With the Compliments of—

The General Construction Company, Limited.

Madras.

The Neriamangalam Bridge

Constructed under the direction of

THE PUBLIC WORKS DEPARTMENT

Government of Travancore

COMMENCED—NOVEMBER 1932 COMPLETED—FEBRUARY 1935

Formally opened by

HIS HIGHNESS RAMA VARMA SRI CHITRA THIRUMAL

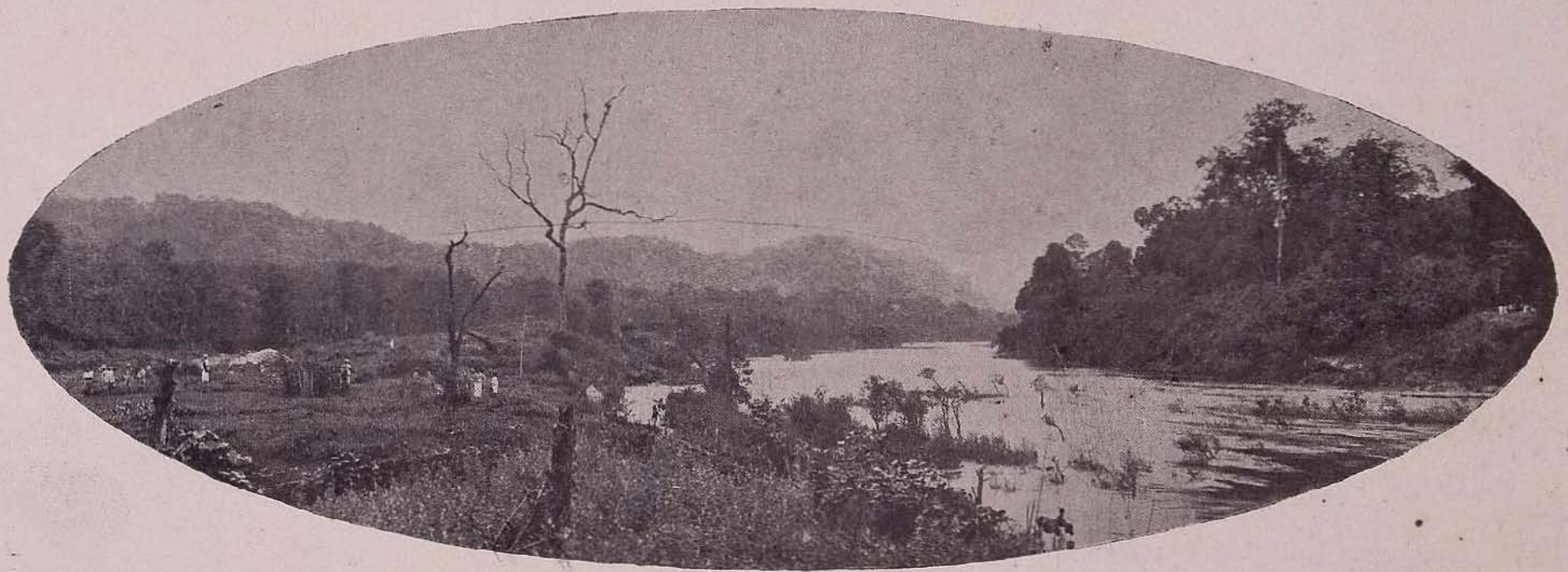
Maharajah of Travancore

2nd March 1935

The Site of

The Neriamangalam Bridge

1932



DESCRIPTION

The Neriamangalam Bridge crosses the Periyar River at Neriamangalam 34 miles from Alwaye on the Alwaye–Munnar Road and lies at the foot of the Munnar Ghat Road, which was completed in the year 1931.

The bridge is 792 ft. long, and consists of 5 spans of bow string girder construction each 140 ft. long in reinforced concrete, the clear waterway provided being 655 ft.

The piers, of which there are four in number, are of mass concrete with granite stone nosings, and average 59 ft. high from bed level to the springing of the arch rings.

The Periyar River at this point is subject to very heavy floods at certain seasons of the year, hence the necessity for the amount of clearance to the underside of the bridge. The maximum flood level on record has risen to as much as about 3 ft. below the present level of the road.

The roadway is 16 ft. wide, and is designed to carry a unit loading of a 15-ton roller and a 5-ton lorry running side by side. The total distributed loading that can be carried on each of the 5 spans is the equivalent of 90 tons, or a total load of 450 tons distributed over the whole length of the bridge. The road surfacing is also of concrete.

The height to the crown of the arch from road level is 29 ft., thus making the average total height from bed level a matter of approximately 88 ft.

The abutments are also of mass concrete with granite stone quoins.

The construction of the bridge presented several unique problems, the most important of which was the foundation for the left or south abutment. The right abutment and piers were all founded on solid rock, which was found to exist at about 5 to 10 ft. below normal bed level. In the case of the left abutment, investigation showed that contrary to anticipations no rock existed, even up to 98 ft. below ground level, to which borings were carried. Soft rock was found at about 44 ft. below ground level, but the bearing capacity of this was insufficient to carry the loading of the original design. It was therefore decided to increase the area of the foundation, so as to bring the loading within the safe bearing capacity of the soft rock found at this level.

These investigations were carried out by means of an open excavation to the above mentioned soft rock level, and subsequently by means of a Calyx Drill. Due to the consequent heavy cost of shoring for this foundation, it was decided to sink a monolith. This monolith is of mass concrete, reinforced at points which were liable to stress at the time of sinking. The overall dimensions of this monolith was 60 ft. long x 40 ft. wide x 39 ft. 6 ins. high, and weighed approximately 4,500 tons.

This is believed to be the largest monolith ever sunk in India and probably one of the largest in the world. The average rate of sinking was from 6 ins. to 9 ins. per day, and was carried out by the usual method of excavation from the inside. The sinking presented no particular difficulties, as it was very carefully watched and checked at all stages of the operation, and the variation of levels at no time exceeded 9 ins. On reaching foundation level, all variations were corrected and brought to within ¾ ins. of dead true.

The bottom of the monolith was sealed with a slab of mass concrete 4 ft. thick, on which the cross walls and outer walls rested. The monolith was then filled with sand and capped with a reinforced concrete slab 4 ft. thick, on which the abutment proper was constructed.

The total loading of this abutment, including filling, is approximately 9,750 tons, and subsequent instrument measurements have shown no signs of settlement.

Another unique feature of the bridge are the joints between the arched spans and the piers and abutments. These consist of double Cast Iron sliding plates of a special design calculated to withstand the necessary stresses, and they are a somewhat unusual feature for this class of design. Their object, however, is to eliminate stresses due to variations in temperature.

The following are the description and totals of the various items of materials used in the construction:—

Mass Concrete	..	179,000	C.Ft.	Broken Stone ..	210,000 C.Ft.
Reinforced Concrete	..	30,000	,,	Sand ..	430,000 ,,
				Cement (Indian manufacture)	1,750 Tons.
				Steel (British manufacture) ..	290 ,,
				Timber (Travancore Forests)	24,000 C.Ft.

Cost approximately Rs. 5,00,000. The works were completed under the supervision of the following officers of the Travancore Government Public Works Department:—

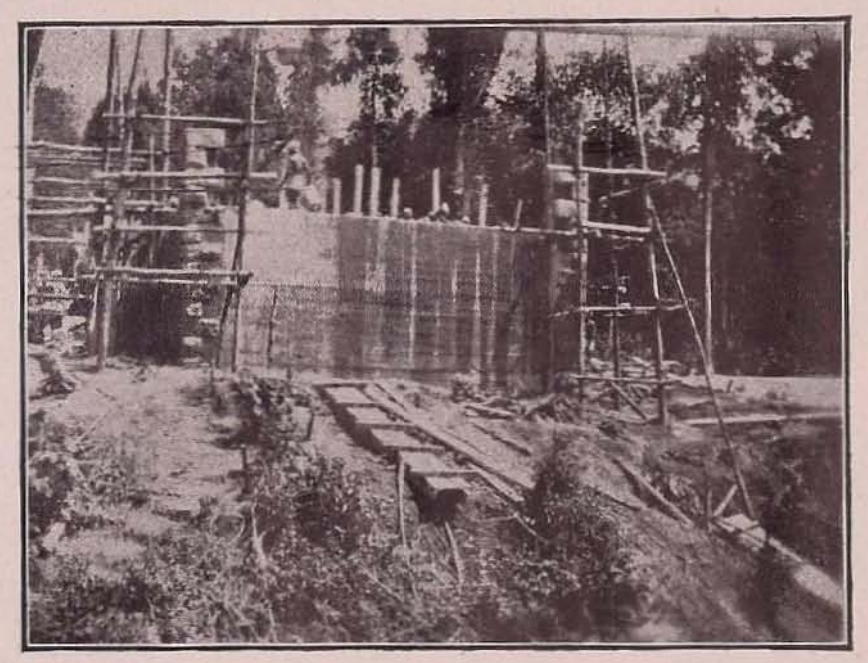
G. B. E. TRUSCOTT, Esq. .. *Chief Engineer.*

M. P. MANI, Esq., B.E. .. *Executive Engineer.*

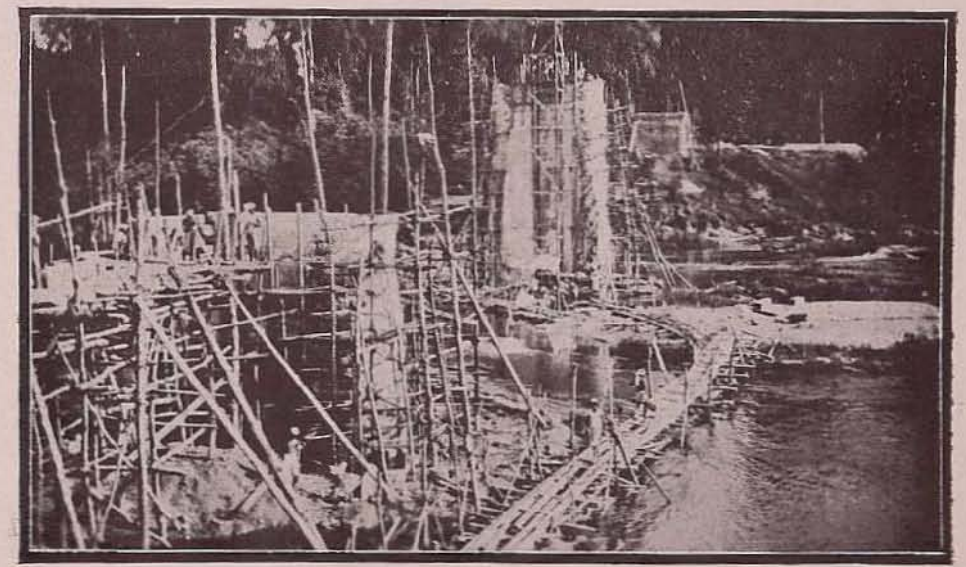
K. N. GOVINDA PILLAI .. *Assistant Engineer.*

Designed by:—C. HODGSON, Esq., A.M.I. Struct. E.—The General Construction Co., Ltd.

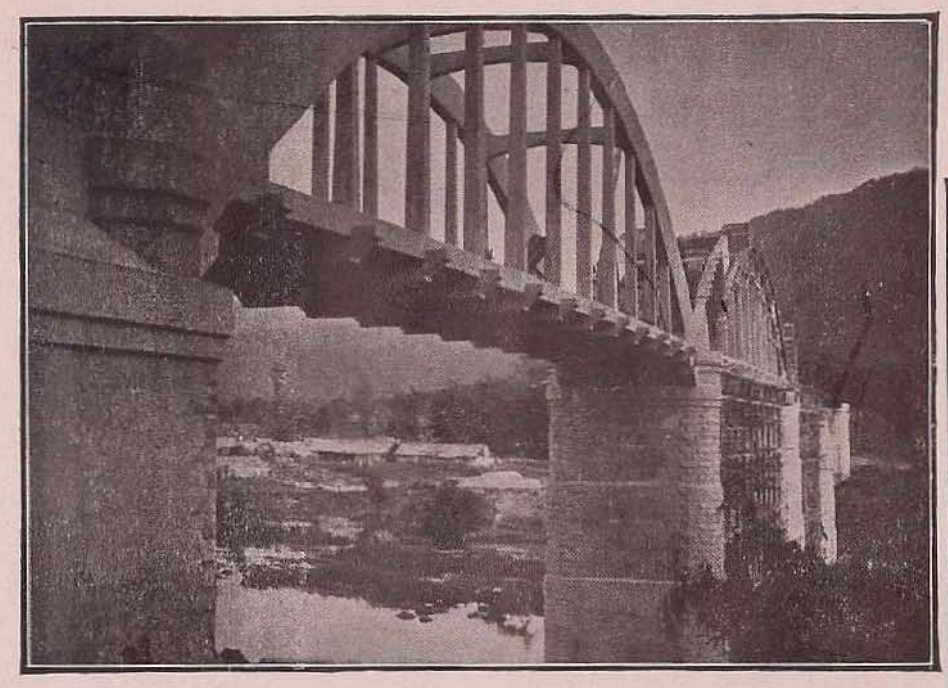
Contractors:—THE GENERAL CONSTRUCTION Co. Ltd., MADRAS.



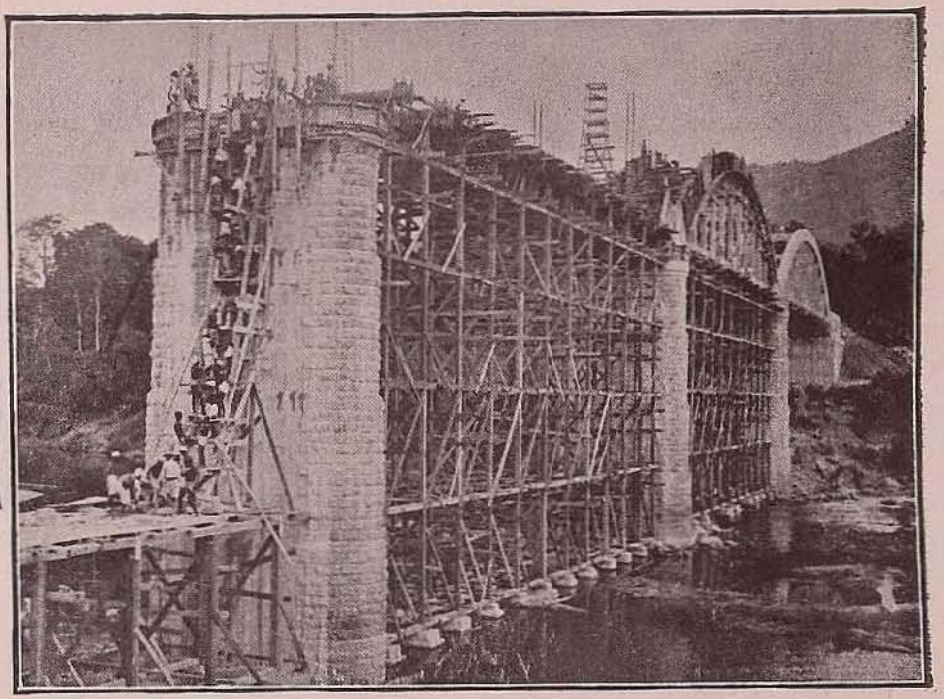
Work on the right abutment.



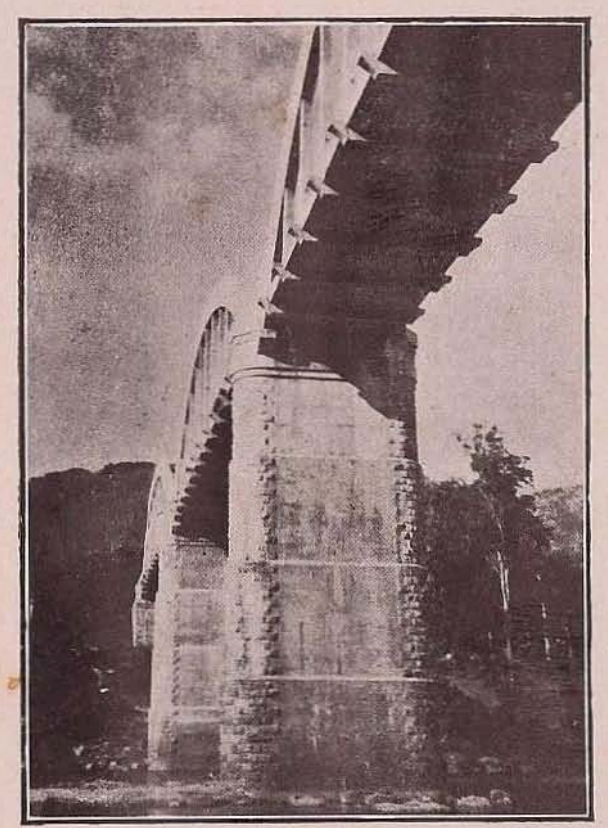
Early days on the piers.



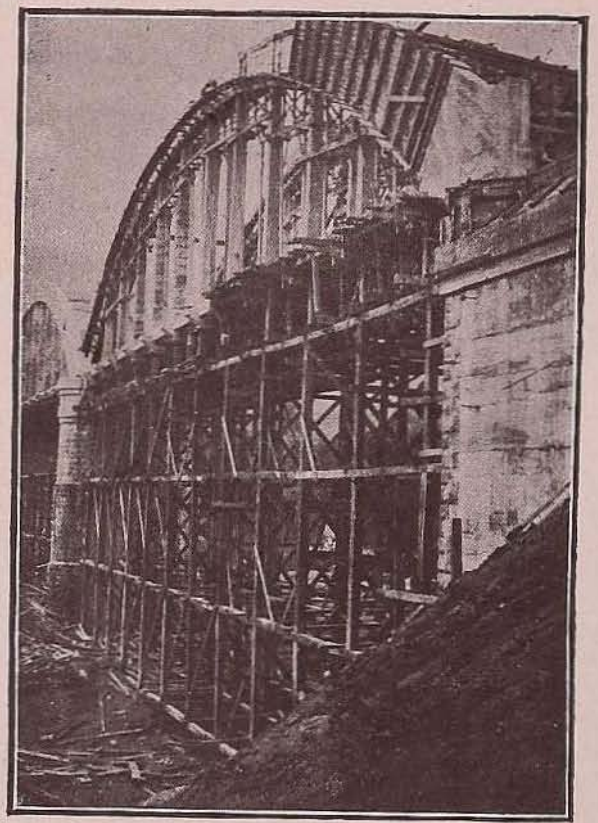
The first Span completed.



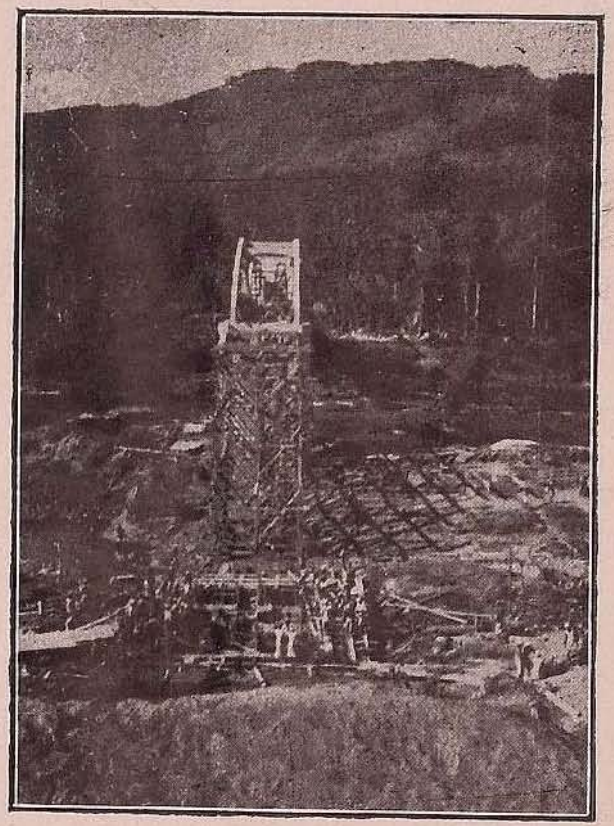
Work in progress on Spans two and three.



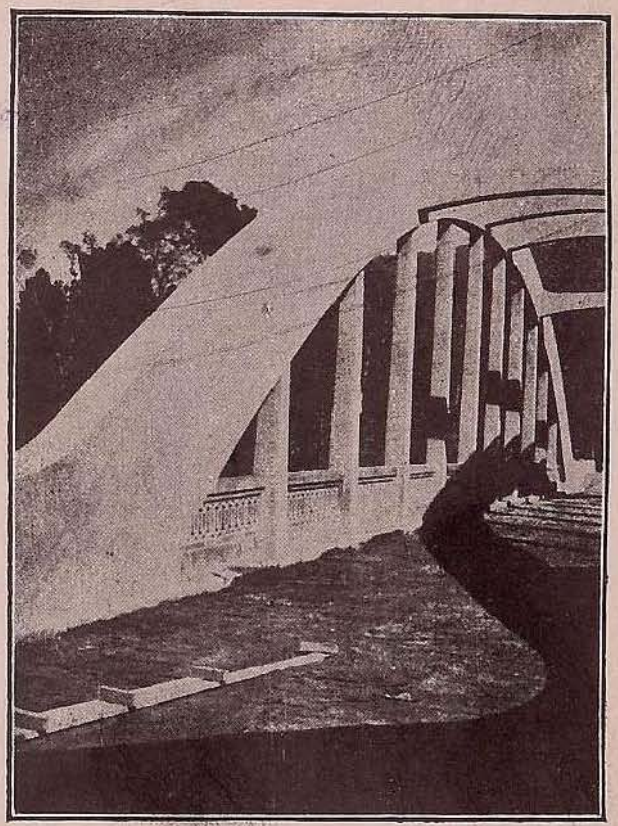
An impression of the height of piers from water level.



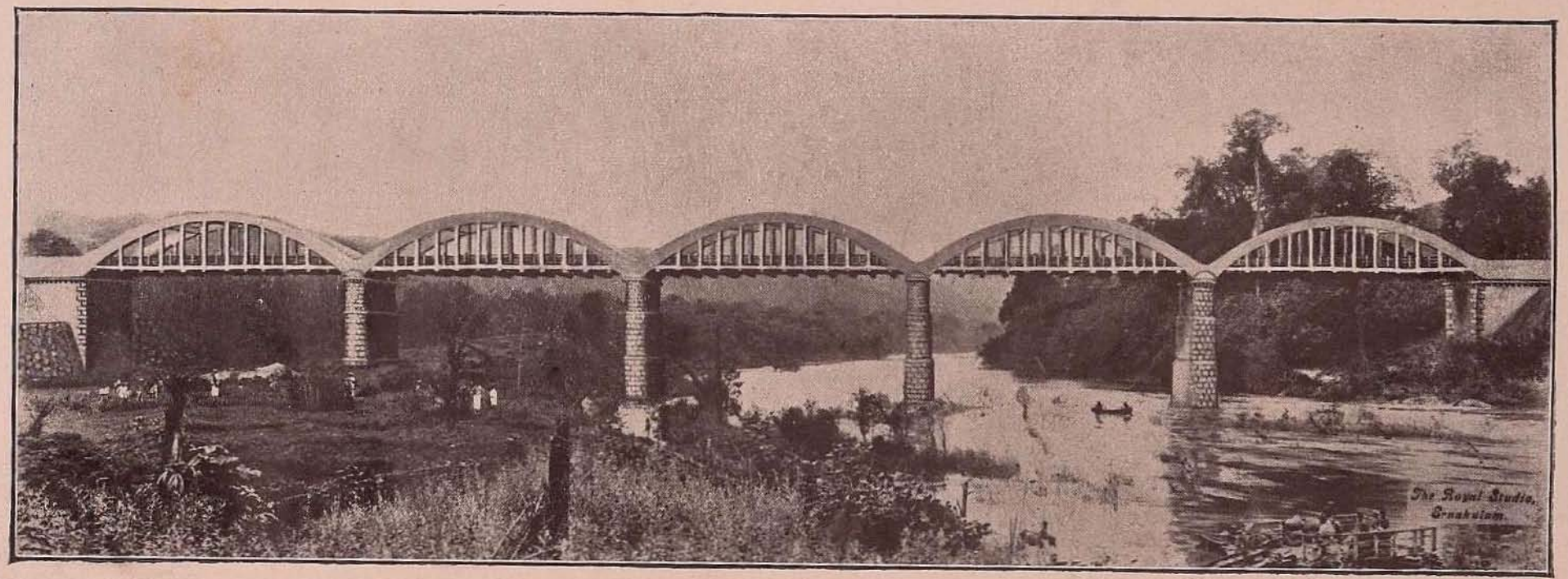
Nearing completion—the last Span.



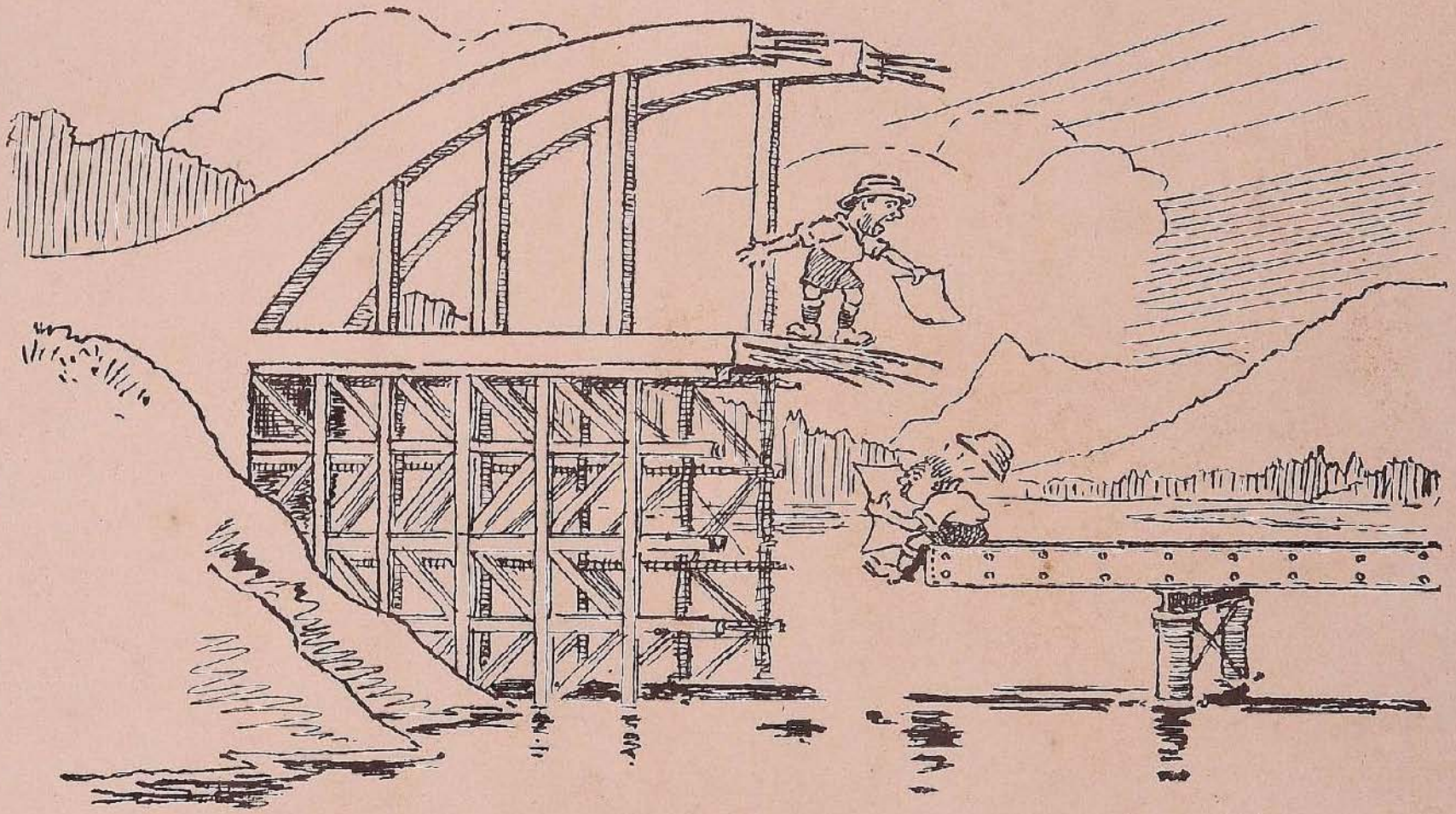
At work on the Monolith for the left abutment.



Details of one of the Arch Rings.



The completed bridge from upstream—a view of the site before work commenced is shown on page 3 of this booklet.



I told you you were working from the wrong plan, it's Concrete not Steel.

THE MADRAS PUBLISHING HOUSE LTD.,