tural steel, as well as the sawing, moving and placing of 1½ to 2 million feet of lumber, besides other material incidental to building construction.

The rock formation at the dam is grey laurentian

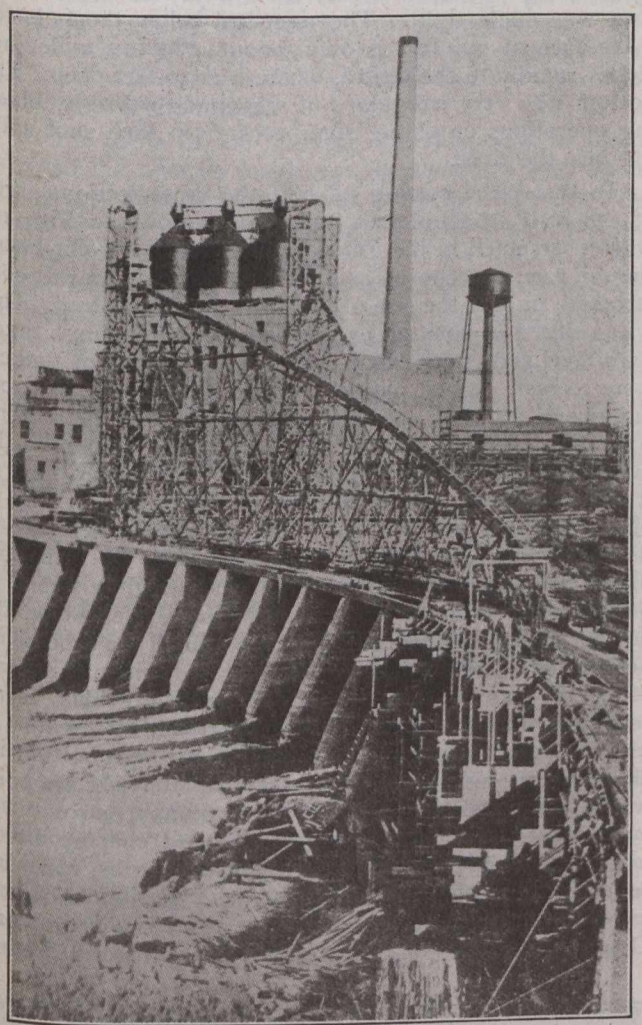

Fig. 6.—View of Dam Which Had a Radius of 333 Feet on the Upstream Surface

granite with intrusions of black basalt, two of which have been decomposed by the action of frost and water resulting in an east and west channel with a smooth island of granite in the centre, which gave the place its name. The west channel for a distance of 50 feet or more is only about 5 feet wide and possibly 40 feet in depth, and as the

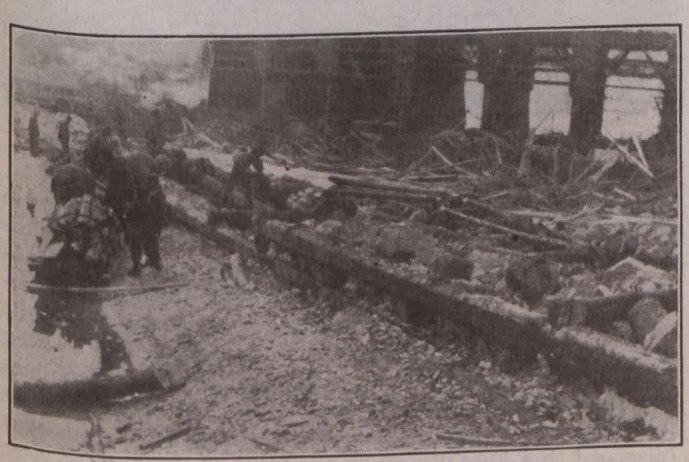

Fig. 7.—The First Coffer-dam Being Removed

east channel goes dry in low-water this place has the distinction of being the only point on the Mattagami River where a man can jump over, and accordingly has been called the "Jumping Place" by the Indians. Fig. 4 shows this channel in August, 1914, when the discharge was only 750 c.f.s., although it will take care of 1,300 c.f.s. without overflowing. The lower portion of the east channel also is 30 feet in depth but much wider, while the upper portion at the break is shallow and narrow.

It was therefore decided for the following reasons to build a circular dam, starting from the west side above the

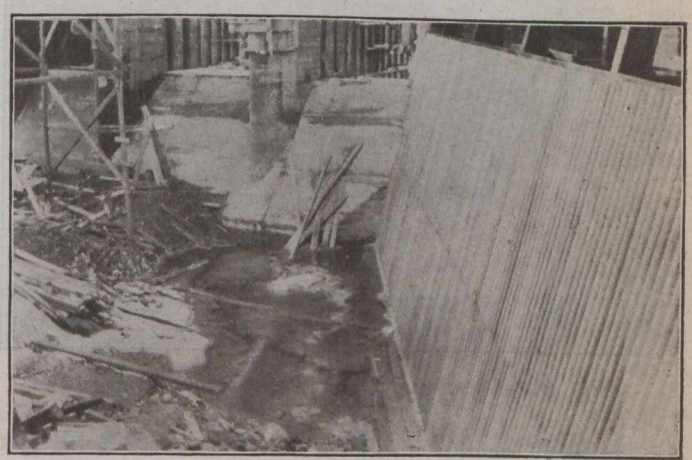

Fig. 8.—Completed Sluiceways

break in the west channel, curving over the extreme top of the island with the toe of the dam slightly above the break in the east channel, the apron being carried over the gorge on a reinforced concrete arch, while the dam terminated in the power house situated on the east side and below the falls.

In the first place, without dewatering it was impossible to ascertain the depth of the west fissure, which might prove exceedingly difficult to seal, hence our decision to keep above the falls. Furthermore, high rock on the west side above the falls made an excellent place to terminate the end abutment. By following the crest of the island, excellent facilities for construction were provided, mass concrete in the base being reduced to a minimum of 4 feet in thickness under sills, and sloping both upstream and down made a natural and ideal approach and discharge, in design, character and efficiency.

It was desirable on the east side to leave sufficient cross-sectional area between the dam and shore to insure a low velocity of approach to headworks of power house. (Fig. 5.) By placing the power house at the bottom of the falls, less rock excavation was required, and a deeper section provided in front of the racks, permitting the dam at the same time to approach more closely to the shore without reducing the section. For the above reasons, and on account of tremendous spring freshets, of which there had been no accurate measurements taken, it was considered advisable to obstruct the river as little as possible and provide as many and large sluiceways as the location would permit of. It was found that a circular dam 448 feet in length, consisting of 18 piers, 19 sluiceways and the two abutments, as shown in Fig. 6, with a radius of 333 feet to the upstream surface, met all conditions. The base of the dam is of mass concrete in the proportion of 1:3:6, while in the upper part in which the stop-log sills are embedded and anchored together with the piers, a 1:2:4 mixture was used.