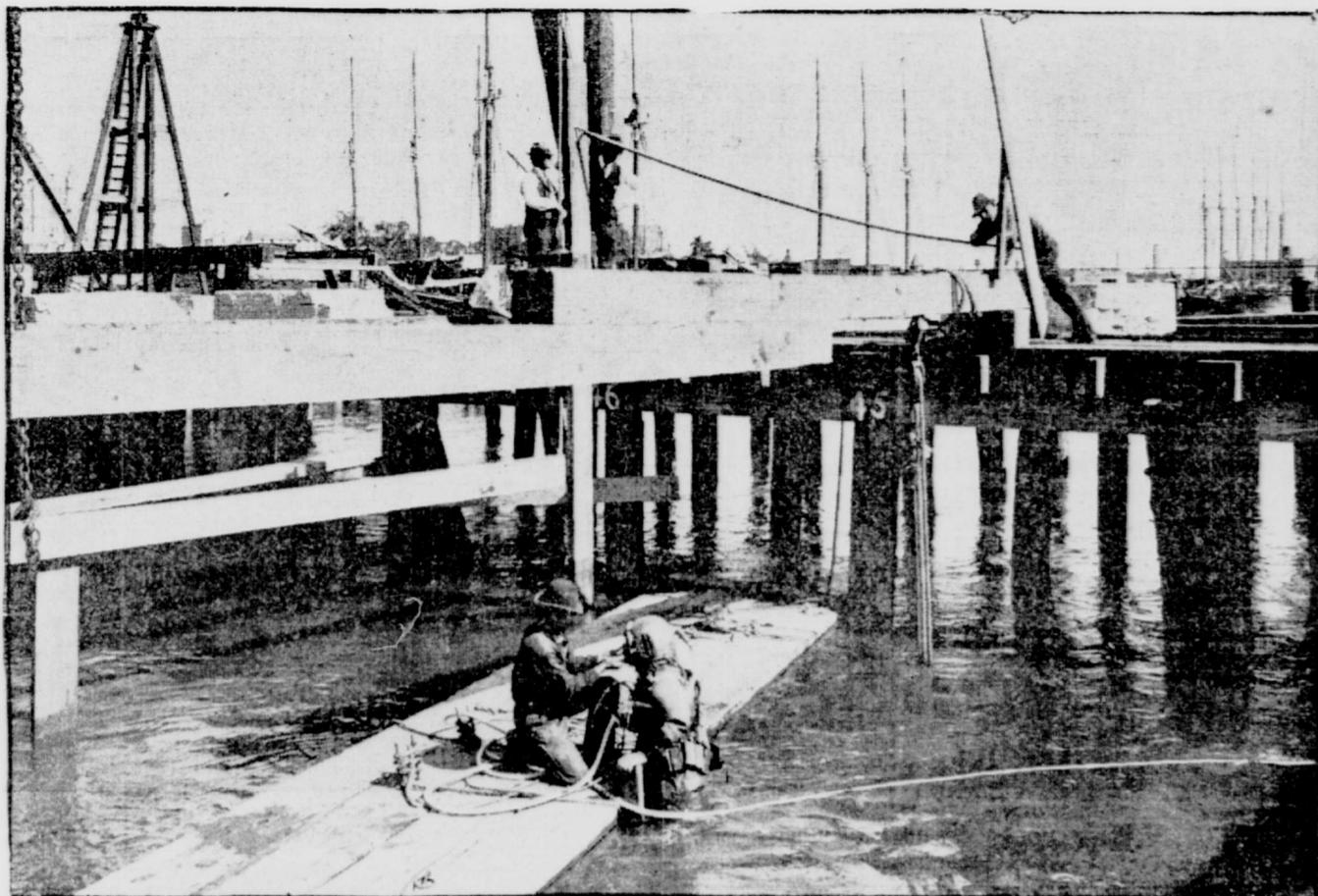


A RARE PIECE OF ENGINEERING IS THE RAPID TRANSIT TUNNEL BEING BUILT UNDER THE HARLEM RIVER



DIVER AT WORK ON THE SUBWAY TUNNEL BENEATH THE HARLEM RIVER.

UNDER HARLEM TUNNEL.

A GIGANTIC CAISSON CONSTRUCTED IN WHICH IT WILL BE BUILT—
PROGRESS OF SUBWAY.

One of the most important pieces of engineering work in connection with the construction of the underground rapid transit road in this city is approaching its most interesting stage. This is the building of that part of the tunnel which will pass beneath the Harlem River, on the Lenox-ave. branch. This branch leaves Lenox-ave. in a sharp curve to the eastward at One-hundred-and-forty-fifth-st., on a down grade sufficient to carry its roof beneath the bottom of the Harlem River throughout its width.

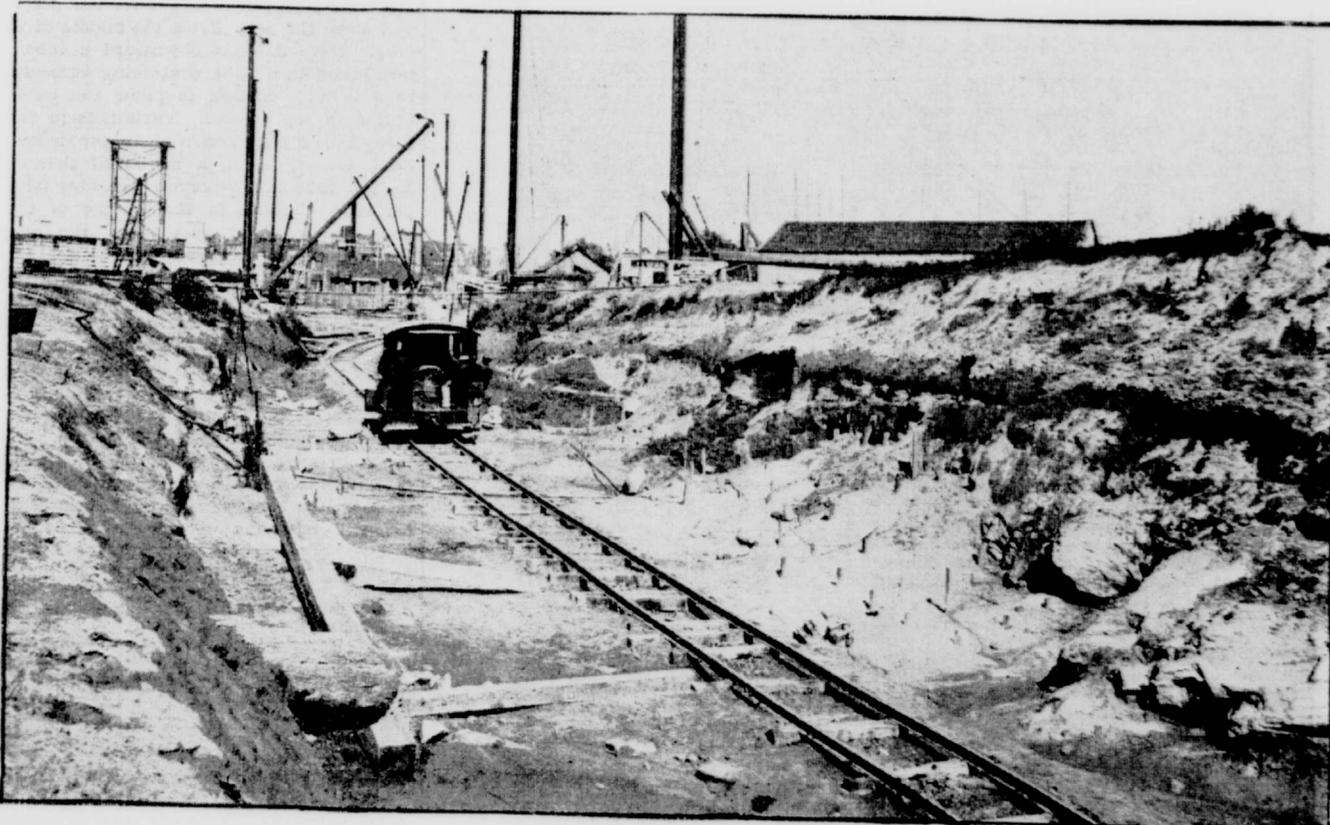
The tunnel, however, is not being driven beneath the river bed from one or both sides of the stream, as is usual in such cases, but is being constructed on a principle similar in many particulars to that employed in building other portions of the subway in the streets. The tunneling in Fourth-ave. and that in the City Hall Park differ from the method employed under the river chiefly in the fact that air filled the excavation from the surface to the bottom in the two former instances, while it is full of water in the latter.

The first step in constructing the under river section was the digging of an open ditch of the requisite width and depth in the bed of the river beneath the water from the Manhattan



A PEEP INTO THE GREAT BOX BEING CONSTRUCTED BENEATH THE HARLEM.

This part is about half above water, but shows the same construction of the framework as in the portion wholly submerged.



EXCAVATING THE CUT APPROACHING THE HARLEM RIVER.

shore half way across. This ditch was dug with dredges, and its banks, which at the top are composed largely of shifting silt, are supported by piling. The piles are in groups of four, the groups being set about eight feet apart. Inasmuch as a vertical bank beneath the water could not be made to stand, the ditch has been dredged much wider at the top than at the bottom, giving both sides a sufficient slope to prevent caving in.

This ditch has been dug to a depth of about forty feet below the surface at mean high tide, and under the middle of the river will be sunk finally to a depth of fifty-three feet. The top of the tunnel will, therefore, when completed, be about forty feet below the surface and in the vicinity of ten feet beneath the river bed. According to the terms of his contract, Sub-Contractor Duncan D. McBean is required to erect the under water portion of the tunnel one-half at a time, leaving the other half of the river free from obstructions to navigation, and the half now under construction is on the Manhattan side of the stream. When this has been completed so river craft can pass over it in safety the work at The Bronx side will be begun.

The ditch having been dredged to a depth sufficient for the purpose, piling was driven along its sides to a considerable depth below the bottom of the proposed tunnel, and sawed off beneath the water at a height conforming to the grade of its roof, but some inches above that level. Three rows of these piles were driven—one in the centre of the ditch and one at each side. On the outside of these piles, at some distance above the bottom of the ditch, string pieces of heavy timber are bolted, and a heavy timber also caps each row. Braces are run from the top of each pile in the outer rows to the bottom of that in the corresponding position in the centre row, and heavy beams extend across the top from one outside row to the other, resting in the centre on the row of piles.

These correspond exactly in purpose and appearance to the heavy beams from bank to bank inside the tunnel in the streets. They will resist the pressure of the earth against the continuous walls of timber along the sides, and are also intended to support a roof heavy enough and thick enough to bear the weight of water above. The timbers and braces, the longitudinal string pieces to support the side walls and the caps of the tiers of piling are being bolted into place beneath the water by divers.

This framework will constitute, when completed, the skeleton of a box as long as half the under river section of the tunnel, approximately 750 feet, and a little wider and deeper than the two tunnel tubes which are to be constructed within the box. The side walls, instead of three-inch thick planks, such as support the sides of the excavations in the streets, will be 12x12 timbers, tongued and grooved so as to form a water tight barrier, and bolted firmly to the string pieces as pickets are fastened to the rails of a fence. They are to be prepared for driving by being bolted together in threes, so every group that is sunk will add three feet to the length of the wall.

When this sheathing has been fastened in place by the divers, and the 40-inch thick roof has been placed on top and weighted down with heavy stones, and when the end of the box in the middle of the river has been converted into a shaft rising above the water level, enormous centrifugal pumps will be set in motion, and the box, if no accident happens, and Mr. McBean's novel plan is successful, will be emptied of water. This will be the critical moment for the enterprise.

If the pumping operation frees the box from water and thin mud, it will be a tunnel with a sandy clay bottom and timber sides and roof.