



2nd YEAR

OCTOBER 1927

NUMBER 1

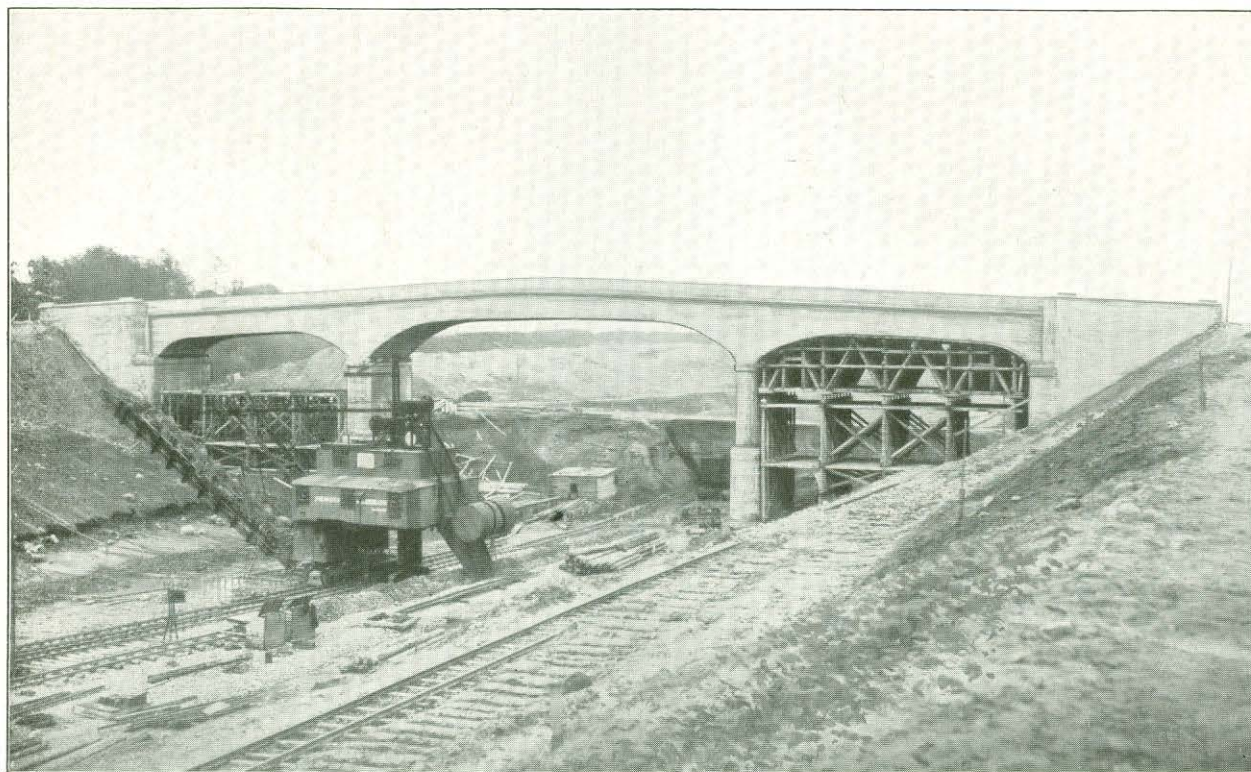
The Blackwater Bridge

Provision has been made for three bridges across the 12 km. long Head Race of which one has already been built and is called the Blackwater Bridge.

This bridge carries the road from Limerick to Broadford over the Head Race and provides for the heavy traffic between Limerick and East Clare;

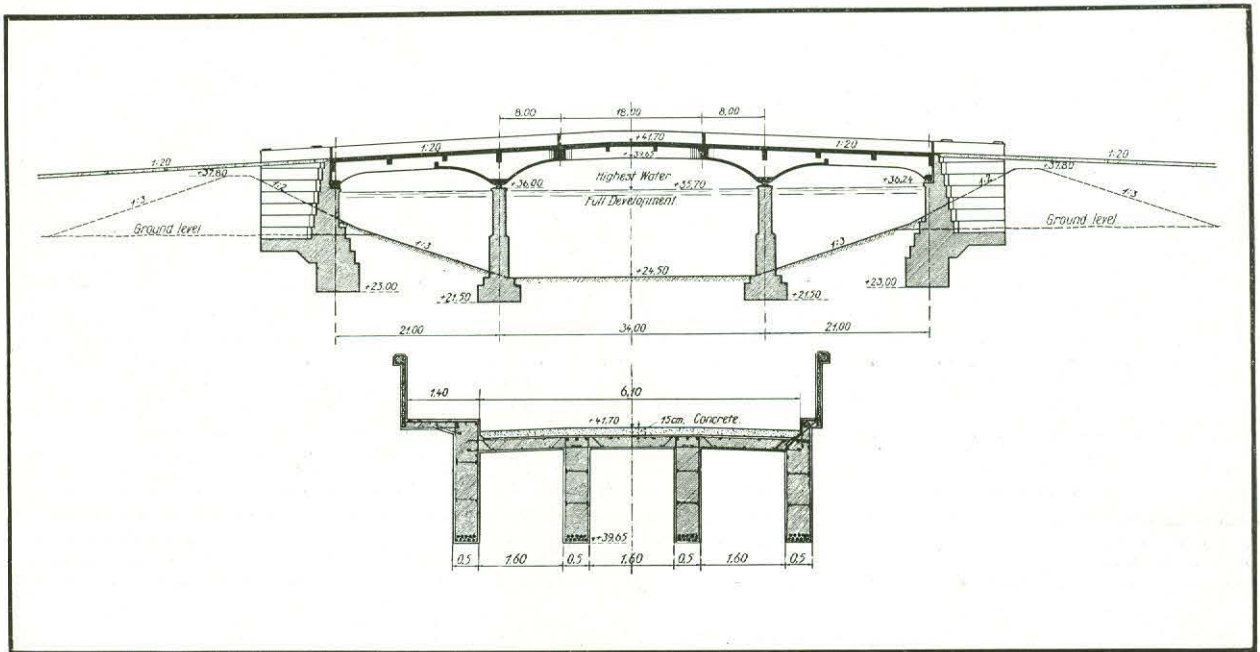
in addition some of the materials which are needed for the building sites are also transported along this road.

At the place where the bridge was built the road had to be diverted slightly. The bed of the canal under the bridge is at a level of 24.50 m. O. D., the water level for the Partial Development will



The complete Bridge

- 2 -



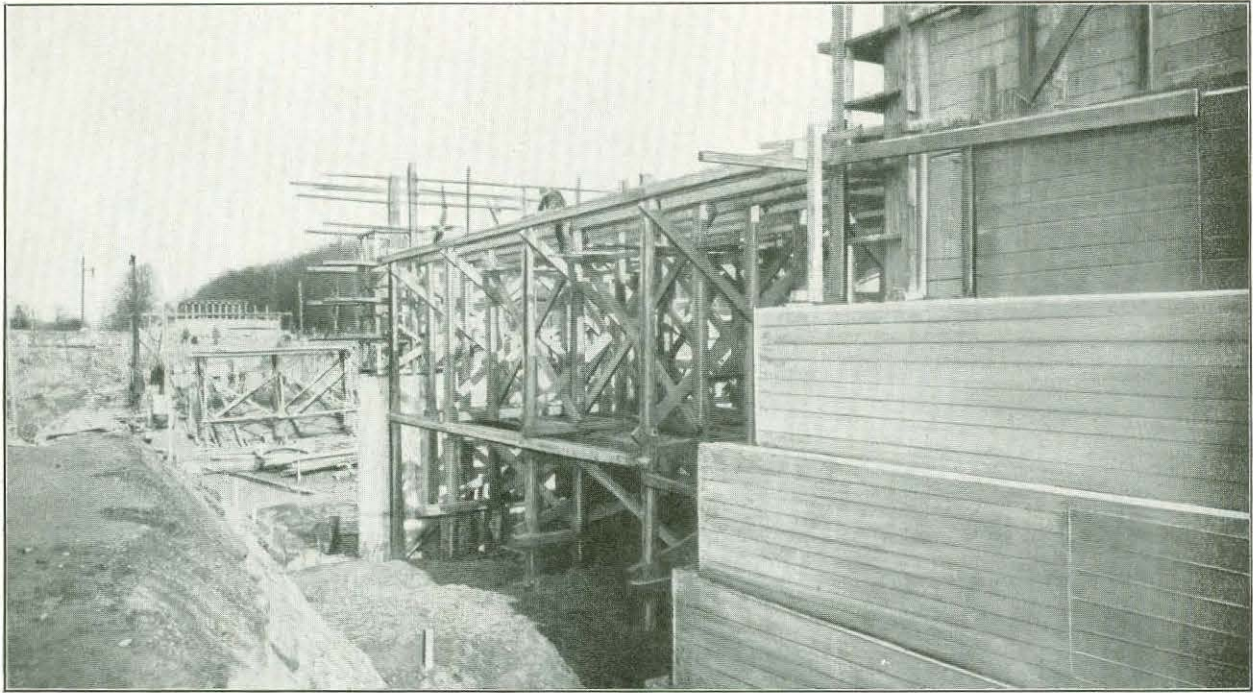
Longitudinal and Cross section

be 33.55 m. O. D. and for the Full Development 35.70 m. O. D. To enable the Head Race canal to be used for navigation, the bridge had to be raised to a height of 41.70 m.; in other words over 17 m. above the bed of the canal, approach

ramps lead up to the bridge, rising gradually to the required level at its centre. The bridge superstructure consists of reinforced concrete three span cantilevers with a suspended centre girder, the centre span being 34 m. and the side spans 21 m.



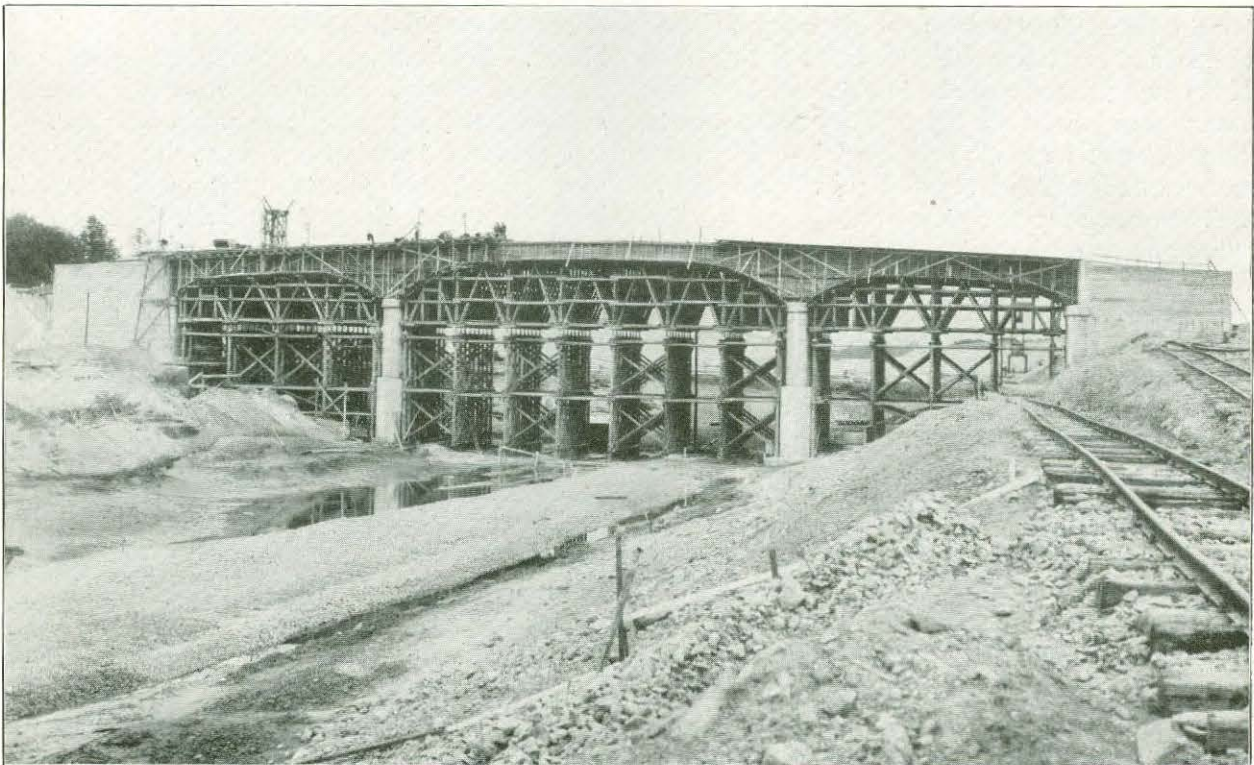
Excavation of foundation and concreting of the piers and abutments



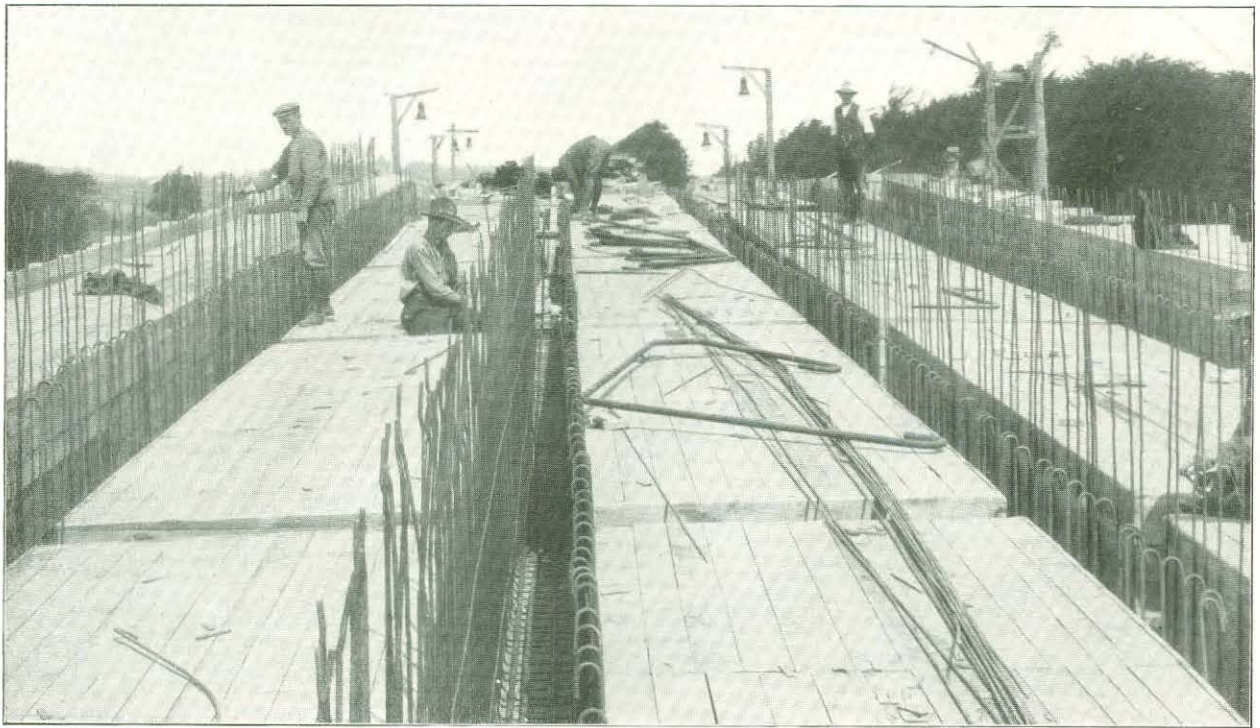
Erection of centering for left opening

long, while the distance between the abutments is 76 m. The end spans are formed by longitudinal beams which rest on the piers and the abutments and project into the middle span, thus forming

cantilevers. Steel bearings for expansion and deflection are provided on the piers and the abutments as well as on the projecting arms of the cantilevers to support the centre girder.



Erection of centering and concreting of the right abutment



Mould and reinforcement of the roadway

The superstructure of the bridge as is previously stated is of reinforced concrete. The width of the roadway of the bridge is 6.10 m., and on one side a footpath of 1.4 m. has been provided. The 4 main longitudinal beams which reach a depth of 4 m. and are 50 cm. wide form the main feature of the superstructure of the bridge. On top these beams are spanned by the roadway slab. Special mention must be made of the reinforced concrete pressure slabs which had to be provided owing to high stresses over the piers and abutments. The reinforcement of the main beams is made of 36 mm. diameter round steel bars.

The concrete mix for the piers and abutments was 8 parts aggregate to 1 part cement, whereas the mix for the superstructure was $4\frac{1}{2}$ parts aggregate to 1 part cement. Limestone which had been crushed in the crushing and washing plants at Ardnacrusha and Clonlara has been used for the aggregate. A concrete mixer of $\frac{1}{2}$ cbm. capacity has been used, the mix being emptied into elevators which conveyed it into trucks running on a 60 cm. gauge track on top of the bridge. This concrete mixer could provide 75 cbm. of concrete per 10 hour shift. The total amount of concrete used for the whole bridge was approximately 4,000 cbm.

Day and night shifts were worked during the whole time while the bridge was being built. Approximately 25 men were busy mixing and

placing concrete as well as doing the necessary earth work, while a gang of 10 carpenters were carrying out the required shuttering and scaffolding work.

One may mention the following as regards the centering required for the superstructure of the bridge. The lower part of the centering was composed of lateral horizontal rows of beams at approximately the same level as the bearings. On top of these jacks with a max. lift of 20 tons were placed, and the top part of the centering built on these. These jacks have been used in order to simplify the lowering of the centering after the bridge had been built without interfering with the bridge in any way. The shape and arrangement of the centering was designed so that it can be made use of for the erection of another bridge over the Head Race of a similar type at O'Briensbridge.

The centering was lowered on the 1st of October of this year. The centerings of the middle span were lowered first and then the centerings of the end spans. Accurate measurements showed that the bridge floor had settled 5 mm. in the centre of the middle span and 2 mm. in the centres of each of the end spans. This corresponded exactly with the calculations which had previously been made. A 17 ton roller has already been run over the bridge as a preliminary test, and the Black-water Bridge is now open for traffic.