



2nd YEAR

NOVEMBER 1927

NUMBER 2

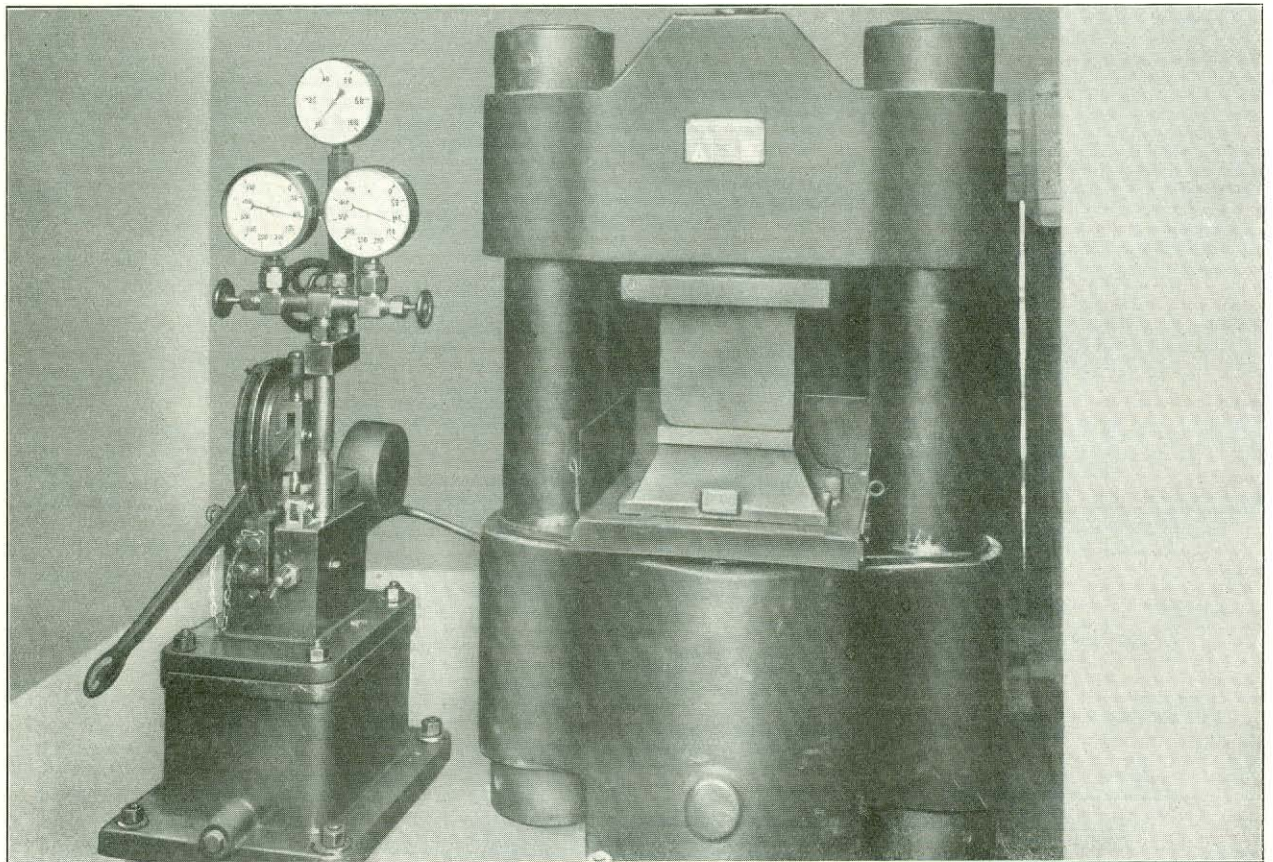
Concrete Testing and Concrete Work at the Power Station Intake Building

The necessity of erecting the large buildings at the Weir, Intake and Power Station in the short time available, forced the Contractors to place the concrete as cast concrete, because only this method of placing allows the handling of such large quantities of concrete in a relatively short period and in the most economical manner.

On the other hand the use of cast concrete makes it necessary to give the question of the grading of concrete aggregate the greatest attention in order to obtain the best possible strength and density consistent with its suitability for flowing in chutes. For this purpose a concrete laboratory was established on the Ardnacrusha Building Site and all the



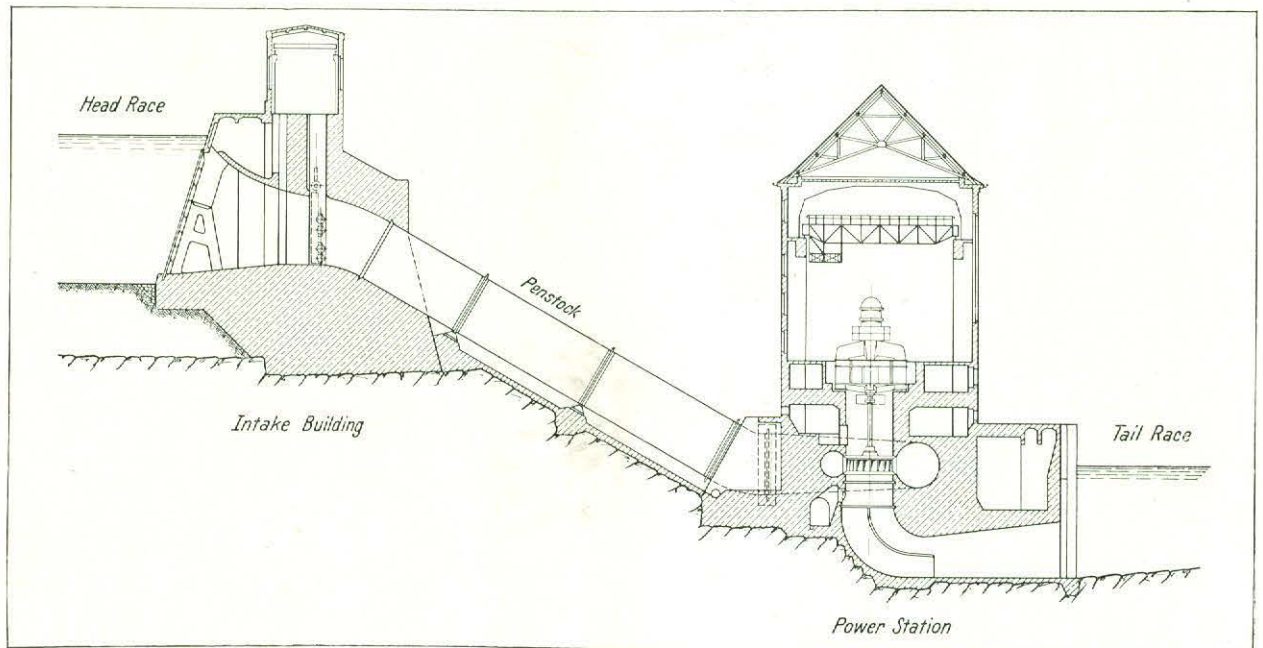
Machinery and Apparatus in the Concrete Testing Laboratory



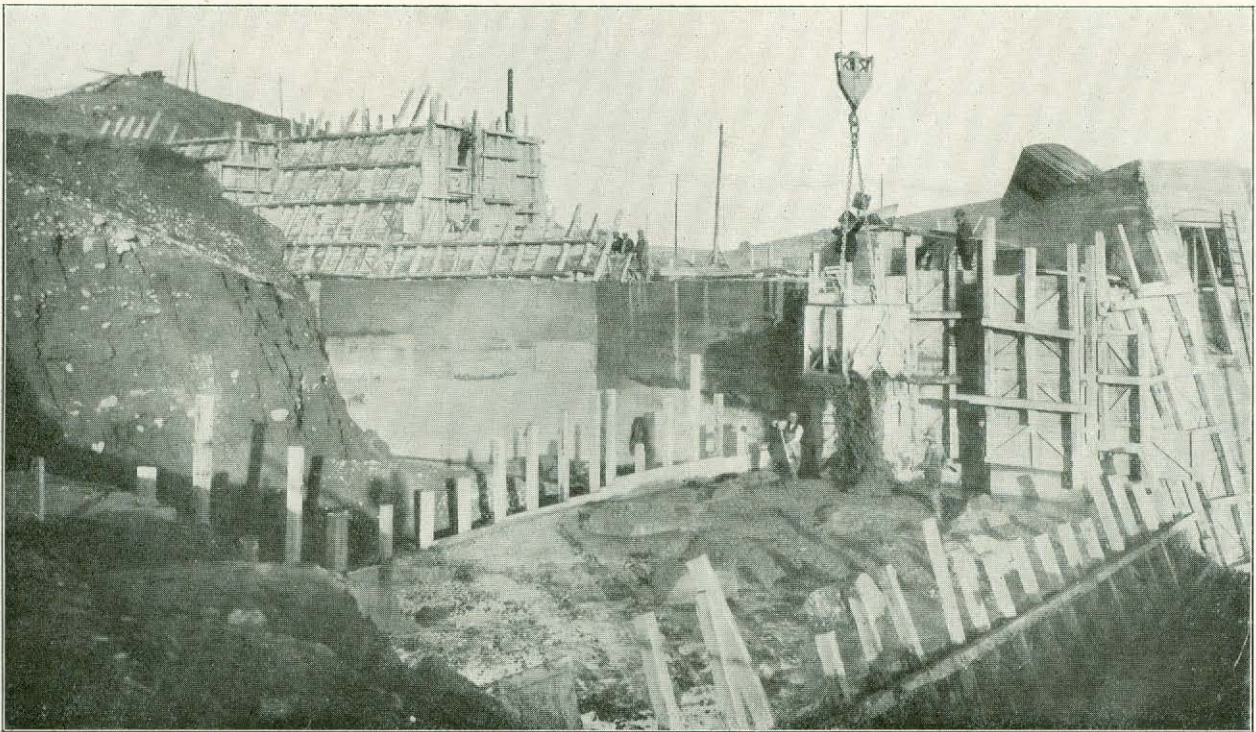
300 ton Concrete Testing Press

questions which have to be taken into consideration for obtaining the most suitable mixes for cast concrete are carefully and accurately investigated in this laboratory.

Our first picture shows a view of a room of the laboratory with the numerous apparatus and machines which are necessary to test the aggregate and concrete as well as to determine whether the



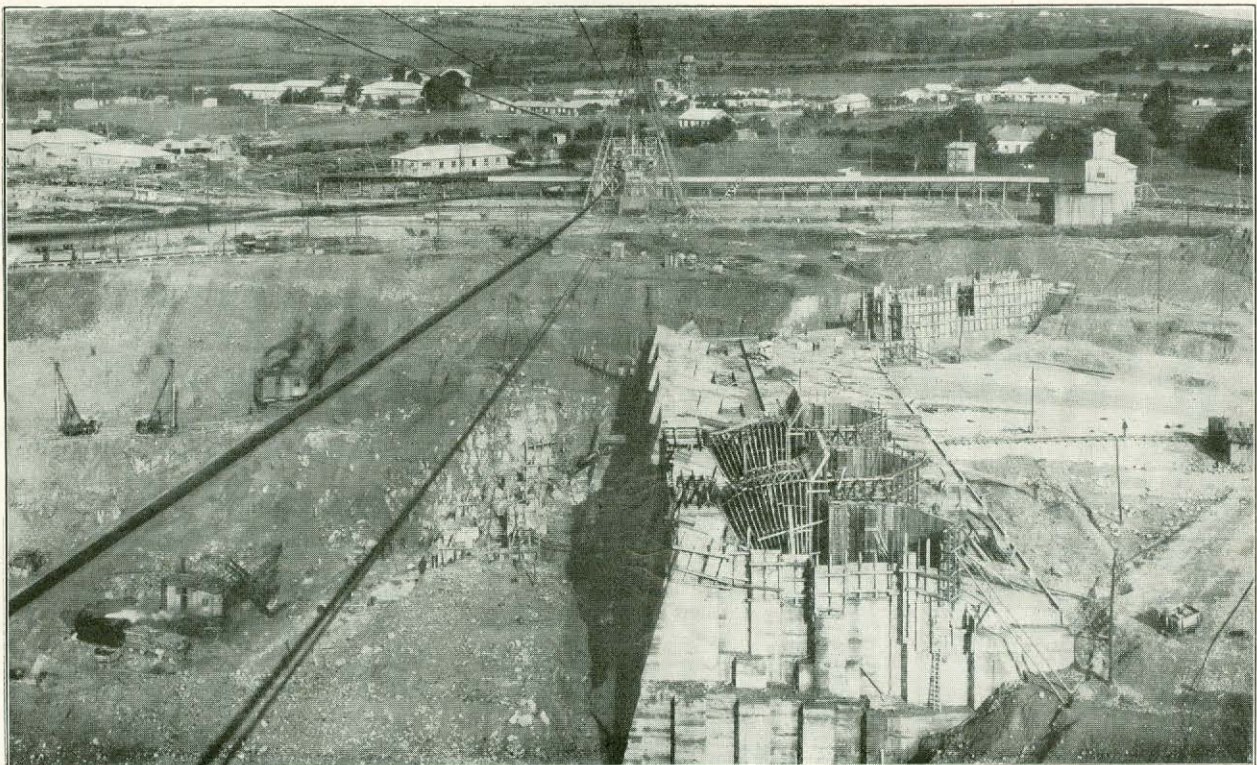
Cross section of Intake Building and Power Station



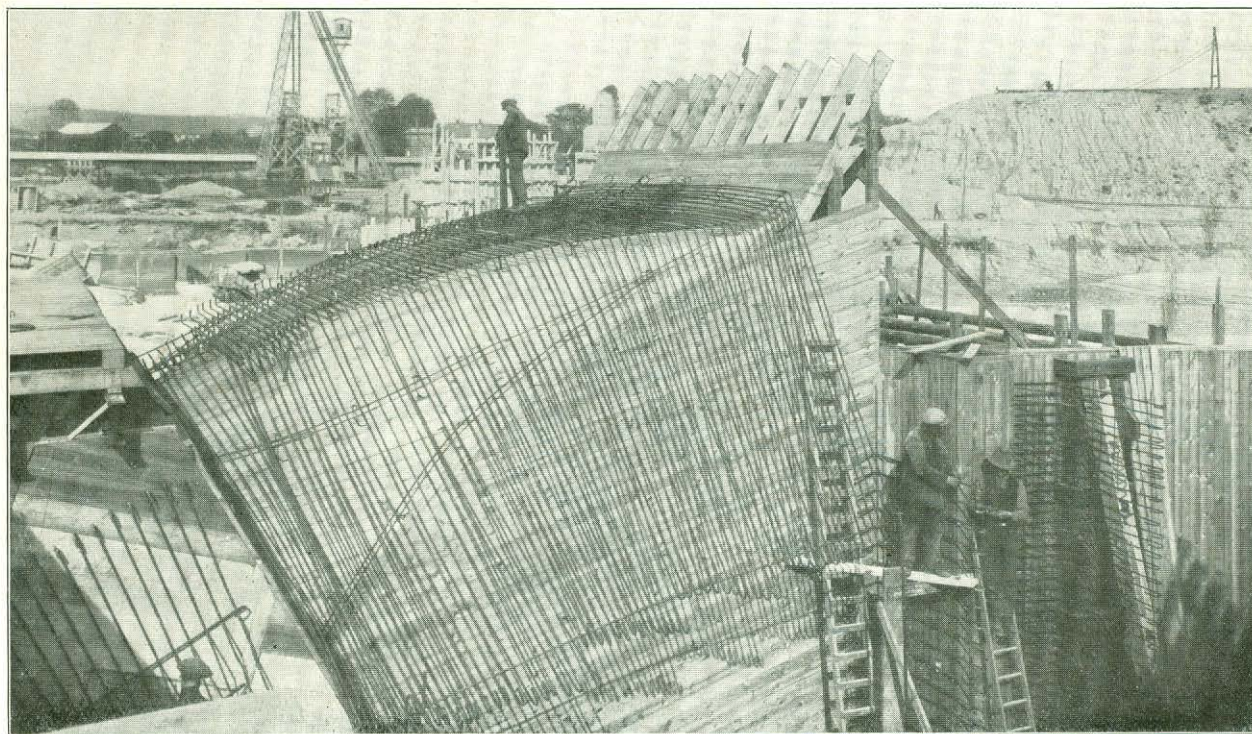
Placing of cast concrete in the Wing Wall of the Intake Building

cement complies with the required British standard specifications as to fineness, soundness, setting time and strength. As soon as a shipload of cement

arrives at Limerick, cement samples are taken from a number of different bags and tested in accordance with the above mentioned specifications.



Shuttering of Inlet Piers and Centering for Draught Pipes



Steel Reinforcement for Draught Pipes

In a second room provision is made for actually making concrete with the quantities of cement, aggregate and water calculated according to certain scientific methods. From the finished mix a small sample is put into a cone-shaped vessel, standing with its large base on the steel plate of the so-called flow table. This is a smooth level steel platform which can be moved up and down by about $\frac{3}{4}$ of an inch with a simple mechanism. The vessel is then taken away and the concrete retains its shape until the shaking mechanism is put in motion. Then the concrete cake gives way and spreads over the steel platform. If no separation of aggregate takes place during this operation and the diameter of the cake after 20 movements of the table has increased by about 100%, the consistency is right to enable the concrete to flow in a chute. After this test the total mixed concrete is filled into iron cube moulds in which it is allowed to become hard. After 28 days the cubes prepared in this way are tested for compressive strength. The testing machine for this purpose can be seen on the second picture. The concrete cube rests on a base plate of steel lying on top of a cylinder which, by means of an oil pump, can be moved against the top plate of the press. The pressure produced in this way on the cube can be read on the pressure gauges which are seen on the left side. Thus the load is steadily increased until the cube gives way and gets crushed. The position of the index on the pressure gauge can now be taken and the crushing strength of the concrete cube calculated.

In order to have a check on the quality of the concrete actually produced for construction work, samples of the concrete are regularly taken when the concrete is still fresh, and test cubes are prepared for crushing after certain periods so as to determine their crushing strength.

The next picture shows cast concrete being placed in position on the building site. It can be seen how the concrete flows out of the bucket into the shuttering of the building where, if the materials are accurately gauged and the water control correct, it spreads like a doughy mass. In this way the expert knows that it has the right consistency. Only 2 workmen are necessary to tip the bucket and prevent accidental separation of the aggregate when the mix is poured out. Large stone displacers are used in construction work where large quantities of mass concrete are placed.

A great deal of concrete work has already been done on the Intake Building of the Power Station. Built on solid rock, a large concrete wall rises out of the excavation pit as a protection against the waters of the Head Race. Only half of this wall has as yet been built.

The last 2 pictures give an idea of the difficult shuttering for the inlet piers and the wooden frame construction providing for a proper passage of the water from the Head Race into the pipes through which the water will flow into the turbines. The inner layer of concrete at that point is being strengthened by means of reinforcing steel bars.