

States Steel Products Co., and were perhaps the first departure from the customary 6-inch and 12-inch steel piles previously used. They were of 9-inch section, 18 feet in length, and weighed 21.3 pounds per square foot. They were driven in panels of six (as shown in Fig. 11) for a distance of 1,800 feet on either side of the pile line (3,600 linear feet in all) or to such a point where it was deemed that the line was sufficiently low in the water to obviate all necessity of piling and concreting. A steel rod was placed across the top of the piles every 7 feet, it being  $\frac{7}{8}$ -inch in diameter.

**Concreting.**—The concrete used was a 1:2:4 mix, and was placed with the use of a tremie pipe, the depth of concrete work varying from 20 to 55 feet. About 4,000 yards were used.

In connection with the shore tank, previously mentioned, the concreting of it into position was greatly facilitated by placing the forms before it was lowered into the excavation, and when properly located, it was then easily concreted.

**Personnel.**—The work was done for the City of Toronto, for whom Mr. R. C. Harris is Commissioner of Works, and Mr. George C. Powell, Deputy City Engineer. Mr. C. W. Allen was resident engineer on the initial part of the work, and was succeeded by Mr. A. U. Sanderson for the remainder. The contractors were, as stated, Roger Miller and Sons, Limited, Toronto, and we are indebted to Mr. A. E. Gibson, member of the firm, for most of the information and illustrations contained in this article.

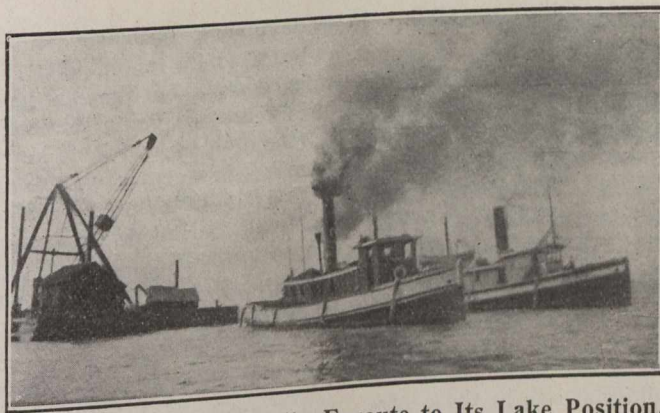


Fig. 9.—The Intake Crib, Enroute to Its Lake Position.

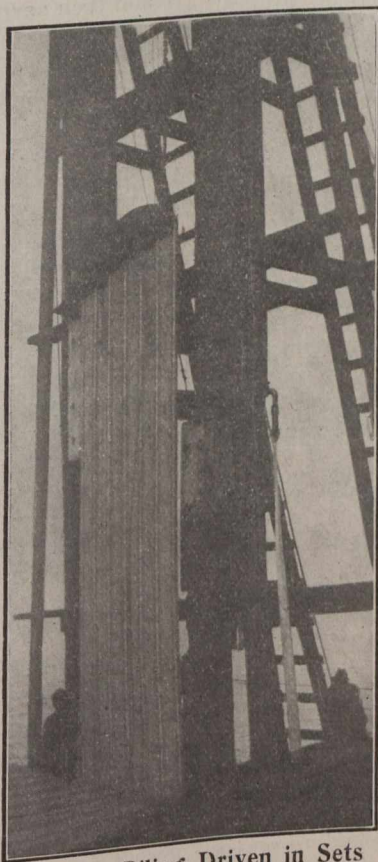


Fig. 11.—Piling Driven in Sets of Six at a Time.

## LARGE CONTRACTS FOR WATER POWER PLANTS

In connection with the new enterprises of Dr. F. S. Pearson in Barcelona, Spain, known under the name of The Barcelona Traction Company, the Swiss turbine builders, Escher Wyss & Co., have secured large contracts for the supply of water wheels and pipe lines. Besides an auxiliary plant of 4,000 h.p., four large installations are being equipped by Escher Wyss & Company. Three of these utilize water from the River Ebro. The first installation comprises five units of 16,000 h.p. each under a head of 140 feet, and is nearing completion. For the second and third, the turbines are well under way. These installations comprise in one case four units of 15,000 h.p., under a head of 250 feet, and in the other, four units of 11,500 h.p., under a head of 165 feet.

The same company are supplying the water wheels and pipe lines for a high-pressure plant in the Pyrenees, built by a concern controlled by the Barcelona Traction Co. There are five turbines of 7,000 h.p. capacity each, under a head of 2,800 feet. They have obtained great experience in building plants for high heads, having built the famous Adamello power plant, operating under 3,000 feet head; the plant of the Rio de Janeiro Tramway, Light and Power Co., as well as the "Necaxa" plant of the Mexican Light & Power Co.; both these latter being enterprises of Dr. Pearson, like The Barcelona Traction Co., and developing over 100,000 h.p. each.

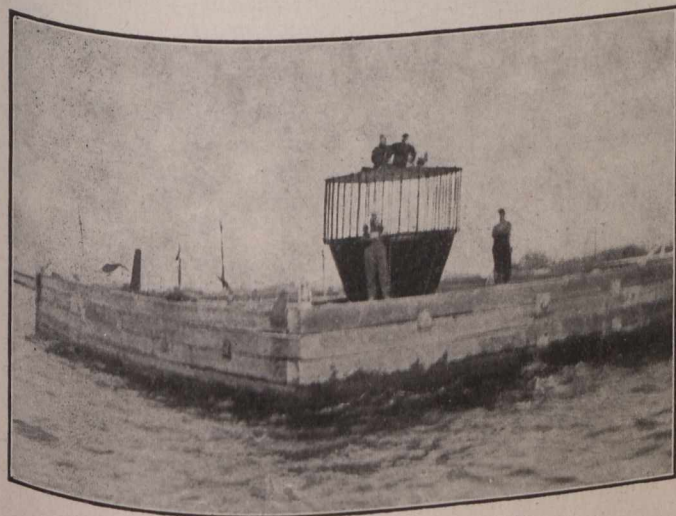


Fig. 10.—Illustrating Construction of Intake.

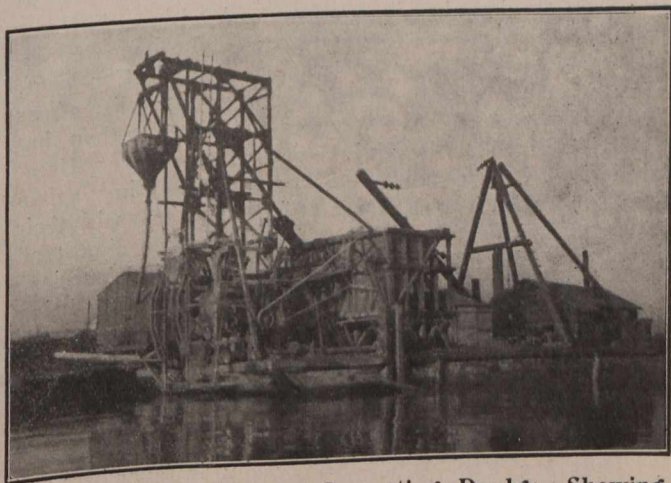


Fig. 12.—Front View of Concreting Dredge, Showing Elevating Apparatus, Etc.