalt shall be bought on open specifications and not under separate specifications for natural and oil asphalts, as was proposed by the consulting board of highway engineers. Full details have not yet been prepared, but it has been announced by the Governor that "it has been decided to have the specifications so drawn that every suitable asphalt known can be used, but to insert the conditions that every contractor must guarantee the road he builds for at least three, and possibly five years. This will do away with the asphalt scandal. This provision will give every asphalt dealer in the world who has an asphalt which he will guarantee for five years an equal chance with every other asphalt man for the business of New York State."