

A WATER SUPPLY FOR WINNIPEG

A REPORT CONCERNING SHOAL LAKE AS A SOURCE OF SUPPLY FOR THE GREATER WINNIPEG WATER DISTRICT—BY AN OFFICIAL BOARD OF CONSULTING ENGINEERS.

WINNIPEG'S chief problem is that of water supply, and municipal authorities have for years been studying the question of a sufficient supply of safe and desirable water for domestic and industrial use. A year ago *The Canadian Engineer* (issue of Sept. 19th, 1912) published, in part, a report presented by Prof. C. S. Slichter, of Madison, Wis. Shoal Lake was recommended by him in preference to the other possible sources, viz., Winnipeg River, the Poplar Springs, the Crystal Springs, and the artesian well system which, up to that time, was the source of supply. This source provided a water of high mineral content, corrosive and destructive to plumbing, boilers, etc., and generally considered too hard for domestic use, as well as being unsatisfactory from a health point of view. The report referred to pronounced Shoal Lake as a supply not requiring treatment before consumption. Readers are referred to the article mentioned for a concise résumé of Prof. Slichter's recommendations.

This source had already been suggested in 1907 by a commission, but, judging such a project as being too expensive, Winnipeg River was recommended instead. No procedure was made, however.

Mr. H. N. Ruttan, city engineer, suggested last year that steps be taken to have a thorough investigation of the Shoal Lake project, as the question had resolved itself largely into one of cost and an accurate estimate of the expenditure which such a proposal would entail, was necessary before proceeding further. This investigation has been carried on since early spring by Rudolph Hering, Frederic P. Stearns and James H. Fuertes, the board of consulting engineers, and who have just presented their report, which we publish herewith in part:

Quantity of Water Required.—The population of the Greater Winnipeg water district is about 225,000, about 200,000 being in the city of Winnipeg. The rapid growth is shown by the fact that the present population is twice that of seven years ago, and five times that of fifteen years ago. The city and district are now so well established that it is not advisable to adopt a hand-to-mouth policy if it can be shown to be more economical in the long run to provide works of large capacity at the present time. The population of Winnipeg and the amount of water supplied in each year beginning in 1902, is given in Table I.

Year.	Population as shown by assessment records.	Water supplied per day*	
		Imperial gallons.	Imperial gals. per inhabitant.
1902	48,411	1,550,000	32
1903	56,741	1,860,000	33
1904	67,262	2,340,000	35
1905	79,975	3,280,000	41
1906	101,057	3,500,000	35
1907	111,729	4,580,000	41
1908	118,252	4,880,000	41
1909	122,390	5,820,000	48
1910	132,720	5,930,000	45
1911	151,958	6,510,000	43
1912	166,553	7,750,000	47

*The table does not include the small quantity of water pumped at the high pressure fire station for other than fire purposes.

This table shows that the amount of water used per inhabitant is increasing, which is a result to be expected with the increase in the facilities for using water and one which accords with the experience of other cities. The increase is likely to continue until it reaches about double the present amount now used per inhabitant, if the present meter system of selling water is continued, as we believe it should be, or a much larger quantity provided the water is not metered to the consumers.

We believe that 85 gallons per inhabitant is a proper quantity to adopt for estimating the future needs of the district as an average for the year, but in some months the rate will average as high as 100 gallons per inhabitant. Therefore an aqueduct to provide for a considerable time in the future should, in our opinion, be designed with a capacity of 100 gallons per inhabitant, and even with this provision a large reservoir should be built near the city, in the future, to provide for a still higher rate of water consumption during short periods.

The consumption of water at the present time is somewhat restricted by the limited capacity of the sources of supply and will undoubtedly increase to a considerable extent when a new supply with a better water is furnished. For the next ten years, however, the consumption is likely to be less than 85 gallons per inhabitant.

As already indicated, we have found that the best structure for conveying water for the greater part of the way from Shoal Lake to Winnipeg is a concrete aqueduct laid with a continuous down grade, and as such a structure can be built of large capacity for a moderate additional cost, we have designed this structure to carry 85,000,000 gallons in 24 hours, sufficient, on the basis assumed, for a supply throughout the year for 850,000 inhabitants.

This may seem to be an unnecessarily large provision for future years, but it must be born in mind that the additional cost of making such a structure of liberal size is comparatively small while the cost of duplicating such an aqueduct would be large.

We adopted the capacity of 85,000,000 gallons daily after giving due consideration to the many demands for money for public works in a growing city like Winnipeg; otherwise we should have recommended a larger aqueduct, say one having a capacity of 100,000,000 gallons in 24 hours.

From the point near Transcona where the concrete aqueduct ends, to the existing McPhillips Street reservoirs, a pipe is recommended; and a single pipe line of the sizes which now seem desirable will convey by gravity 25,000,000 gallons of water in 24 hours, or nearly three times the quantity of water now used. When necessary, the flow through this pipe can be increased by pumping, or a second pipe can be laid.

Assuming a continuous growth for the Greater Winnipeg Water District, based upon the past growth of the district and the rate at which other somewhat similarly situated cities have grown, the 85,000,000-gallon aqueduct would have sufficient capacity for supplying the district until 1944. Assuming further the introduction of water from Shoal Lake at the earliest practicable date, the aqueduct would supply the requirements of the district for