In constructing the pontoons, 3 casting floors of shiplap were built on the beach and carefully levelled up. These served as forms for the bottom of the pontoon and two sets of collapsible wood forms were then made up, which were used 15 times in all. The outside forms were first set up and the reinforcing carefully placed and supported from the bottom by small concrete blocks which were cast into the floor. The floor was then poured, using a wet mixture of 1 part cement and 2 parts sand. This covered the steel completely, and was very thoroughly tamped to fill all the voids.

A mixture of 1 part cement, 2 parts sand and one part screened gravel of ½ inch maximum size was then poured on the top and brought to a depth of 2½ inches. The collapsible inside form was then quickly set in place, and braced into alignment, and the concreting of the walls continued without a break. Very great care was used in the mixing, and especially in tamping the thin walls, to insure the steel being thoroughly enclosed and all air expelled. Very gratifying results were obtained, as of the 15 pontoons built, not one of them showed any indications of dampness of any sort when launched. They have been in the water now for nearly nine months.

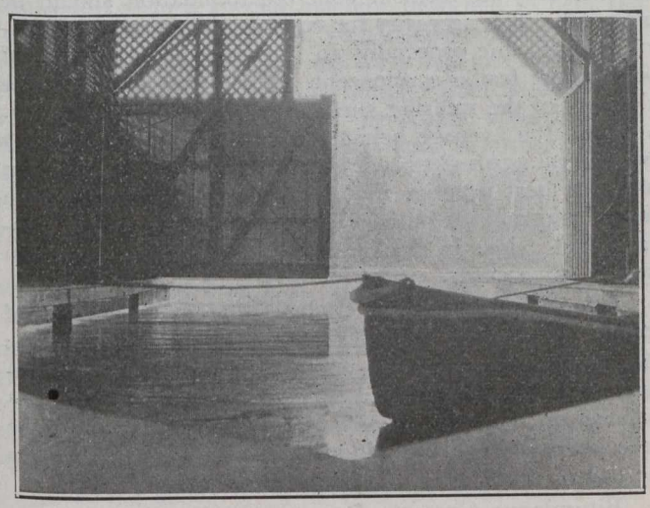

Fig. 3.—Showing Pontoons in Place.

Forms were stripped in about 36 hours and allowed to season until thoroughly set, when a frame was placed over each end. Chain blocks were used to lift the pontoon clear of the floor, when launching timbers 10 by 14 inches were placed under on rollers. At high tide the pontoon was about 6 feet above the water. An incline runway was built, extending into the water, and a temporary roof built over the open side of the pontoon to prevent shipping water on launching. Two men with bars easily pushed it off the floor and it took the water very easily. A motor boat then took it in tow for about a mile to the site of the boathouse.

Accurate account was kept of the cost, which amounted to $78 including launching, for each pontoon.

Considering their indestructibility, they are far superior to anything else in use, and prove conclusively that concrete itself, if well placed, is a sufficient waterproofing agent, as no waterproofing was used in the concrete.

The pontoons and boathouse were designed and built under the direction of Mr. D. C. Findlay, A. M. Can. Soc. C.E., chief engineer of the Vancouver Portland Cement Company, Limited, of Victoria, B.C., for Mr. R. P. Butchart, managing director of the company.

MACADAMIZED ROADS CONSTRUCTED WITH TARRY, BITUMINOUS OR ASPHALTIC BINDERS.

At the third International Road Congress the third question, "Construction of Macadamized Roads Bound With Tarry, Bituminous or Asphaltic Materials," was discussed by representatives from twelve different countries. Interests on this side of the Atlantic were looked after by Professor A. H. Blanchard, of Columbia University, and consulting engineer of New York; Major W. W. Crosby, chief engineer to the Maryland Geological Survey, and consulting engineer of Baltimore, and Prevost Hubbard, Department of Roads and Pavements, the Institute of Industrial Research, Washington. The following is taken from Professor Blanchard's paper, which dealt with bituminous surfaces and bituminous pavements constructed by the mixing methods, and refers to progress made during the past three years:

In order to avoid continual explanations and the use of long expressions, the following definitions are given:

Bituminous surfaces consist of superficial coats of bituminous materials with or without the addition of stone or slag chips, gravel, sand or materials of a similar character.

Bituminous concrete pavements are those having a wearing surface (crust) composed of stone, gravel, sand, shell or slag or combination thereof, incorporated together by mixing methods.

Bituminous concrete pavements which have been used in the United States during the past three years and of which broken stone forms an integral part may be grouped in three classes dependent upon the character of the mineral aggregate.

Type A consists of so-called one size crusher run broken stone mixed with bituminous material. This description of broken stone refers to the product obtained at a crushing plant which passes over a screen having holes of one size and through a section of screen having the next larger size holes or which passes through a screen of one size of holes and is retained upon a screen having smaller holes.

Type B consists of one size crusher run broken stone as defined above and sand or other fine mineral matter mixed with bituminous material.

Type C consists of a predetermined graded aggregate usually composed of broken stone and sand with or without other mineral matter mixed with bituminous material.

Foundations and Drainage.—The following statements contained in the 1912 Report of the Special Committee on "Bituminous Materials for Road Construction" of the American Society of Civil Engineers embody the underlying principles of the best current practice relative to foundations, subdrainage and surface drainage.

Sub-Grades and Foundations.—Your Committee believes that the use of any form of a bituminous wearing surface does not preclude the necessity for the construction of a well-drained, thoroughly compacted and adequate sub-grade. In fact, such improvement of the road surface frequently attracts heavier traffic, and thus increases the stresses in the sub-grade.

Crown.—The investigations and observations of the Committee to date have convinced it that the crown generally used in construction of macadam roads is excessive when bituminous materials are used, and that a crown of even ½ in. to the foot should be avoided when a lesser