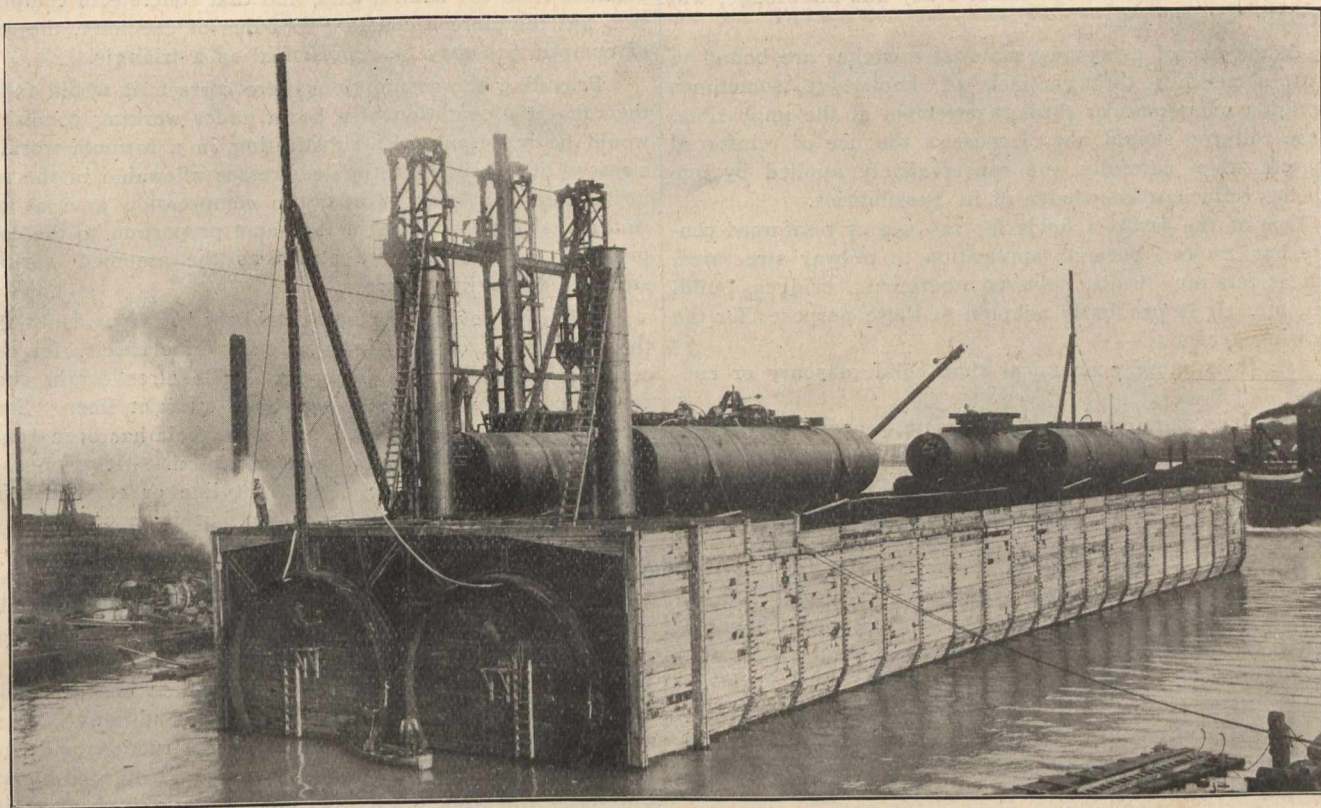


LOWERING SECTIONS FOR THE DETROIT RIVER TUNNEL.

The accompanying illustrations show the manner in which the sections are floated down the St. Clair River, and the systems of lowering these, in the construction of the Detroit River Tunnel for the Michigan Central Railway service connecting Windsor and Detroit across the Detroit river. These sections are constructed at the St. Clair yards of the Great Lake Engineering Works, Detroit, there being ten sections similar to those shown in the accompanying views. Each section is 260 feet long, and each tube is 23 feet 4 inches outside diameter.

The subsequent portion is 2,624 feet in length, westerly of the open cut, 1,540.07 feet; westerly approach, 2,128.97 feet; easterly approach, 3,193.14 feet; easterly open cut, 3,500 feet, making a total distance of excavation of 12,786.18 feet, or a little more than 2.42 miles. The tunnel proper consists of two parallel tubes laid on girders in a trench dredged across the bottom of the river, the trench afterwards being filled in with concrete. The depth of the tubes will be 65 feet below the water level, and the under-water portion,

ful clam-shell buckets, while following the dredges are the pile-drivers. The tubes are located on temporary piles which are driven into the trench. Piles are driven on either side of the trench in two rows, reaching to the surface of the water, and guide the tubes as they settle into position. These piles are afterwards removed. In the operation of floating a section of the tunnel containing two tubes and 23 diaphragms is blocked up at each of the twin tubes with bulkheads of wood, and made ready to float on the river. This method makes the tubes air tight. Four temporary floating cylinders, each of about 10 feet in diameter and 60 feet long, are chained on the top of the tubes. These cylinders are filled with compressed air, so that with the enclosed air in the main tubes, and the outside planking the whole structure is made buoyant. An accompanying illustration shows the lowering of one of these sections between the guide piles and the river. While the air is allowed to escape from the tubes, final adjustments are made by the compressed air cylinders. The tubes shoulder in rubber gaskets at the



The First Section for Detroit River Tunnel Ready to be Submerged.

875 yards long. These tubes, which have an internal diameter of 20 feet, are being constructed of three eight-inch plates, stiffened on the outside by webs 12 feet apart. The laying is done in sections of 263 feet long, which are afterwards rivetted together under water. The tubes which are each 23 feet 4 inches outside diameter, have a concrete lining 20 inches thick, which gives a clear diameter of 20 feet. Each tube contains one track and the roof of the tunnel is 18 feet above the rails. Running along the sides of the tunnel are concrete platforms 5 feet 3 inches above the rails, and 3 feet 10 3/8 inches wide at the top. These concrete platforms contain conduits for signal lighting and electric power cables, telephone and telegraph. The platforms also provide a walk for passengers in case of necessity and room for the workmen.

The method used in laying these sections of tunnel consists in placing sections of tube in the dredge channel, connecting them together when in place, and then filling in with concrete. The pumping out of the water in each of the continuous tubes follows. The trench is 48 feet wide at the bottom and about 32 feet deep, with a slope of 1/2 to 1, so that the trench is between 50 and 60 feet wide at the top. The dredging is performed by dredges equipped with power-

joints, in each side of which are partially cylindrical chambers.

The joints are finally locked with heavy pins, entering into corresponding sockets in the adjoining sections and securely bolted. A sleeve 17 inches in length, situated at the forward end of each of the tubes, fits over the end of the section already sunk. The work of filling in the concrete then follows. A great deal of the work is done at the surface, greatly lessening the dangers connected with the undertaking.

ARTS AND MANUFACTURE CLASSES IN MONTREAL.

The secretary of the Council of Arts and Manufactures has issued the report of the attendance in the various classes for October in Montreal, which shows an increase over the previous year. There are 1,213 pupils following the instruction given by competent teachers. Mechanical drawing is taught to 637 pupils in Montreal; plumbing to 117; modelling, 30; free hand drawing, 154; carpentry and stair building, 70; architectural drawing, 102. A lack of room is one of the drawbacks found in Montreal, where the classes are conducted in the Monument National on St. Lawrence Street.