

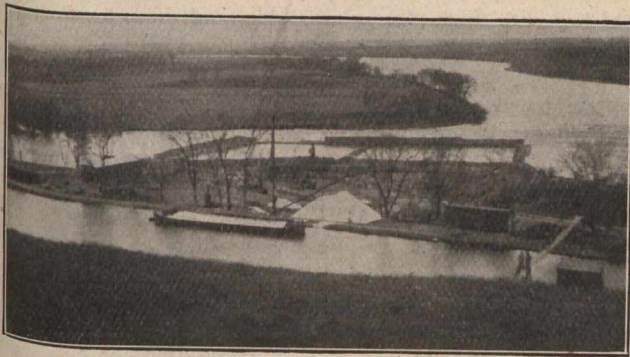
**RAPID COFFER-DAM EXCAVATION.**

By Charles M. Ripley, New York.

**The Contractors Plant and Methods for the Excavation. Showing Details of Cofferdam Construction.**

The Economy Light & Power Company are constructing the foundations for a 10,000 horse-power hydro-electric plant at the point where the Desplaines River empties into the Kankakee River, the two forming the Illinois River. After the completion of the dam, it is the opinion of the engineers that a full seventeen-foot drop will be gained which together with a flow of 10,000 cubic feet per second will be employed for the generation of electric power which will be marketed largely in Joliet, Illinois.

In the month of August, 1907, J. O. Heyworth, the general contractor, began to move his construction plant by fifty-ton barges down the Illinois and Michigan Canal, hauled by a 24 horse-power Barber Bros. gasoline launch. In a period of three months' time the following work was done:—A camp was built for the accommodation of about 200 men, a 7,000 yard U-shaped levee, which we will call coffer-dam No. 1, was thrown up, 5,000 yards of rock were also excavated from the power plant site and placed in the cribs of the coffer-dam No. 2 beyond the levee of the river as shown in the photographs, and the work pushed to the stage shown in the photograph taken November 10, 1907, or about three months' time. The contractor's plant is described as follows: A Lidgerwood 8 1/4 x 10 hoisting engine at the side of the canal with a guy derrick for the unloading of the heavy machinery from the barges. This engine and derrick were also used in connection with the unloading of the barges of crushed stone and one yard Hayward clam shell bucket

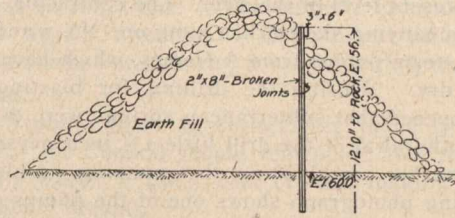


unloads three 180-ton barges in 14 hours; thus all trucking to the job was eliminated.

An industrial railway enters the site of the excavation at the north-east corner in the form of a single track. It is fanned out in eight tracks on which Western dump cars carry out the excavated material, which is silt, glacial drift and sandstone underlying about nine feet. At the top of a ten per cent. grade the single track runs level for about thirty feet, at which point an 8 1/4 x 10 inch Lidgerwood double-drum double-cylinder hoisting engine is located with the drums facing down the track. Two cables extend down into the excavation and thus one hoisting engine with one engineer attends to the removal of the material and is capable of moving two trains of six cars up or down the grade at the same time. After the cars get on the level track, teams of horses haul them to the spell bank.

One of the most interesting features of the work was the way the Page Drag scraper excavating bucket was used both to run the levee around coffer-dam No. 1 and also to assist in filling cribs in coffer-dam No. 2. In the earlier stages of the work, the two Page buckets with their accompanying engines and derricks, were the first pieces of apparatus to begin excavation. The machines travelled on a track laid just within the limits of the excavation. In one operation dirt was dug, lifted and after the machine made a quarter turn, earth was dumped just beyond the excavation limits, making levee on three sides. Later these machines were run nearer the centre of the excavation and, again in one operation, they dug, hoisted and dumped as follows:—The same one-yard special power scraper bucket strung from the

40-foot boom of the derrick dug out the silt and glacial drift, part dry and part wet, and dropped part into the industrial cars and part was upset in a pile where laborers with wheelbarrows conveyed the dirt to make the earth fill in coffer-dam No. 2, further out in the river. Seven thousand yards of dirt and 5,000 yards of rock were excavated in a little less than two months and placed either in the spoil bank or in the coffer-dam. Thus excavated material from coffer-dam No



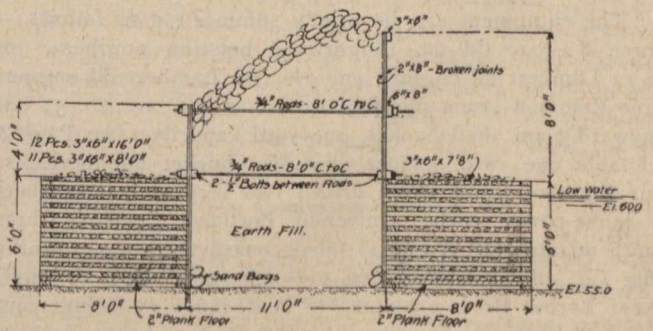
1 was used in construction of coffer-dam No. 2 as well as making levee around coffer-dam No. 1.

In the rock excavation, four Ingersoll-Rand inch-and-a-half steam drills were used, and decidedly heavy blasts were employed during the noon hour and after the end of the day. In that part of the excavation which was beyond the reach of the Page drag bucket, teams and scrapers were used and some pick and shovel work was done.

The accompanying illustrations show the different types of coffer-dam and levee construction. Type 1 was used running at approximately right angles to the Desplaines River for a distance of 120 feet back from the edge of the stream. As will be noted two by eight timbers were driven three feet into the ground, the joints broken and a top walling piece of three by six timber spiked to it, after which the earth fill was dumped on either side. Type 2 was used on the down stream side of the coffer-dam for a distance of 110 feet out from the edge of the stream where water is still. The construction is shown in the accompanying illustration. Types 3 and 4 were used on the up-stream face of the coffer-dam where the full force of the fifteen mile an hour current strikes it and also on the sides where the scouring effect of the stream is most dangerous. It is interesting to note that on the up-stream face of the coffer-dam, the level of the water is 3 1/2 or 4 feet higher than on the down stream face owing to the banking up of the water as it strikes at high velocity. The rock cribs are on both sides of this most critical point in the coffer-dam. They were constructed as shown in the accompanying detailed drawing and were 8 x 16 feet in dimension, 6 feet deep, and had a 2-inch plank bottom. These were built of heavy green maple, which almost sank as soon as launched in the stream above their final location. Three 1 1/4 inch manila ropes were used to gradually locate each coffer-dam in place as the heavy current carries them down stream, one by one, into place.

As a further precaution against the destruction by the combined static and velocity heads of the water a row of 1 1/2 inch holes were drilled just inside of the up-stream side of the coffer-dam. Iron rods were driven into these to further act as an anchor to the stone cribs and prevent their being slid out of place.

The accompanying photographs show the method of putting in the earth fill in a Type 4 coffer-dam—the most



difficult section of all. Wheelbarrows were run along the planks shown after the cribs had been filled with rock at either side.