TORONTO'S FILTRATION PLANT.—Interesting Engineering Undertaking Now in Process of Installation at Centre Island.—Feature of Its Design and Construction.—General Plan Admits of Further Extensions as Growth of City Might Demand.

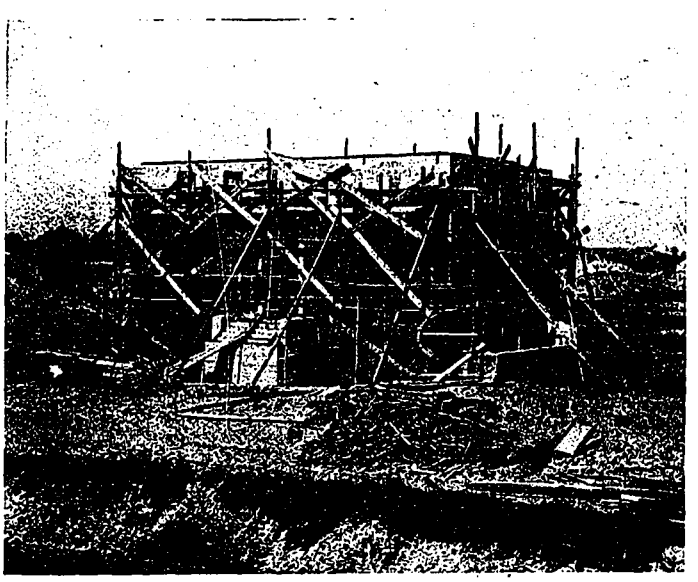
WHEN THE FILTRATION PLANT now under construction, at a cost of $750,000, is placed in operation in the spring of 1911, Toronto will have one of the most modern and thoroughly built water purification works on the American continent. Aside from being an undertaking of considerable magnitude, the fact that it is the first filtration plant of any great size to be established in the Dominion, attaches an importance to the work which renders it of especial interest to Canadian engineers, and Canadian municipalities in general.

So far, the progress of the work has been eminently satisfactory. Since operations were begun in the latter part of June, by the contractors, Messrs. Dill, Russell & Chamber, Toronto, a large force of men have been steadily employed, and the number is to be materially increased as the work progresses. Already one of the two great sections of area comprising the site of the filter beds, has been excavated and levelled preparatory to putting in the concrete work, and a portion of the 24-inch cast iron pipes to be located beneath the regulator houses between the two groups of filters, have also been set in place. The installation of the concrete foundation for the low lifting pumping station is another part of the work nearing completion; while the three-story structure, built entirely of concrete, which is to house the offices, chemical and bacteriological laboratories and provide living quarters for the employes of the plant during the winter months, is now ready for the putting on of the roof.

The plant is located at Centre Island, a little more than a mile across the bay from the city's present main pumping station, to which it will eventually connect, and the work is being carried out in accordance with the plans prepared under the supervision of Mr. Allen Hazen, whom the city has retained as consulting engineer to City Engineer, Mr. C. H. Rust. In design, the filters themselves, in that they are to be of the closed type, will differ materially from the open sand filters recommended in 1894 by the late John Mensergh, of London, England, who was retained at that time to investigate existing conditions and to report as to the most feasible means of providing the city with a pure water supply. The closed type of filter is more representative of the advancement which has taken place in the science of water purification within recent years, and is especially required in a climate where severe winters are experienced.

The plan of the works, which is shown in an accompanying illustration, provides for twelve filter beds, each 117 by 312 feet in dimensions, aligned in equal number on either side of a court containing the regulation house and sand bins. Adjoining these filters is a pure water reservoir, 312 feet square. The water will pass through the filter at the rate of 9 feet per hour, and the arrangement of the beds is such as to readily permit of further extensions as the growth of the city might demand. Owing to the fact that most of the foundations for the works are being placed below the level of the lake, it was necessary at the outset to surround the entire site with a drainage canal, so as to lower the ground water level to a point which would not interfere with the putting in of the concrete. This canal was made by a huge lake dredge which worked its way through the sandy soil, cutting a channel with a minimum depth of 7 feet below zero level of the lake and a bottom width of no less than 10 feet; and it is drained by centrifugal pumps discharging 4,000 gallons of water per minute into the bay.

From the low-lifting pumping station, which is seen in the general plan, the water will flow through a 72-inch reinforced concrete pipe, from which 36-inch reinforced concrete pipes are taken off at right angles to the inlet chambers under each filter entrance. Similar pipes will also be used to convey the filtered water to the reservoir, and all manholes on each line and the Venturi meters will also be likewise constructed. The contract for these pipes was completed within the past week, and they are to be placed in position during the winter months. With the exception of a very limited number of smaller sections, the pipe was cast in 4 ft. lengths in cylindrical vertical moulds, the concrete used being of a proportion of one barrel of cement, 7 cu. ft. of sand and 10 cu. ft. of ballast, the latter ranging from ¼ to 1 inch in size. The sections are made in three diameters, 36, 54 and 72 inches, and in addition to the triangle mesh reinforcement, they are further reinforced by ¼ inch steel bands, spaced four inches apart, which are firmly secured to the mesh. The method of making the joints of the adjacent lengths in laying this pipe, is particularly interesting. The end of one pipe has a projecting ring which fits into a socket on the end of the other pipe. The inner form of this socket differs somewhat from the ring entering it, so that after the two parts are in place there is an annular groove on the inside of the pipe line, having a dove-tail cross-section. The operation of making the joints is conducted in two stages, first to make an exterior joint and then to complete the work from inside the pipe. The two lengths of pipe are first brought into position and the joints filled with oakum. The outer surface of the ends are then smeared with hot tar and covered with strong building paper, which is in turn smeared with tar. A second layer of paper is applied and covered with tar, and a strip



Construction work on three-storey Office and Laboratory Building at Filtration Plant, Toronto.