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PROGRESS ON THE SHANNON

3rd YEAR

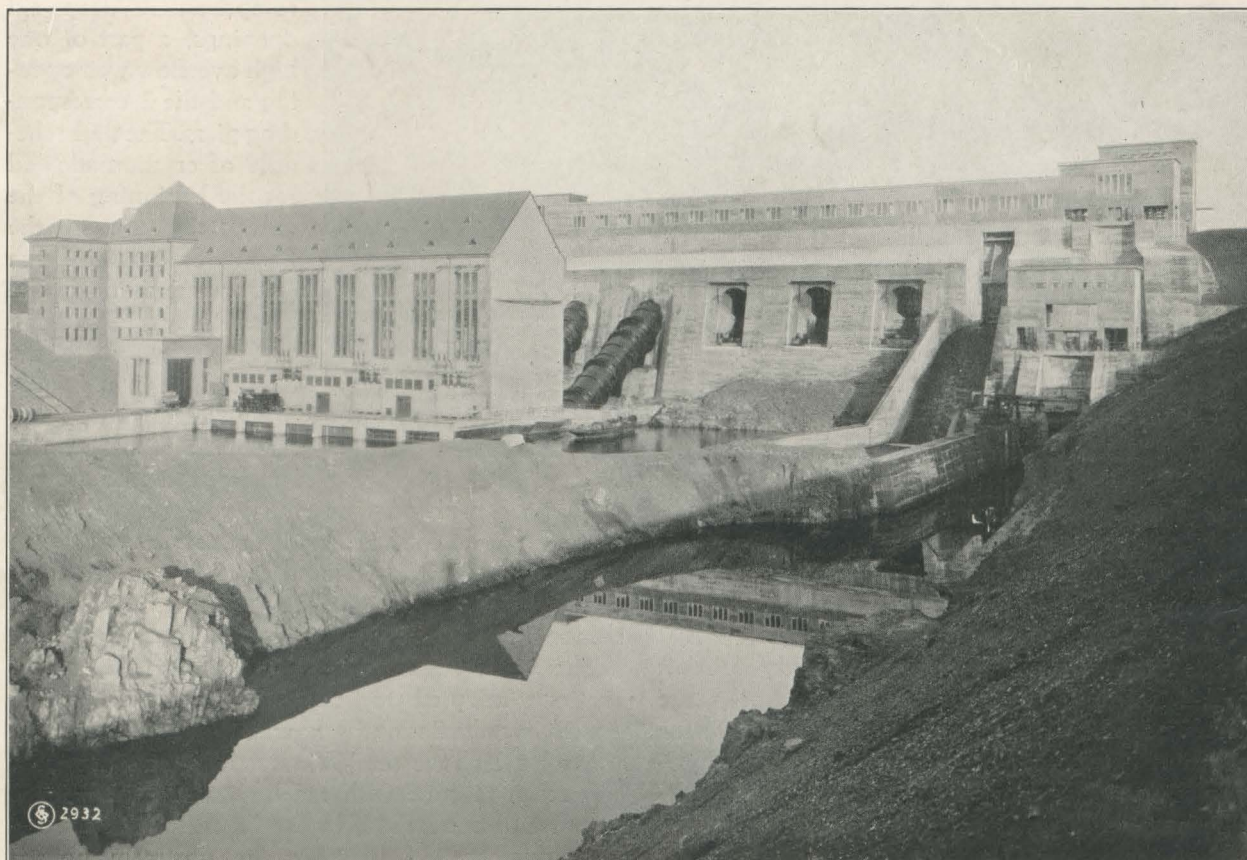
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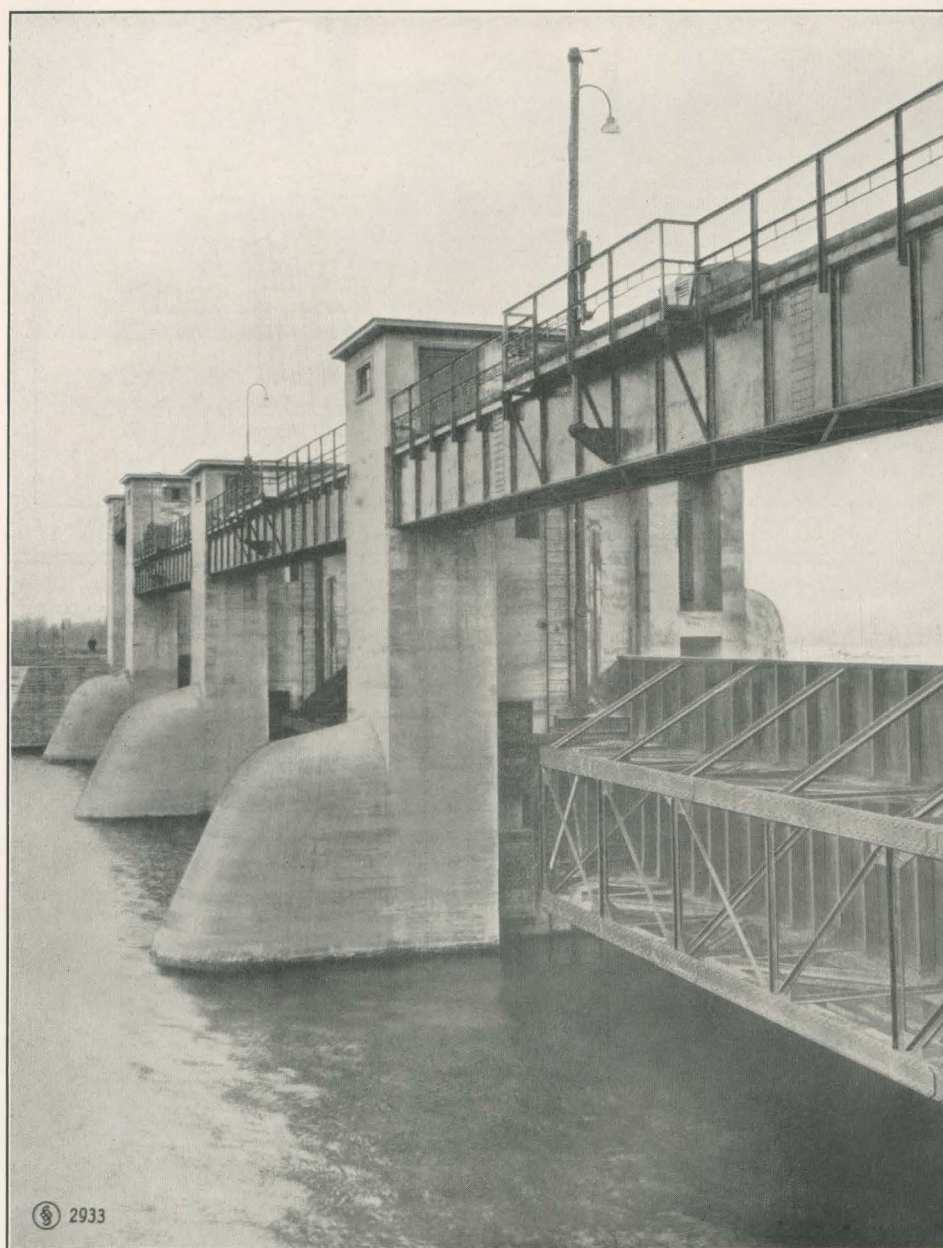
Completion of the Shannon Power Plant

The closing chapters of the Shannon Works now drawing to an end, we take the opportunity to give in this last pamphlet several more details

concerning various parts of the Works already outlined, as well as mention some minor works never yet described.



1. General view of the Power Station from the Navigation Channel



2 Downstream view of the Intake Building to the Head Race

The Power Station and the Locks have been completely finished as far as structural details are concerned. The work now being done consists in giving finishing touches to the inside plastering and painting.

Boats for experimental purposes already went up the Tail Race, Navigation Channel and Locks, the latter worked perfectly and the conditions for navigation between the Locks and the Shannon proved most satisfactory.

The net-work of lightning conductors on the roofs of the Power Station, Intake and Locks has been completed and already worked successfully in

recent thunderstorms. Similar provisions have been made at the Weir and Intake Building near O'Briensbridge.

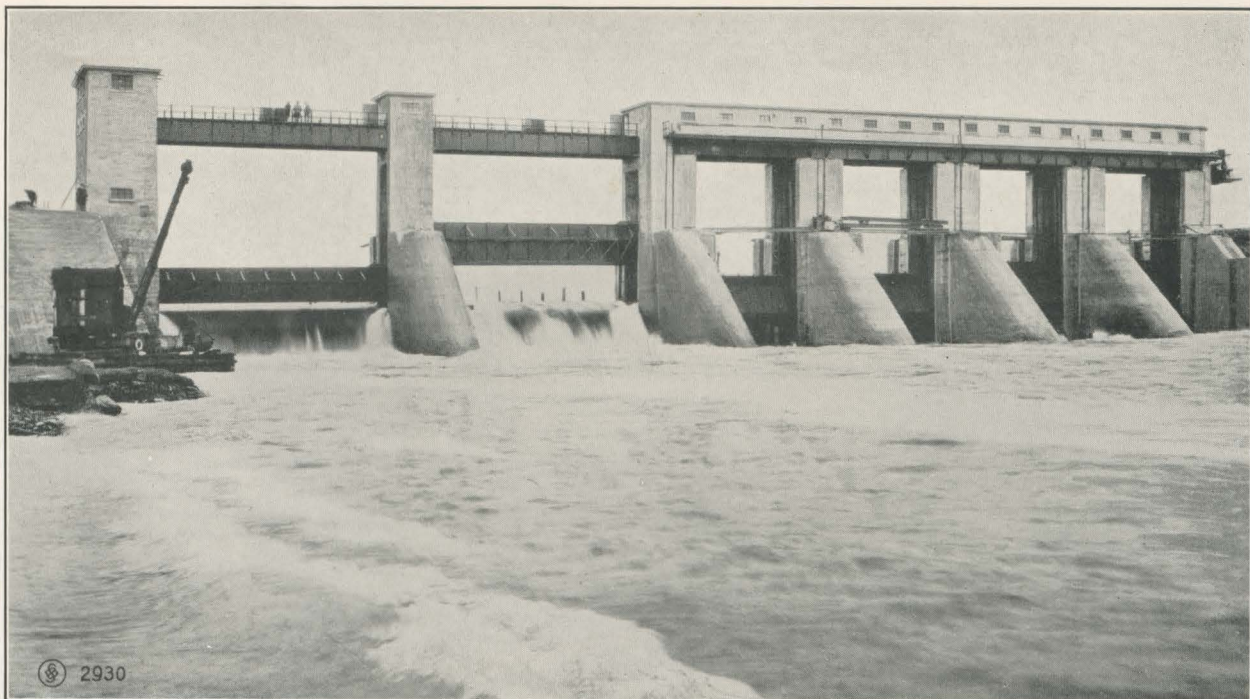
This portion of the work has been completed and all the 6 gates of the Weir can now be operated. The Intake Building was already finished some time ago.

As previously described, the Weir was built in 3 main sections between cofferdams, each cofferdam section slightly overlapping the next.

For several unforeseen reasons and modifications in the lay-out of the Weir, after the work had already commenced, the section of the Weir to be built last happened to be in the middle of the river. It comprised 2 deep sill openings, a part of one high overflow weir opening and the 2 corresponding piers. The time schedule of erection allowed for the beginning of the commercial use of the Power Station and the consequent filling of the Head Race and the raising of the water level in the Shannon basin above the Weir, during the constructional time on this last Weir section.

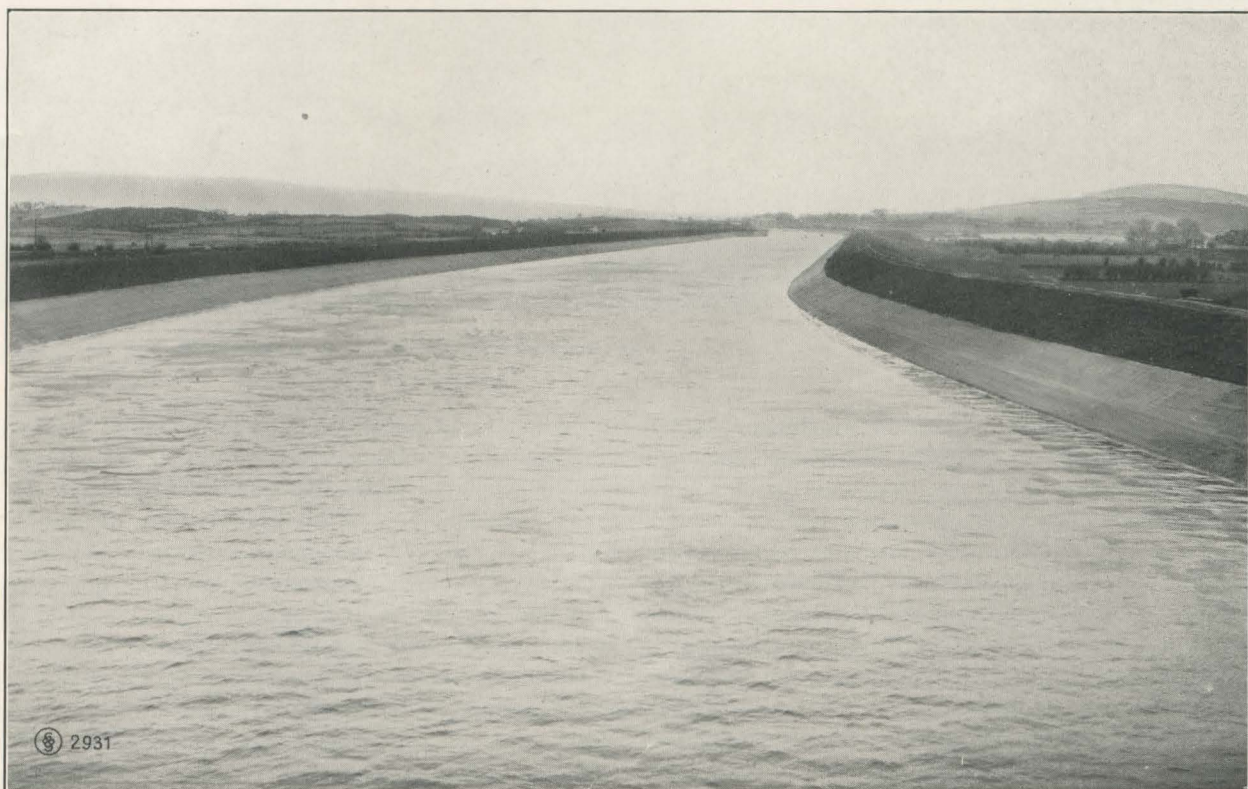
The water level was thus to reach + 32,00 towards the end of the work, namely a level some 4 m higher than the flood level in the Shannon during the constructional period for the first two sections.

The work began inside a cofferdam identical to the one adopted for the second section. After approximately 2 months however, the raising of the water level above the Weir was begun and a special cofferdam to cope with the highest level of + 32,00 that would be reached, had to be built. This cofferdam was erected between the upstream normal cofferdam and the by then completed 2nd and 4th

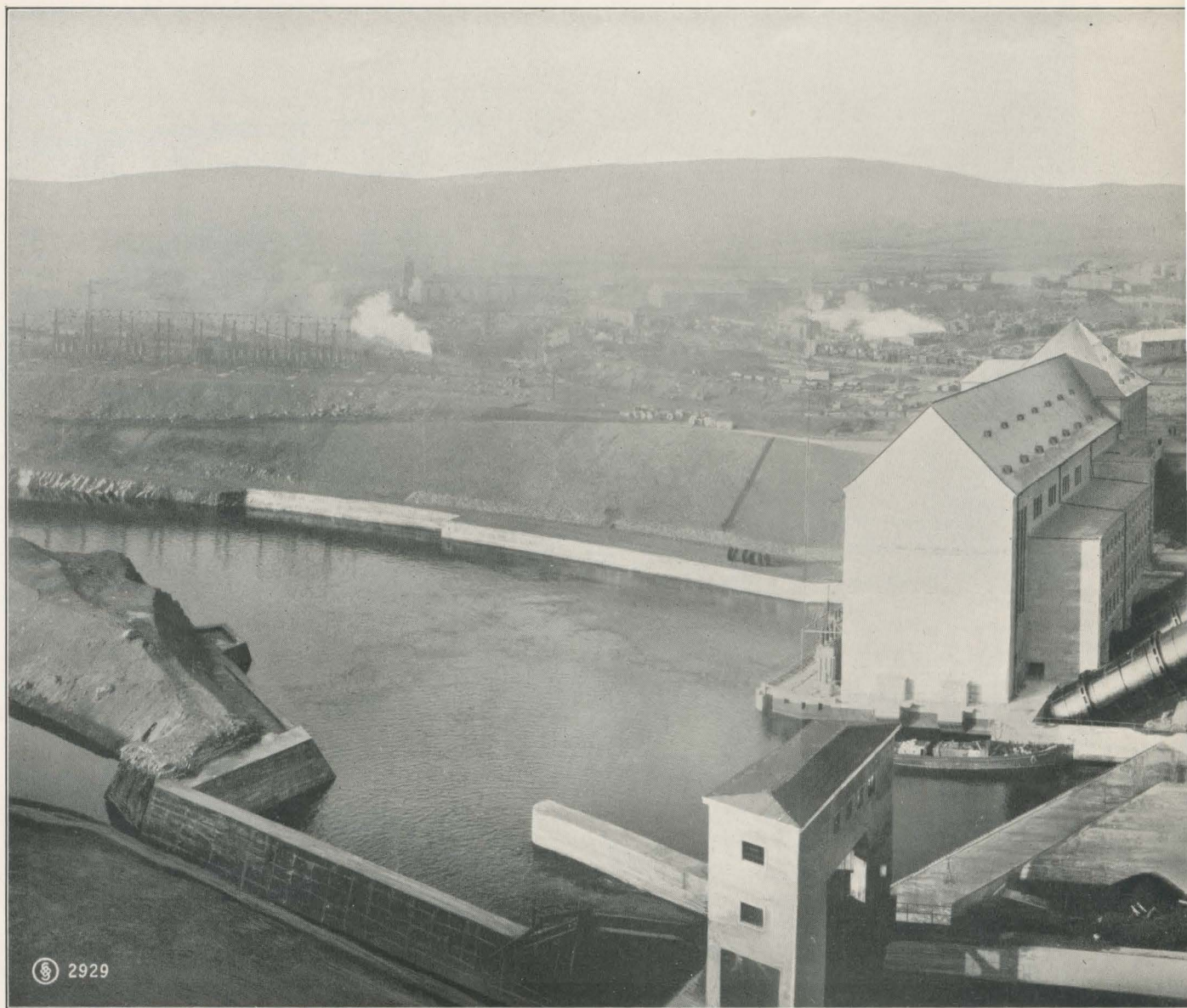


3. General view of the Weir from downstream

piers from the right shore. In plan the cofferdam was shaped as a rough V, the ends joining to the two piers; the type of joints allowed for an easy removal of the cofferdam. The cofferdam was of



4. General view of the Head Race near O'Briensbridge



5. General view of the Power Station with the Head Race on the right

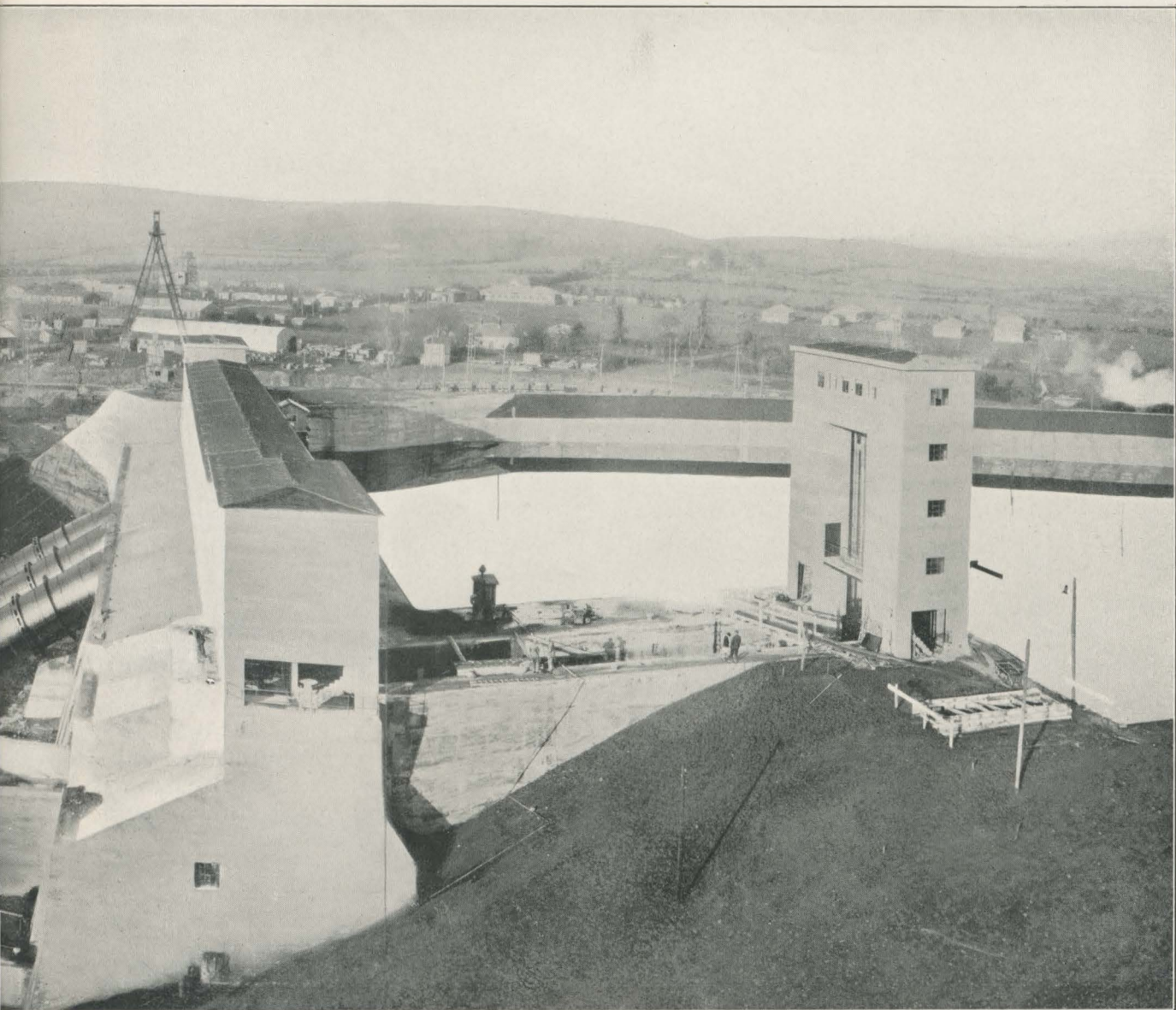
concrete and buttress type, with a certain amount of steel reinforcement between the buttresses and the wall.

The downstream cofferdam did not of course require raising as the water level there remained the same if not lower at times than before.

When the sills, spillway and the gates between the 2nd, 3rd and 4th piers were completed, the cofferdam was removed. This was done by very careful blasting in small parts, provisions having been left for placing the charges when building the cofferdam. In order not to damage the gates, in such a close proximity, the upstream dam beams were lowered and timber sheeting 5" thick placed

in front of them. The overflow sills in the first and part of the second right hand Weir openings, outside the last building section, originally left out for navigation and hydrometric purposes were completed inside special small cofferdams running between the corresponding piers. The upstream cofferdams consisted of vertical steel joists and horizontal tongued and grooved timber sheeting which proved extremely watertight; the downstream one was built of timber boxes sunk by filling them with clay. These boxes were some $2\frac{1}{2}$ m wide and 5 m long.

All the cofferdams are now removed. The steel sections were pulled out by small winches, while



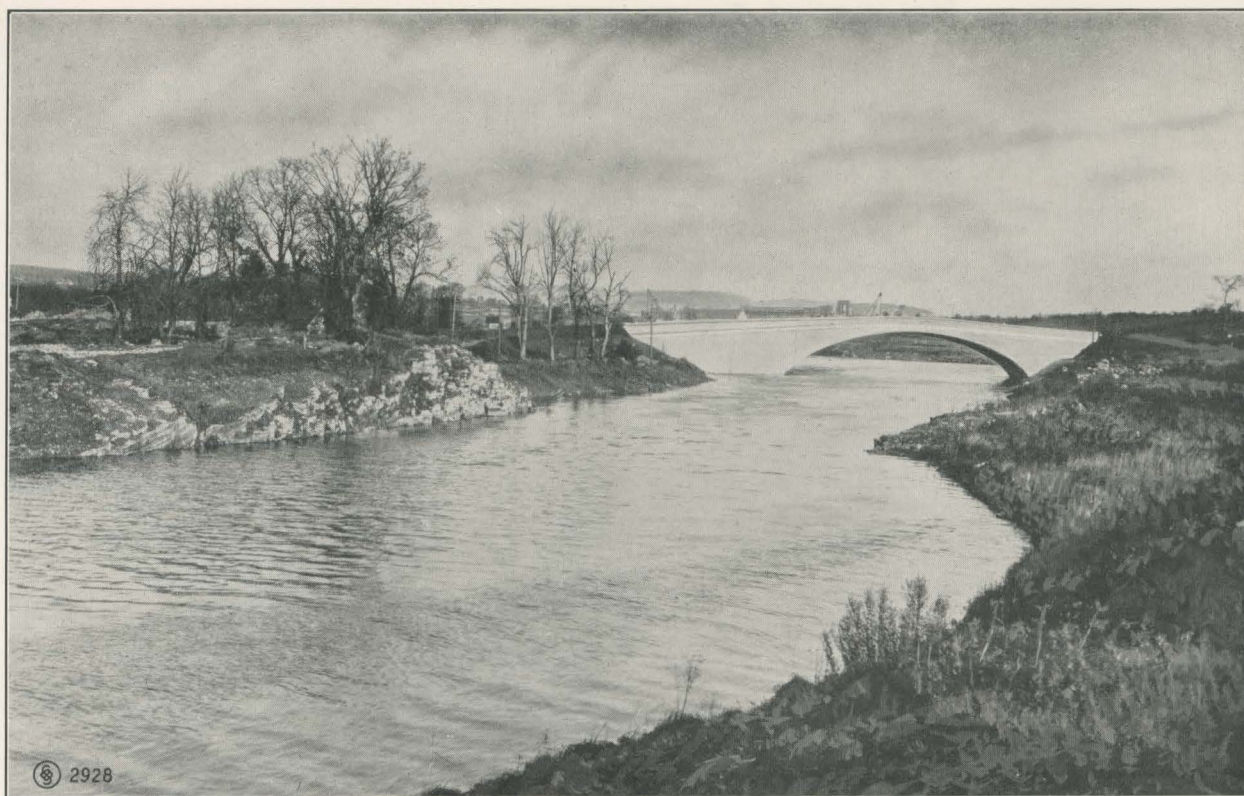
the Tail Race on the left and the locks in the immediate foreground

the clay and concrete debris were removed by a grab excavator on pontoons. All these operations were done under the directions of divers.

A small steel bridge of a single span is now being built across the Kilmastulla River diversion cut some 100 yards above the Weir. The bridge is of the simplest type and consists of steel joists resting at the ends on concrete abutments, and at the third points on inclined steel struts bearing on the rock side slopes of the cutting, at this place about 9 m deep. The bridge which is only 9 ft. wide and has a timber decking will serve as a means of access to the Weir from the left shore of the Shannon.

The reconstruction of a portion of Killaloe bridge has been completed. This work was necessary in order to provide sufficient head clearance for navigation under the new conditions of higher water levels. Only one arch of the old bridge has been removed and substituted by a light steel girder and buckle plate bridge. Provisions have been left for changing this bridge into a lift bridge. This however will only be necessary for the Full Development Scheme.

Before the arch could be removed the two piers had to be strengthened to take the unbalanced thrust of the adjoining arches which would result immediately the arch in question was thrown down.



6. Portion of the Tail Race and Parteen Bridge

The 2 piers were strengthened by completely encasing them inside strong reinforced concrete cylinders carried down to the solid rock foundation of the existing piers.

A timber scaffolding was then built to the underside of the arch, the latter removed stone by stone and the steel girder bridge built in its place.

In order not to interfere with the considerable traffic between Killaloe and Ballina, a temporary timber bridge was built alongside the span under construction.

For the Partial Development Scheme now in operation no banking was necessary round Lough Derg above Killaloe, as the maximum water level will never exceed +33.55 or namely the present high winter flood level.

A certain amount of work was however necessary between Portumna and Meelick in order to prevent continuous flooding of arable lands and win some land from the river. Banks were built and a drainage system provided. The water behind the embankments is collected at 3 points and pumped over the banks into the river. The pump stations are in plain and reinforced concrete and each houses one pump, except one station which has two. The pumps are automatic and stop and start according to the water level behind the em-

bankments. In building the pump stations considerable difficulties were experienced on account of a blue clay strata which was so soft that no excavation slopes could stand. The difficulty was got over by working inside strong timber sheet piling. When the required foundation depth to solid ground was reached, the pits were filled with large stones to about 1 m depth and the whole cement grouted. When this had set, another metre of stones was packed and cement grouted and so on until the level of the underside of the concrete floor of the pump stations was reached.

In addition to banks and pump stations, two of the existing weirs, Keelogue and Meelick, were partly altered and re-constructed in order to cope more efficiently with the conditions that will prevail and to facilitate navigation.

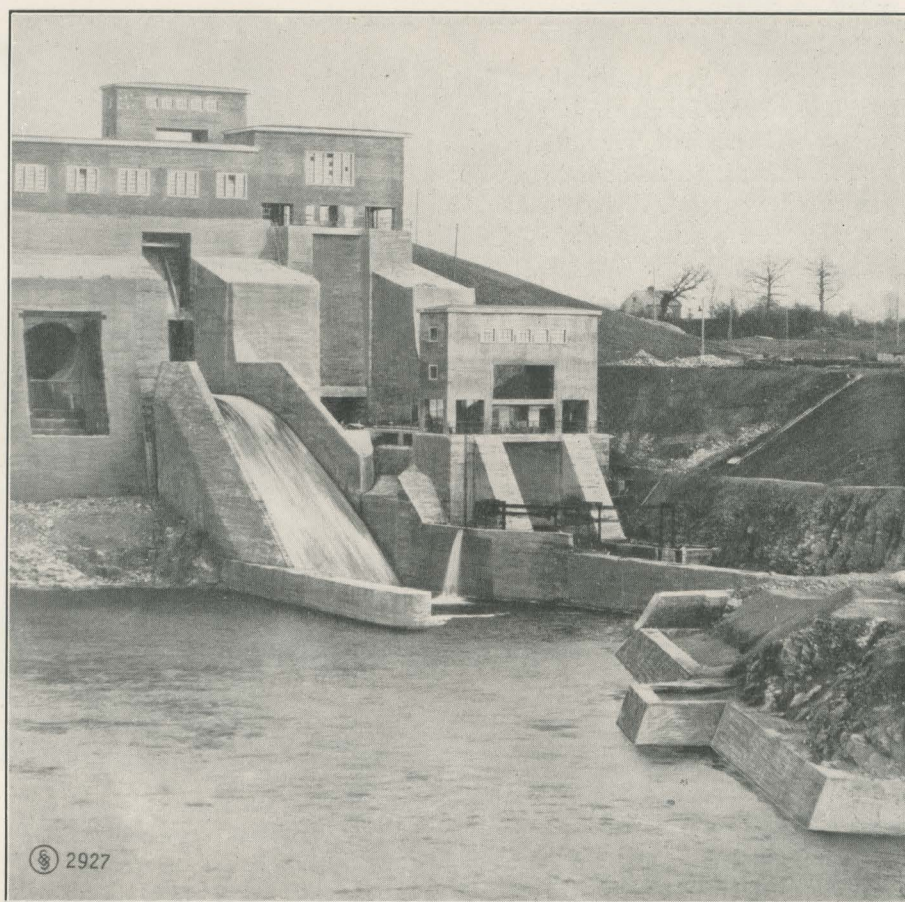
No work has been done round Lough Ree and Lough Allen as Lough Derg alone will act as a natural storage reservoir during the Partial Development. In winter when there is plenty of water in the Shannon, some of the water not wanted for the Power Station will be stored in the Lake and then discharged if necessary in the summer when the river alone might not have a sufficient flow.

The maximum capacity of the Lake for storage purposes, between the maximum and minimum

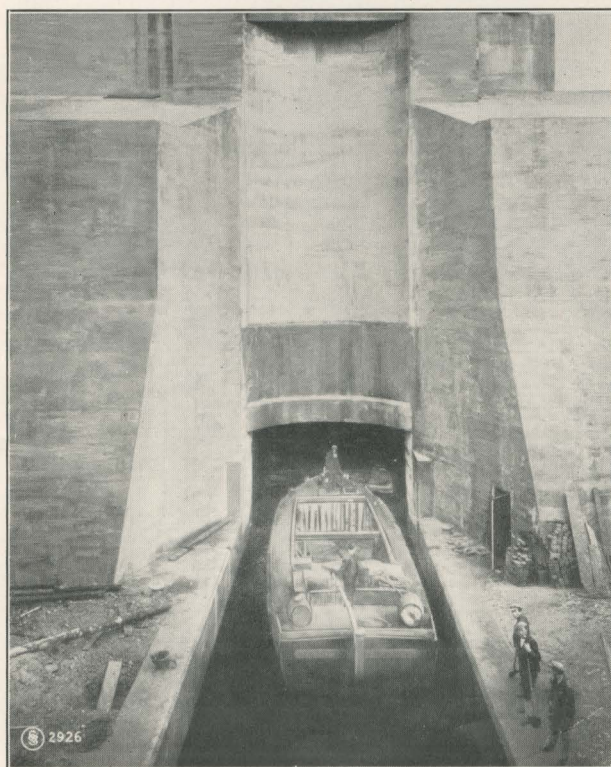
levels of + 33,55 and 32,00 is 186 million cubic metres or 6569 million cubic feet.

We have endeavoured in these pamphlets throughout the past 3½ years to give an idea of the main features only of the work connected with the Scheme. It must however be borne in mind that a tremendous amount of secondary though important work had to be carried out as well, which on account of space could not be described here.

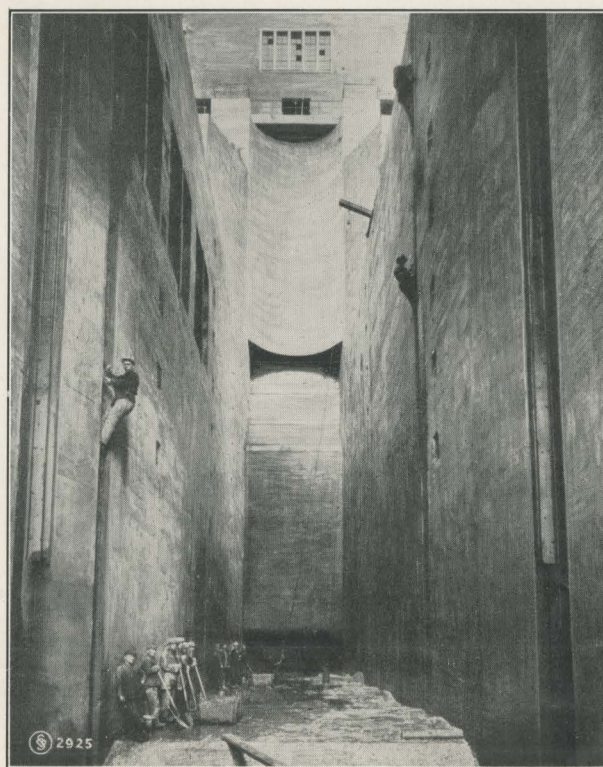
To mention but few, roads were built, telephone and electric lines stretched, 100 km of temporary railway lines laid, excavators and other machines erected, workshops built etc. The readers will understand that for a work of such a magnitude a very large number of engineers and clerks had to be employed. This necessitated the in-



7. General view of the Overflow Channel and Locks at the Power Station



8. A ship entering the lower lock from the Navigation Channel



9. Lower lock as viewed upstream, towards the upper lock. The gate admitting ships to the upper lock is shown closed

stallation of numerous offices on site near the principal centres.

The following data will perhaps describe best the magnitude of the Scheme:

The quantities dealt with are:

earth excavation . . about 7 620 000 cub. m.

rock excavation . . about 1 236 000 cub. m.

concrete about 230 000 cub. m.

Broken stone for

canal slopes etc. about 363 000 cub. m.

Plant used during the work:

6 large multiple bucket dredgers on rails
each weighing about 220 tons.

3 large bank building machines on rails each
weighing about 240 tons.

27 smaller dredgers and shovel excavators on
rails and caterpillars.

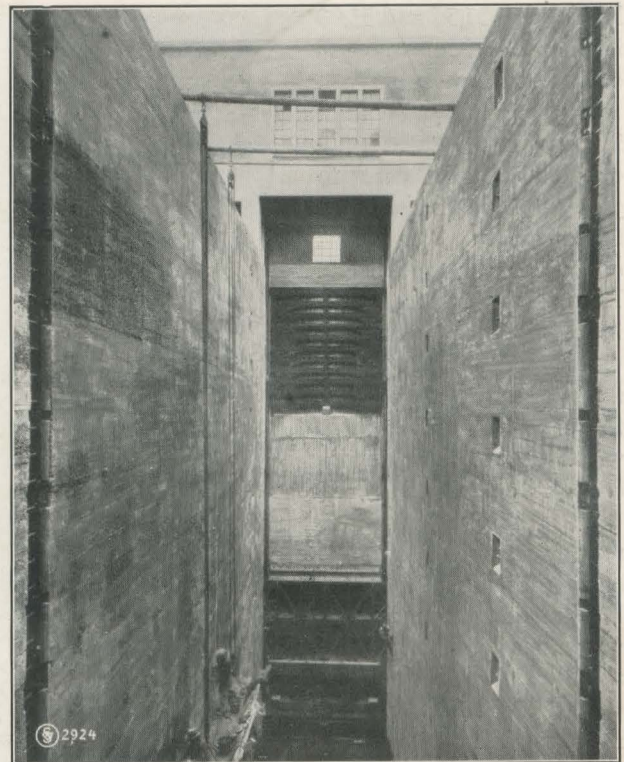
130 steam locomotives,

8 electric locomotives,

31 portable air compressors,

13 portable concrete mixers,

7 tower cranes,



10. The upper lock as viewed downstream, towards the lower lock. The lift gate admitting ships to the lower lock is shown in a lowered position



11. General view of the Generator Hall in the Power Station

3 cableways 310 m long,

1770 wagons for earth, rock and other transport,

20 lorries,

31 motor and other barges, tugs, launches
and pontoons.

The main materials imported from Germany and England and purchased in Ireland are as follows:

timber 23 000 cub. m.

reinforcing steel for concrete 2 670 tons

cement 65 000 tons

fuel oil 10 100 tons

coal 110 000 tons

ammunition 700 tons.

In spite of the far reaching mechanization of the whole work and the application of the most up-to-date plant, over 2500 workmen were employed in the average, though the maximum reached was about 4300.

Canteens and huts have been erected for these men and great trouble taken to make and keep these buildings as hygienic and sanitary as possible.

Please note that this is the last issue of our publication „Progress on the Shannon“.