great, and hence any unsuccessful experiment would be very serious, it is not advisable to attempt anything that has not been done successfully elsewhere, so that the depth of water in which this crib will be placed is 49 ft. The water entering such a crib will be quite as good for drinking purposes as if taken at much greater depth.

The intake crib will consist of two concentric steel cylinders, set on end and firmly braced together, so as to be rigid and stiff, the outer cylinder being 110 ft. diam., and the inner 60 ft. diam. Plates set radially between these shells will divide the annular space into compartments, which will be constructed with bottoms so as to make them watertight. The compartments will then be sufficiently filled with concrete to make the draft of the structure 17 ft., after which it will be towed into the desired position and sunk, the lake bottom having been previously levelled and otherwise prepared for its support. After sinking, the annular space will be filled with concrete, and the structure built up above the water to provide living quarters for men, with lights and signals for mariners.

Properly constructed ports in the crib will admit water to the inner 60-ft. well. These ports will be controlled by gates which may be closed at pleasure, but the water will never be pumped from the inside of this well. An arrangement has been provided, however, so that it will be quite possible at any time to pump all of the water out of the tunnel for cleaning or other purposes, should this be desired.

Intake Shaft.

Through the centre of the intake crib, a vertical steel shell will be sunk to a depth to meet the tunnel. This shell will rise inside the crib above lake level, and will have proper openings for the admission of water to its interior; these ports to have gates that may be closed when desired. The material will be excavated from the inside of this shaft, which will be lined with brickwork to finish 11 ft. inside diam.

Tunnel.

A tunnel will be driven between the shore and intake shaft, having an inside diam. of 9 ft. with a brick or concrete lining. As it is possible that compressed air will be necessary in the driving of this tunnel, and in order to make it perfectly safe for workmen, the invert will be not over 105 ft. below the lake level. The length of the tunnel will be about 6,380 ft.

Shore Shaft.

This shaft will be of similar dimensions to that at the intake, but with a diam. of 10 ft. inside the brick or concrete lining. It will be closed at the top, and at 13½ ft. below zero lake level will have two 7-ft. diam. horizontal branches, to which the suction pipes of the pumps will be directly connected. The cover on the shore shaft will be quite high enough to prevent damage from surges in the tunnel, these being very small, owing to the low tunnel velocity of only 1.71 ft. per sec. when delivering 60 million Imp. gal. per 24 hr.

Capacity of Tunnel and Shafts.

With a draft of 100 million Imp. gal. per 24 hr. the loss of head in the tunnel and shafts will be under 2.5 ft., so that the capacity will be much above 100 million gal. if it is desired to increase the demand above this amount at any time.

Low-Lift Station.

The purpose of the pumps in this station is to take water from the tunnel shaft and deliver it to the filters. They will be driven by steam and have a total capacity of 60 million Imp. gal. per 24 hr. The lift at zero lake level may be approximately 75 ft., depending upon the make of filters used. In order to procure the best use of the tunnel, the floor of this station should be at lake level. An excavation will be made and the station built with watertight walls and basement. In order to insure safety, there will be two 48-in. delivery pipes to the filter plant, each conduit carrying away the water from two pumps.

High-Lift Station.

This station will also contain steam-driven pumps, having total capacity of 60 million Imp. gal. per day, three having a total lift of approximately 220 ft., and the fourth with a lift of about 315 ft. The precise lift is yet to be determined. The floor level of this station will be at the ground level of Victoria Park.

Filtered water will be delivered to this station through a single 7-ft. pipe, the suction of each pumping unit being connected directly thereto. There will be 4 separate discharge pipes, each 36 in. in diam., one from each pump, and connected to the distribution system.

Boiler Room, Coal, Storage, etc.

The boiler room will be located between the engine rooms. This arrangement brings the boilers close to all pumps, thus giving good steam connections, and also precludes any interference whatever between the boiler and engine foundations and the water pipes. This latter matter is of the very greatest importance. Much attention has been given to the security of the system, and the prevention of damage to the pipes from any cause. It is essential that they must always be easily accessible for examination and repairs.

The boilers will be equipped with mechanical stokers, and the boiler room will be furnished with coal and ash handling machinery, so as to reduce the cost of operating the plant to a minimum.

Coal will be conveyed to the plant in railroad cars drawn by electric motor, along tracks laid to York Station, a distance of 1½ miles.

The coal bunkers will have a storage capacity equivalent to one week's supply.

Reservoir.

The matter of an additional reservoir is one requiring careful study. There is no convenient location for a reservoir in the eastern part of the city, and it would have to be located far beyond the city limits if placed in this direction.

An additional reservoir for the city of Toronto is by no means essential, and not at all requisite. It is desirable that there should be some water storage to provide for fluctuations in demand from time to time. This storage has already been adequately provided for in the Rose Hill reservoir, which has ample capacity for all the present and proposed pumping equipment, and will readily suffice for the needs of Toronto for some time to come.

Since a proposition has been made to establish a second reservoir in connection with plans of the Commission of 1912, it may be well to point out, that if a second reservoir were to be used on the same supply mains as the present Rose Hill reservoir, then the new reservoir would have to be placed on exactly the same level as that at Rose Hill. If the new one were the higher, as proposed by the Commission, the present reservoir would be flooded.

An examination of the country has shown that to secure suitable land for such a reservoir, it would be necessary to go so far out that much of its effect would be lost. Such a plan cannot be recommended.

The present Rose Hill reservoir has a capacity of 39¼ million Imp. gal., which corresponds to about 20 hrs.' supply at the present average daily pumpage of approximately 50 million Imp. gal., and is quite sufficient to compensate the ordinary fluctuations of discharge, due to fires, excessive heat or cold, and other causes.

It will be interesting in this connection, to give the experience of some of the larger American cities using lake water. Buffalo, with an average daily consumption of 117 million Imp. gal., has a single reservoir holding 98 million gal. or 20 hrs.' supply. Detroit, with an average daily consumption of nearly 88 million Imp. gal., has no reservoir. Chicago does not possess a reservoir. In Cleveland, the average daily consumption is 63 million Imp. gal., and the city is divided up into 3 districts for distribution purposes, there being a reservoir for each district, the largest having a capacity of 67 million Imp. gal. Milwaukee has a present consumption of about 79 million Imp. gal., and is now increasing its pumping capacity, but there is no intention of increasing the capacity of the reservoir, which holds only 17 million Imp. gal., or about 6 hrs.' supply.

The foregoing examples show that Toronto has now a much larger reservoir capacity than many other of the larger cities, the size of reservoirs being evidently largely influenced by local conditions. The experience of the cities quoted, confirms the conclusion otherwise reached, that there is no necessity at present to increase the reservoir capacity for this city.

Distribution System.

From the pump house there will be four 36-in. pipes, with Venturi meters, running a short distance from the station, after which they will be enlarged for distribution purposes, and will feed four 42-in. mains, all of these pipes being cross-connected and controlled by valves in such a way as to make a perfectly flexible arrangement. These four mains will then run across Queen St., their locations being approximately as follows (see Fig. 1):

1. One 42-in. main will run across Queen St., up Victoria Park Ave. to Danforth Ave., along Danforth Ave., over the new Bloor St. viaduct to Bloor St., and along Bloor St. to St. George St. At the corner of Bedford Rd. this main will be cross-connected to the present 36-in. main., valves being provided so that the connection may be closed as desired. For the present this main will be placed on the service of the middle district, and hence the connection at Bedford Rd. will be closed, but should it be desirable to serve the low level district, this valve would be opened, and all connections with the middle district closed.

This main will be used on the middle district, and will, therefore, be connected to the 12-in. main at Coxwell Ave., to