

1st YEAR

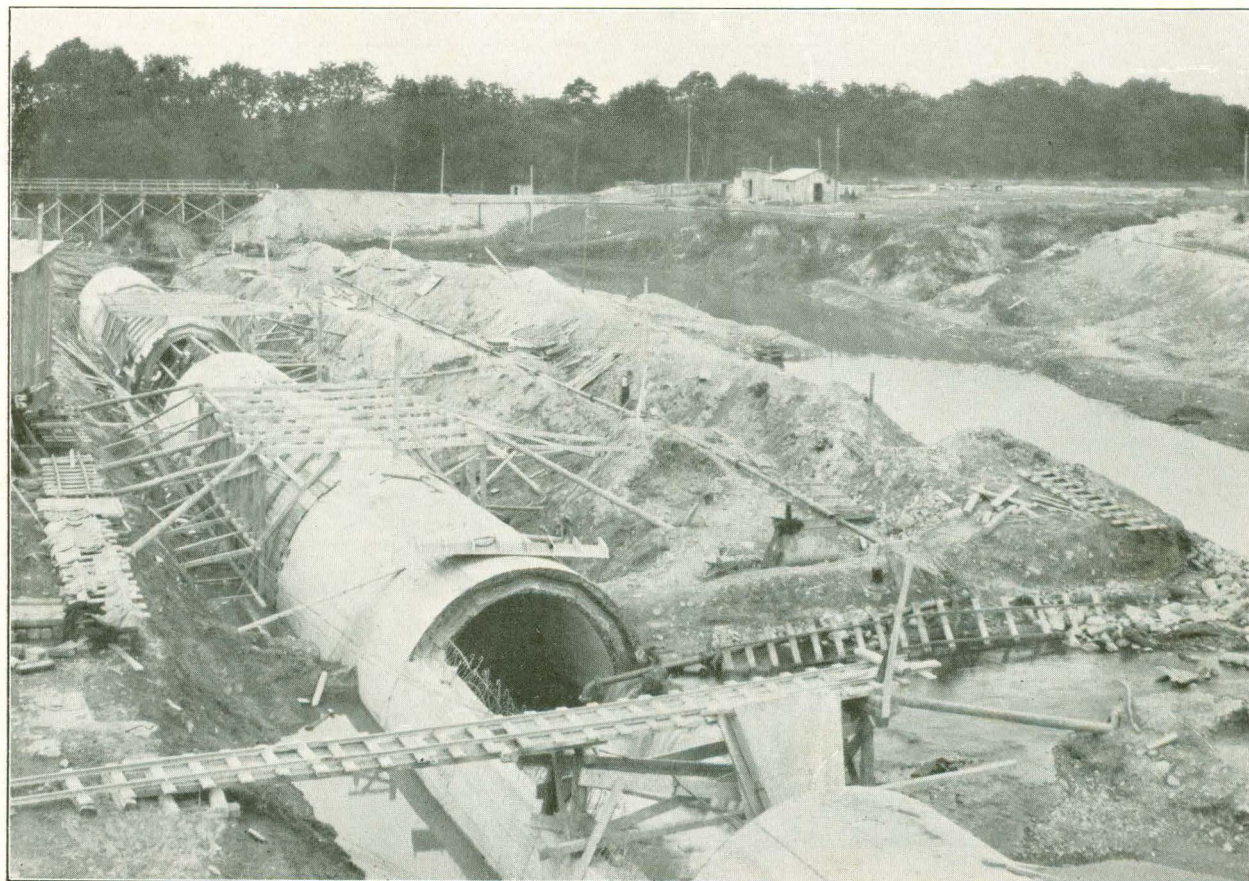
DECEMBER 1926

NUMBER 3

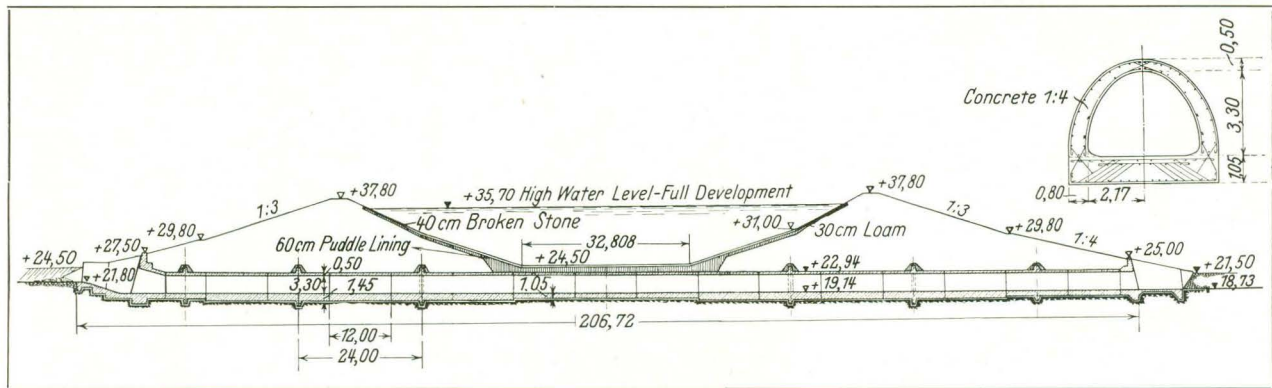
Syphon under the Headrace

The headrace branches off the river Shannon about a mile above the small town of O'Briens-bridge and adapting itself to the lay of the land

extends in long drawn out convolutions to the power house situated near Ardnacrusha. On its course of about 12½ km length the headrace crosses



Blackwater-Syphon. Blackwater-River deflected



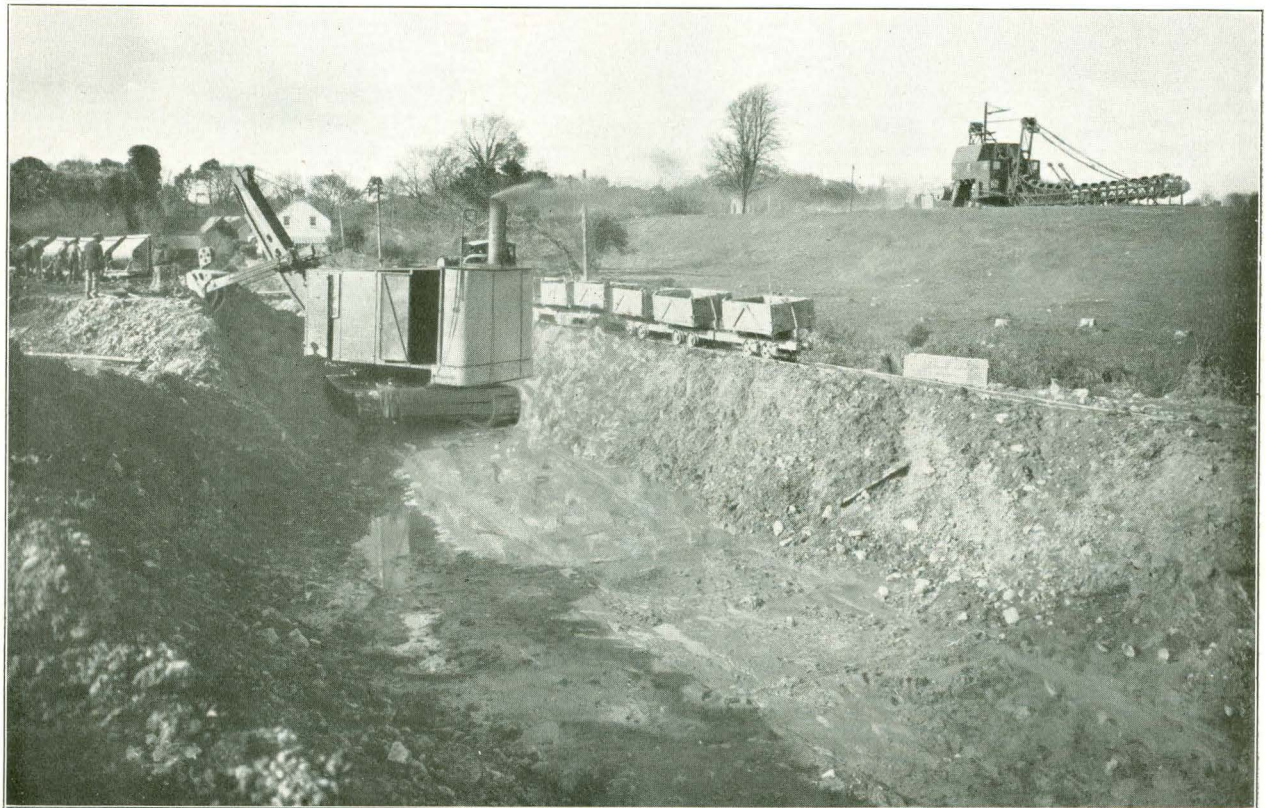
Longitudinal and cross section through the Blackwater-Syphon

several roads and numerous larger and smaller water courses. It was necessary to carry these water courses through under the sole of the headrace and in this way very interesting problems arose. Where the sole of the headrace is situated high enough in dams, the water can be passed through under the headrace by ordinary culverts or conduits; where the headrace cuts deeply into the land, it is, however, necessary to pass the side rivers through under the headrace by means of syphons.

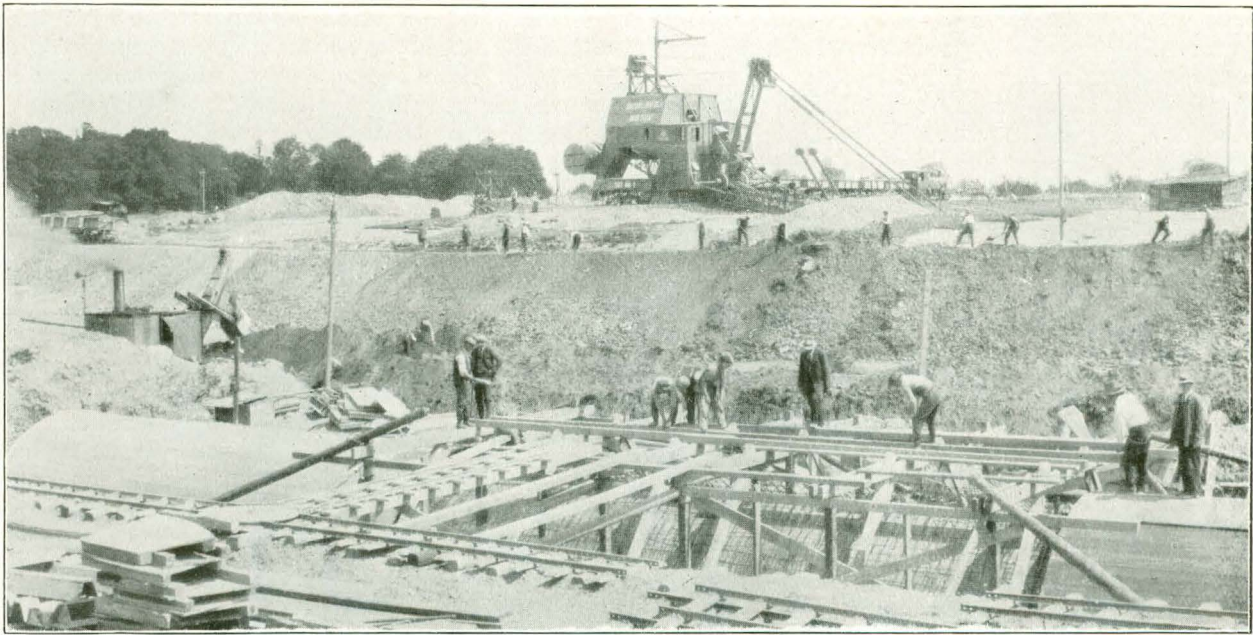
The culverts are generally simple building constructions which offered no particular difficulties,

but the syphons made higher demands upon the engineer.

We proceed to describe in the first place the construction of the syphon for one of the larger rivers, the Blackwater-River. The Blackwater-River is generally an unassuming brook which meanders along between steep embankments. After heavy rainfalls, however, this brook discharges up to 50 cu. m. water per second and becomes a raging torrent. In order to keep the dimensions of the building construction for the syphon within reasonable bounds a flow speed of 4,4 m. per sec.



Commencement of the excavation of the syphon construction pit

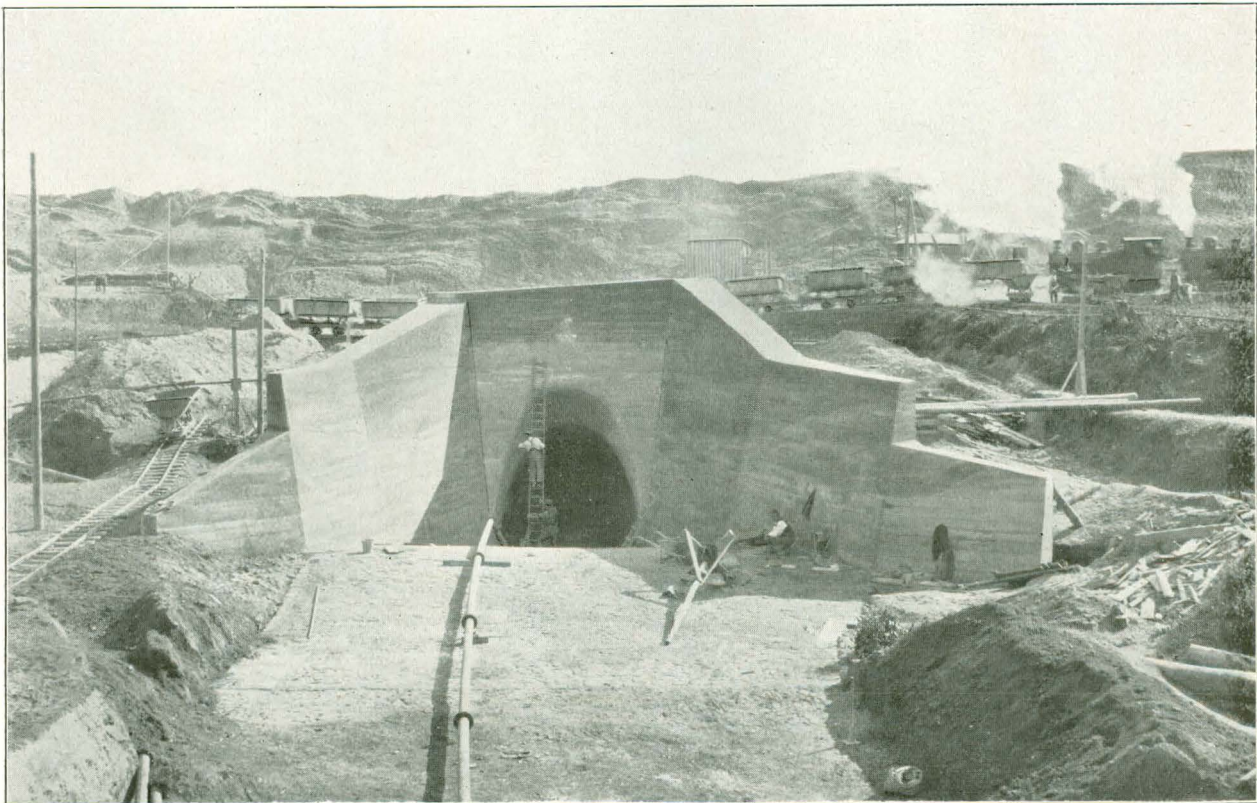


Syphon in course of construction

was permitted for the discharge of the flood water at maximum flood level. There appear no serious objections to this, since the highwater wave abates in a short time and the structure

carries this high speed only during comparatively few days of the year.

In order to initiate the conversion from the lower speed in the river to the higher in the syphon



Inlet construction of the Syphon

itself without danger and in the most suitable manner, the syphon is provided with a steep sill in the inlet structure.

The site is loamy sand in which few stones are embedded. In the dry state the ground is able to support a considerable load, but in the wet state it is less reliable. This has been taken in full account in laying the foundation of the structure. The syphon is covered by an earth embankment of 15 m. height and in order to be able to transmit the pressure developed, in a suitable manner, the arch is correspondingly proportioned and provided with iron reinforcements. The arch of the syphon is situated 1,56 m. below the sole of the headrace and it was considered advisable to make special provisions in order to prevent the percolation of water from the headrace at this place. These provisions consist of a strong, firmly rolled layer of puddle clay applied to the sole and the embankments of the headrace. The layer of clay itself was provided with a layer of stone to protect it against erosion by the flowing water in the headrace. Upon the arch of the syphon cross-ribs of concrete were provided, which prevent water from flowing along the concrete arch in the longitudinal direction of the syphon.

The work at the syphons was commenced in April of this year. An old mill was pulled down and the building pit for the syphon excavated by means of a steam shovel mounted on caterpillars and of a capacity of 0,8 cbm per stroke.

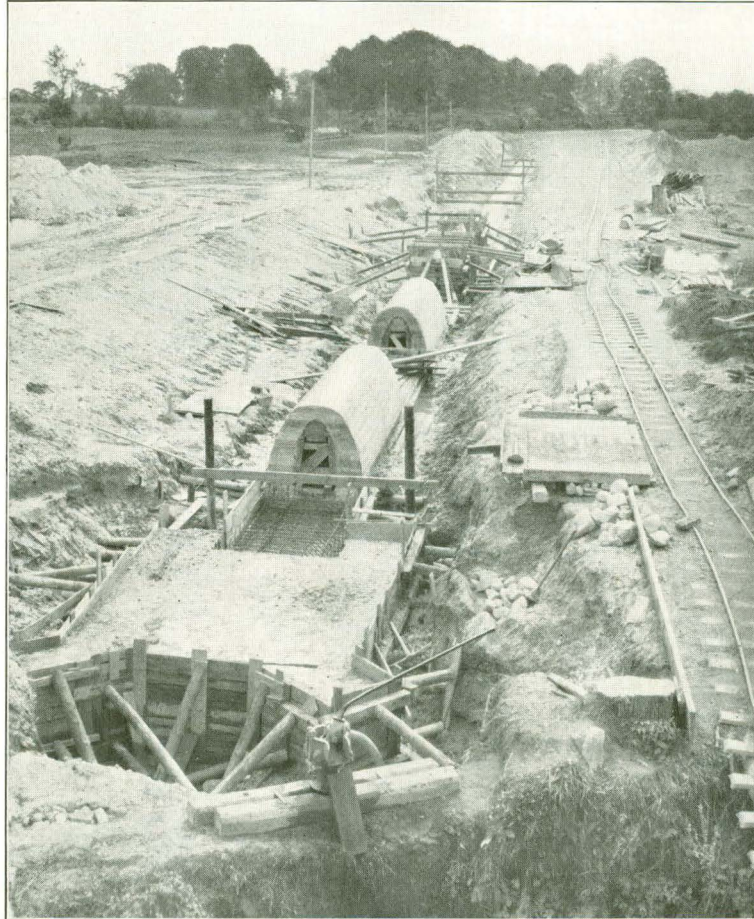
Before the excavation of the building pit of a total length of about 220 m had been quite finished, the construction of the syphon was commenced in the already completed portion of the structure.

Commencing at the lower end, the syphon was constructed in sections of 12 m. length each while every second section was at first omitted. The joints of the individual sections were encased and sealed by bitumen to prevent entry of water. Already in the middle of July the river could be led into the finished portion of the syphon through an opening provided in the arch, and the building pit be filled up. In this way it was possible to carry out the embankment for the headrace at this point, for which purpose a setting apparatus was employed. Simultaneously the upper portion of the syphon was driven forward. The entire system was completed on September 28, 1926.

The erection of the syphon involved the moving of 8800 cbm of soil and the placing of 3700 cbm of concrete and reinforced concrete. On

account of the comparatively short building period and the fact that during the construction a number of floods occurred, there is every reason to be satisfied with the result attained.

Besides the large syphon for the Blackwater-River seven smaller syphons along the course of the headrace are to be constructed. The last illustration of our series of pictures shows the section of one of these smaller syphons, the Annegrove Syphon, in course of construction.



Construction of the Annegrove Syphon