NINETEENTH ANNUAL REPORT

OF THE

BOSTON TRANSIT COMMISSION,

FOR THE YEAR ENDING

JUNE 30, 1913.

BOSTON
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24-inch pipe, and 485 feet of 36-inch pipe, was begun on March 4, 1913, and the water turned on through it at 1.00 P.M. March 18, 1913.

FOUNDATIONS.

The ground through which this section of the subway passes is similar to that encountered in other sections of this subway. At Dartmouth street there is about 17 feet of silt between the bottom of the subway structure and the hard clay. West of Dartmouth street the subway station is to be built on the earth without pile foundation. At other places the invert rests either on the hard blue clay or upon longitudinal concrete walls or piers built up from the clay.

CARE OF THE OLD SOUTH CHURCH TOWER.

As is quite generally known the tower of the Old South Church has a distinct inclination to the southwest. This condition has existed ever since the completion of the tower. An examination of the foundations show them to be inadequate for the support of a tower which weighs approximately 5,000 tons. There are no drawings available showing precisely the character of the foundations under the tower, but from test pits dug in the church basement it is ascertained that the foundation is of granite, spreading to 37 feet by 42½ feet at its bottom dimensions and is supported on piles spaced about 2½ feet on centers, which piles are cut off at grade 3½ feet above Boston base. The tops of the piles are slightly above the old marsh level. Below this level, and extending to a depth 34 feet below the sidewalk, is a layer of black silt composed of finely divided sand and clay colored with organic matter. This silt is impervious to water and is stiff enough to stand with vertical banks 10 feet high. Below the silt are pockets of sand and gravel overlying the clay. The clay extends from 37½ feet to 140 feet below the surface of the sidewalk. The upper part of the clay is hard for a depth of about 10 feet. Below this it is soft and extends in this condition to the bottom. It is not known whether the piles extend through the silt to the harder strata below. As a measure of protection the

subway excavation area between the westerly end of the station and the westerly side of Dartmouth street was enclosed within rows of interlocking steel sheet piling 35 feet long with upper ends driven to elevation 108 which is about 10 feet below the surface of the street. As a further protection 2-inch pipe borings, about 10 feet apart, were driven on the outside of the sheet piling, and neat cement grout was forced through the pipes into the earth, at a pressure of from 50 to 90 lbs. per square inch, to fill all the cavities caused by driving the sheet piling or otherwise and to make concrete out of the sand and gravel stratum.

ARTICLES OF ANTIQUARIAN INTEREST.

Interesting antiquarian relics have been unearthed in the Back Bay district of Boston during the construction of the Boylston-street Subway. On Boylston street between Dartmouth street and Clarendon street at a depth of 30 feet below the surface were found the remains of what appears to be a prehistoric fish weir, the parts found consisting of sharpened sticks about 4 feet long and two inches and less in diameter driven points downward about 18 inches into the blue clay, with traces of longitudinal wattling between the uprights. The tops of the sticks became covered with silt and it is supposed that their present depth marks the total subsidence of the land since they were set in place. Some of the sticks are birch, some pieces still retaining the bark. Others bear a rough brown bark similar to that on the trunk of a white pine. The sticks show unmistakable signs of being sharpened with some rough implement. Their upper portions were covered by the overlying stratum of silt, and were not so well preserved as the points. The wood, while keeping its shape, was very soft when found, and easily broken or scarred. Some of these sticks are now at the office of the Boston Transit Commission, and others have been taken to the Peabody Museum at Harvard University.

As before stated this ancient weir was found in the surface of the blue clay deposited by glacial action in the old Boston Basin. This stratum of clay is about 100 feet in thickness at this point and rests on bowlders overlaying the bed rock. The top of the clay here is about 12 feet below mean low water.

Borings along the line of the subway indicate that the surface of the clay is at its lowest level at this point, the low channel extending north and south about on the line of Dartmouth street from this point to the Charles River. Above the glacial clay is a deposit about 20 feet in thickness of compacted silt, extending to the surface of the old Back Bay and containing layers of giant oyster shells. The largest of the shells found is 10 inches long and weighs 2¼ lbs. The ground above this point was filled in with gravel in the year 1870 to something above its present grade.

The whole Back Bay district, extending across the Charles River into Cambridge, has shown a gradual settlement in addition to more marked local settlement due to the displacement of the silt. This settlement has been reliably estimated to be at the rate of 1 foot in 100 years. Assuming this rate of settlement to be fairly uniform an interesting estimate may be made of the age of the sticks found. The present elevation is about 12 feet below mean low water. The original elevation must have been about tide marsh level or about 8 feet above low water, making a total settlement of 20 feet. At the rate of 1 foot subsidence per 100 years, this 20-foot settlement would indicate that the sticks discovered were sharpened and set in place some 2000 years ago.

EAST BOSTON TUNNEL EXTENSION.

The location as determined upon March 11, 1913, when it was decided to locate the westerly end of the open incline near North Russell street, makes the total length of the extension about 2,700 feet including the changes to be made in the grade of the East Boston Tunnel under the part of Court street between Washington street and Scollay square. This location is shown on the map, Plate 1. The westerly incline is to be between Chambers street and North Russell street, and between these two streets a land taking on the northerly side of Cambridge street about 46 feet in width has been made for street widening, to provide a roadway and sidewalk on each side of the incline. A triangular strip has also been taken on the westerly side of North Russell street for the same purpose. Bids have been called for, to be opened July 1, 1913, for tearing down the buildings on the land taking between Chambers street and North Russell street. Detailed plans are being pre-