

water was not as well understood as it is to-day. The towns were built on the shores of large rivers offering a supply of good appearance, and consequently the rivers were used in preference to more distant sources of supply.

The lakes, on the other hand, have not been fully utilized, when one considers that only 3.8% of the population is supplied by such a source. The numerous lakes all over the province offer a first-class supply, but, unfortunately, the lakes are not near the large centres of population. Twenty waterworks use lake water, but they serve mostly small towns.

The water-bearing formations in the province are not well known, and the available information on the subject is very meagre. Hence, 10% only of the population is supplied with underground water. With few exceptions, the 75 water works in this class, use springs originating at the outcrop of a porous stratum with an impervious one underneath. Such supplies are usually possible for small towns only. Several artesian wells have been sunk in the last few years, with remarkable success. The disadvantage of the source of supply is, that unless an extensive water-bearing formation is reached, the yield of the wells is uncertain and variable.

A great number of municipalities do not own their water supply, but with the exception of a part of the city of Montreal and two adjoining cities, this occurs in small towns and

TABLE 2—OWNERSHIP OF WATER SUPPLIES IN QUEBEC

Ownership.	No. of works.	% of total number.	Population.	% of total population.
Municipal	124	64.6	1,046,260	75.6
Private	68	35.4	337,469	24.4
Total	192	100.0	1,383,729	100.0

villages only. One municipality out of three, as will be seen from Table 2, does not own its water supply. The cost of water works is high, and after the construction of them, the small town finds that most of its borrowing power has been used by the water works, and that practically nothing is left for other improvements. Consequently, in order to have both, the water works and the necessary funds for other improvements, the municipality grants a franchise for the water works, which is a revenue-producing utility. This practice is not to be encouraged, as in most cases, the system does not provide for adequate fire protection, and eventually, the municipality has to buy the system and practically build it new.

Since the creation of a department of municipal affairs, the limit on borrowing power has been removed, but the necessary majority to sanction a by-law has been increased. Hence, it is hoped that the number of municipal water works will increase.

If we examine the use made of the various sources of supplies by the municipal or private corporation as indicated in Tables 3 and 4, we find that in both cases, over 85% of the population is supplied with river water. Two private water works only, use lake waters, while forty small supplies are derived from springs and wells:—

TABLE 3—SOURCES OF SUPPLY FOR MUNICIPAL WATER WORKS

Source.	No. of works.	% of total number.	Population.	% of total population.
Rivers	71	57.3	903,778	86.4
Lakes	18	14.5	49,929	4.8
Springs or wells	35	28.2	92,523	8.8
Total	124	100.0	1,046,260	100.0

TABLE 4—SOURCES OF SUPPLY FOR PRIVATE WATER WORKS

Source.	No. of works.	% of total number.	Population.	% of total population.
Rivers	26	38.2	288,734	85.5
Lakes	2	3.0	2,950	0.9
Springs or wells	40	58.8	45,745	13.6
Total	68	100.0	337,469	100.0

Although 86% of the population served by waterworks is supplied with river water, which is usually unsafe for domestic use, all of this water is not consumed without previous treatment. In the province to-day, 858,000 people are supplied with filtered river water and 170,000 with chlorinated water, giving a total of 1,028,000 people using treated water. This number represents 86% of the population using river water. Six municipalities, with a population of 60,000 people, now chlorinating their supply, have been ordered by the Superior Board of Health, to install purification works.

TABLE 5—TREATMENT OF RIVER WATERS

Treatment.	No. of installations.	Population served.
Filtration	29	860,000
Chlorination	15	170,000
No treatment	53	163,000
Total	97	1,193,000

Lake water and underground water being naturally good, it would seem that our water question is practically solved. Unhappily, this is not so. The great percentage of the population is protected against water-borne diseases, but the remaining 14% is divided among many small municipalities which will be harder to reach than the larger towns.

It appears from Table 5, that 53 towns, with a combined population of 163,000 inhabitants, use river water without any previous treatment. The streams from which these supplies are derived are more or less contaminated. Moreover, approximately 20% of the towns supplied by underground water have a supplementary water intake in a nearby stream, for fire purposes.

The Quebec Public Health Act of 1915 gives to the Superior Board of Health extensive powers concerning the control of water supplies. All new water works must be approved by the board before being installed. Furthermore, the board has the right to make investigations and to order purification works where needed, or to order the causes of pollution to be removed. When the supply is owned by a private corporation the Quebec Public Utilities' Commission decides whether the cost of the improvements shall be paid by the private corporation or by the municipality, and in what proportion. To comply with the orders of the board, the municipal corporation is allowed to borrow the necessary amount without being obliged to submit the by-law to its ratepayers, and the board has the right to have the improvements done at the expense of the municipality when the latter refuses to submit to the order.

But even with these extensive powers, the improvements necessary to the water supplies of the small towns above mentioned may not easily be obtained, because of the excessive cost of materials and the high rate of interest charged for municipal loans. The difficulty thus reduces to the financial question of how to obtain money for these small towns at a reasonable interest rate.

This difficulty the Board of Health hopes to overcome by means of a project, now under consideration, whereby small municipalities may borrow from the province, and at a low rate, the funds required for the needed improvements. If, as is expected, the legislature sanctions such a project, this most important remaining problem of water supplies in the province of Quebec—the problem of the small town supply—may be susceptible of solution.

A town planning committee is being formed in St. Catharines to co-operate with the Chamber of Commerce. It is proposed to divide the city into zones showing the possibility for expansion industrially. After that a systematic campaign will be started to bring new factories to St. Catharines.

The newly organized Water Board of Montreal, consisting of A. E. Doucet, W. J. Francis and R. S. Lea, consulting engineers, has completed its organization and is proceeding vigorously with its plans for the completion of the aqueduct, the construction of a new pumping plant, and the extension of the filtration plant.