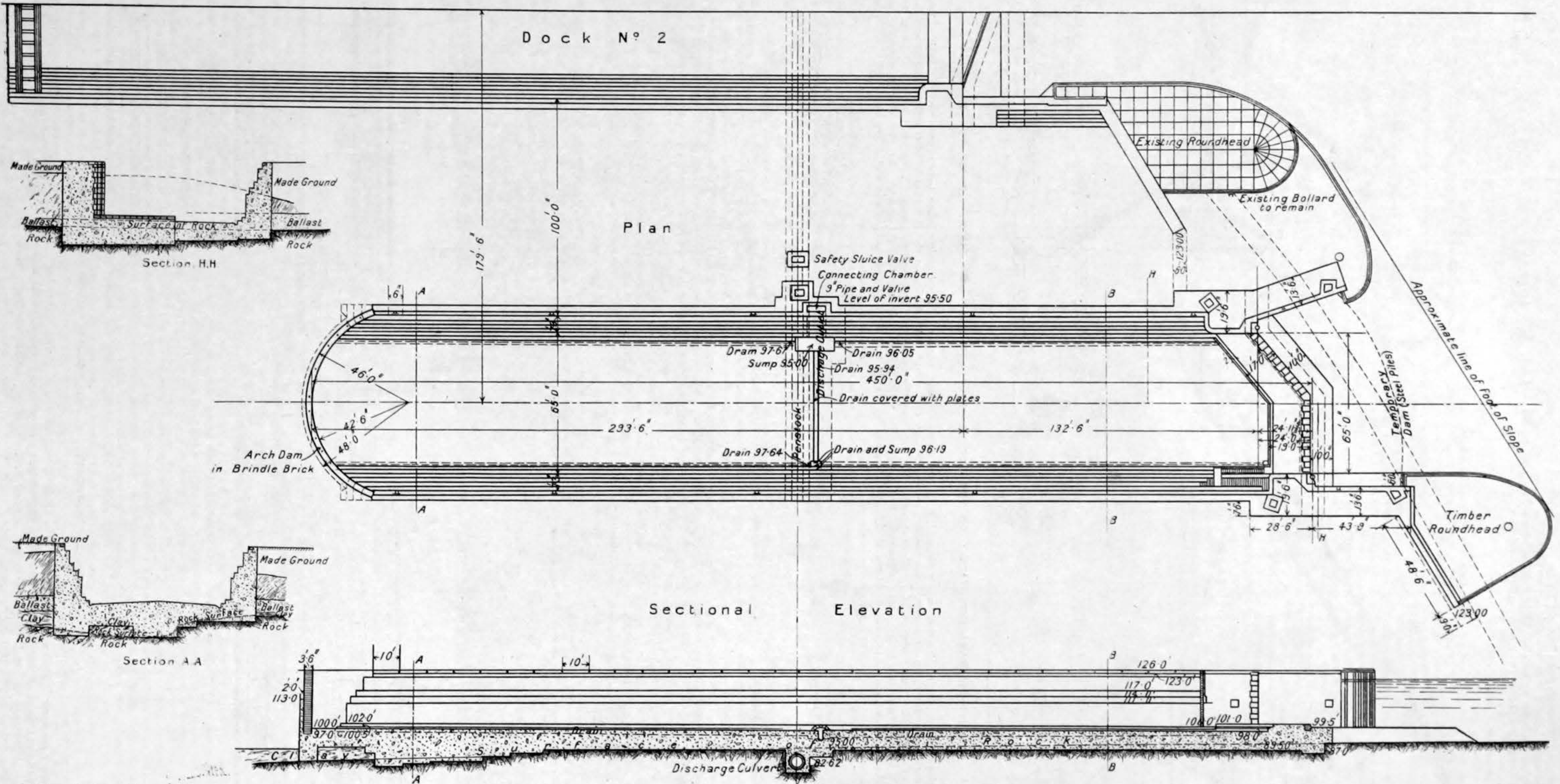


# NEW DRY DOCK AT MANCHESTER

MR. H. A. REED, M. INST. C.E., MANCHESTER, ENGINEER

(For description see opposite page)



"THE ENGINEER"

SWAIN Sc.



EXCAVATOR AT WORK ON NEW DRY DOCK AT MANCHESTER



NEW DRY DOCK AT MANCHESTER.

A NEW dry dock has recently been opened on the banks of the Manchester Ship Canal. It is the property of the Manchester Dry Docks Company, Limited, and is the third which it has had constructed for dealing with the continually increasing number of ships which use this waterway. A noteworthy feature of the work of construction is that the whole of it has been carried out by the contractors, Messrs. Robert McAlpine and Sons, since the commencement of the war, in spite of all the attendant difficulties with regard to labour, materials and transit, the first sod having been cut in May, 1915. The time taken, therefore, was less than two years, for the dock was formally opened on the 5th inst.

machine employs a grab line bucket which excavated the material and lifted it to wagons on a road at ground level. The concrete walls all round the dock were then constructed in timber trenches, and the excavation was subsequently carried out for the floor in trenches across the dock. The dock is constructed of 1 : 3 : 6 concrete with displacers, and is founded on red sandstone rock, with the exception of a small portion of the floor at the head, which is founded on hard boulder clay overlying the rock. The floor is made entirely of concrete, the minimum thickness under the blocks being 8ft. 6in. It has been carried out in block sections, each section being of such a size as to constitute a day's work. The joints with the adjacent blocks and the side walls are formed to approximately the radial lines of a concealed arch.

The water is drained from the dock through a culvert connected to the pumps, which deal with the water from the two existing docks belonging to the Dry Docks Company. This culvert has been extended under the new dock, so as to be available for any future docks that may be constructed. The filling water is admitted by means of four sluice valves in the gates.

The engineer to the undertaking is Mr. H. A. Reed, M. Inst. C.E., who is also engineer to the Manchester Ship Canal Company.

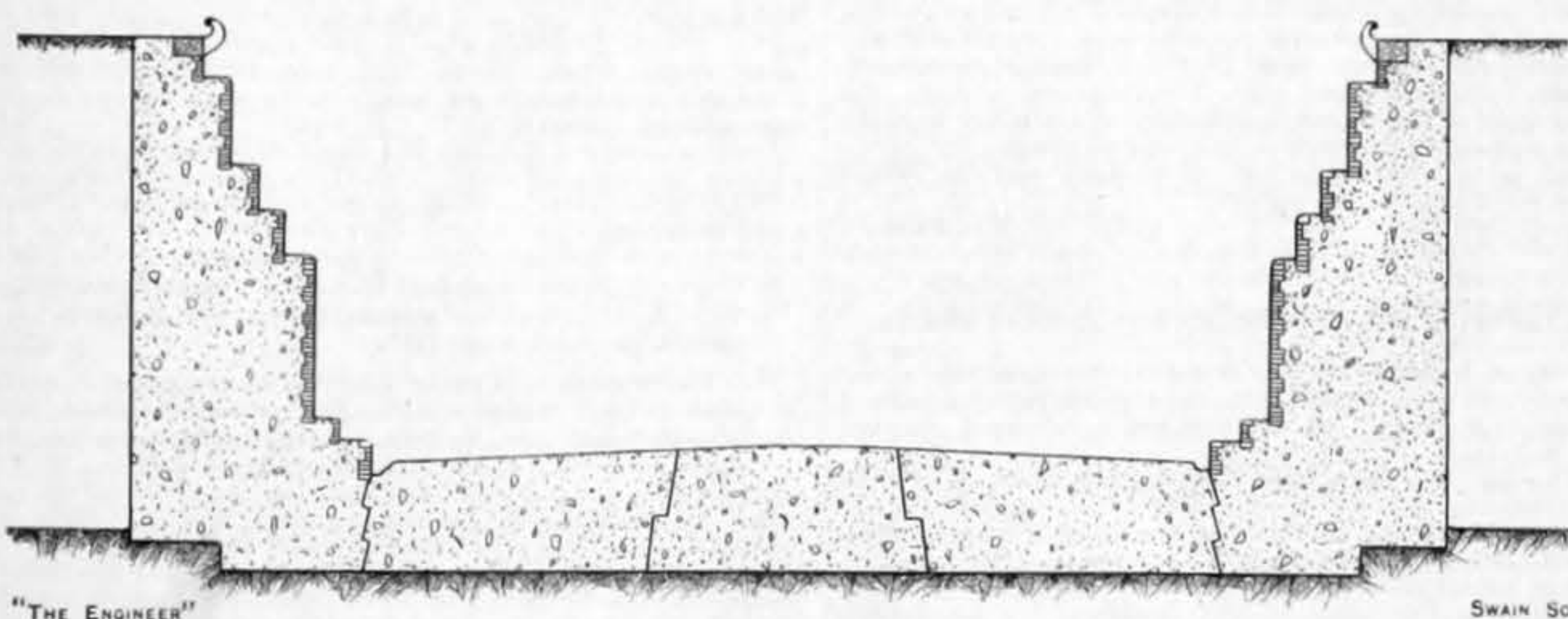
RAILWAY EXPANSION IN THE MALAY PENINSULA.

NOTWITHSTANDING the turmoil in Europe, the British authorities in the Malay Peninsula have been steadily pursuing a progressive policy of railway extension, which has been retarded only by the difficulty of obtaining supplies of ironwork from the United Kingdom.

Under the treaty of 1909, which transferred the Malay States of Kedah, Perlis, Kelantan, and Trengganu from Siamese to British suzerainty, the Federated Malay States authorities agreed to lend a sum of £4,000,000—afterwards increased to £4,750,000—to the Siamese Government, to enable Siam to extend the State Railway southwards to form connections with the Federated Malay States Railway at the frontiers of Kelantan on the east and of Perlis on the west. The work has made steady progress, and is rapidly nearing completion. On their part, the Federated Malay States railway authorities have been pushing on the extensions northward, through the western States of Kedah and Perlis, and recently Mr. P. A. Anthony, the general manager of the Federated Malay States Railways, accompanied by some members of his staff, and Mr. H. Gittins, the chief engineer of the Siamese State Railway, made the journey by train from Bangkok to Prai, on the mainland, opposite to the island of Penang, by way of Bukit Mertajam, the junction in Province Wellesley. The party was thus the first to make the journey over the new railway connecting Singapore and Penang with the capital of Siam.

The line on either side of the frontier cannot be considered complete, and may not be opened to general traffic till next year. A number of bridges and other masonry work remain to be completed on the Siamese side, and the final work will be taken in hand as soon as possible under present war conditions, with the necessary ironwork impossible to obtain from England. On the British side only the ironwork of a few bridges awaits completion. Portions of the line have been finished in Northern Kelantan, while an extension of the existing Federated Malay States railway system has been made from the junction at Gemas, through the eastern State of Penang northwards as far as Kuala Lipis, with a view of linking up with the Kelantan section as soon as opportunity offers.

The value of these railway extensions is considerable. The lines will open up rich tracts of land for mining exploi-



ENLARGED CROSS SECTION OF DOCK ON LINE B B, PAGE 492

The length of the dock is 450ft., the breadth of entrance 65ft., and the depth of water on the sill 19ft. The quantity of material excavated was 60,000 cubic yards. The amount of concrete used was 25,000 cubic yards, brickwork 3740 cubic yards, while for the sill and quoins, 1700 cubic feet of granite ashlar was used, and for the copings 12,000 cubic feet of sandstone ashlar.

On page 492 and herewith we give a plan and sections of the dock, while on page 496 are given views of the dock complete and during construction. An interesting feature in connection with the excavation work was the employment of a Bucyrus steam digger—see the half-tone engraving on this page. This stripped the whole site—or about 30,000 cubic yards—in nine weeks of ordinary working days. This

The side walls are faced with brindle brickwork 4½ in. and 9 in. thick, with bull-nosed bricks on edge at each altar. The dock is set at an angle with the water area of the adjoining Manchester docks, and the gates have been designed accordingly in order to obtain the greatest length, while leaving sufficient room at the head for a further extension if desired at some future time. To enable this extension to be easily and comparatively inexpensively carried out, it will be observed that the head has been built in the form of a brick arch, 3ft. 6in. thick, which will be more readily removable than a concrete wall. The gates are of steel with greenheart mitres, heel posts and sill pieces, and are opened and closed by hand winches. The gates were built by the Manchester Dry Docks Company, Limited.