



PUBLIC WATER SUPPLIES IN THE PROVINCE OF ONTARIO.*

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It is now an acknowledged fact that in cities and towns without a public water supply and without a sewerage system, the death rate is higher than in the rural districts or in those cities and towns that have availed themselves of these evidences of civilization.

From the standpoint of the economist no town of a population of 1,000 people can afford to be without a public water supply for fire protection, as the interest on the first cost will be met by the decrease in insurance premiums, while from the standpoint of the philanthropist, the humanitarian and the medical health officer, no town should be without an ample supply of pure water for domestic purposes, and a system of sewers to carry away the water used and the wastes with which it will be burdened, to such point that no danger can arise from its disposal.

In Canada we find that the first public water supply of any importance was introduced into the City of Montreal by a private company in 1807. These works were sold to another company in 1816, to a third company in 1832, and eventually to the city in 1845. New works were constructed by the city in 1853-56.

The next city to introduce a water supply was St. John's, N. B., where in 1856 a company constructed works which were abandoned in 1849-50, when new works were built. In 1855 the city purchased the works.

In Toronto, water works were constructed in 1841 by a company which operated them until 1873, when the city purchased the works.

Halifax purchased her water works in 1861 from a company which constructed them in 1845-48.

These were the only works in Canada in 1850. In 1860 we had nine works, in 1870 ten, in 1880 twenty-nine, in 1891 the number of cities and towns supplied with water works is nearly one hundred, but in about twenty of these the supply is for fire purposes only.

We will now consider the water works of Ontario only.

In this Province about 30 per cent. of the water works are owned and operated by private companies, while the population served is probably not 15 per cent. of the total supplied. The average total family rate in Ontario is about \$20 per annum in works owned by municipal corporations and \$25 per annum where owned by a company. The cost of works in Ontario is about 35 per cent. less per family in private works and the charge 20 per cent. more than where works are owned by the municipal corporation.

There are 44 cities, towns and villages in which the water works are now owned and operated by the municipal corporation, 13 of these being for fire protection only. Private companies own and operate 14 water works, in one of which (Napawanee) the water is of such exceedingly bad quality that we will classify it as for fire purposes only.

In the majority of these 14 towns and villages the expenditure of a comparatively small additional amount would have secured an ample supply of pure water for domestic purposes as well as a fire supply, would have decreased the death rate and disease, and would probably bring in a revenue after paying operating expenses.

In many of these towns engineering advice was not sought, and in a few it was not followed.

In some of these towns the water is used for lawn sprinkling, for cattle and horses, for baths, for water closets, for all purposes except drinking and cooking, and the temptation may often induce people to use it for these purposes as well. Herein is a great danger. Water once drawn from a tap and used for drinking and cooking will probably continue to be so used until sickness occurs. To those towns supplied with elevated tanks, reservoirs or stand pipes in which to store the fire service water, the foregoing remarks especially apply.

These results are convincing that the private companies in the Province of Ontario now supplying water to cities and towns on the franchise plan are not giving these towns as good water as other cities, towns and villages are supplied with. In only one place is subterranean water being supplied, and in this place it was forced upon the company.

"Quantity" rather than "quality" is their motto.

The short-sighted municipal finance minister who, only considering water works from the standpoint of dollars and cents, revenue, interest and running expenses, and the silver-tongued (fingered?) franchise agent, are often (separately or jointly) directly responsible for the selection of so many inferior water supplies throughout the Province.

Where water works are contemplated, the local boards of health should investigate intelligently and thoroughly before adopting for a public supply a water that is of a suspicious quality or one liable to future pollution.

Analysis of water as now generally conducted are a humbug and a delusion, the honest scientist being no match for the wily manipulator. The color, taste, smell and temperature of the water supplied, and a study of the conditions surrounding the drainage area from which the water is drawn are of greater weight than any analysis in determining the purity of water. The problem of possible pollution from sewage or from farm drainage in the future should also be carefully considered.

In all cases the problem of selecting a source of supply should be carefully

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considered and reported on by some disinterested authority before the works are designed, and the schemes and machinations of the disciples of "quantity rather than quality" should be met by the remonstrances of all sanitarians.

PLUMBING PRACTICE.

It is not expected that every plumber is possessed of knowledge requisite to thoroughly distribute water in all parts of a building, with equal facility to each floor upon which is placed plumbing apparatus, says *Fire and Water*. Where high pressures exist little difficulty is experienced, provided frictional resistances and cross section of area of pipe and branch supplies are considered in their relations to each other. It is often said by way of excuse for bad judgment in the plan of local distribution that there is a lack of pressure, when it is found to be a lack of volume of water—(pipe not large enough). It is a common practice in local distribution for plumbers to run one size of pipe throughout the entire building, with branch connections of same size on each floor, apparently forgetting or ignoring the fact that each added length, whether vertical or horizontal, increases friction, diminishes pressure and reduces flow.

In order to overcome these difficulties, a little study upon the subject will be a great help to the progressive plumber. A study also upon the question of "taking out branch supplies" from "the main supply," as to the angle of connection, will be found to be profitable. A great deal of pains is taken with water-pipe connections; as to angle of connections, the same rule applies with more force with respect to branch supply from main supply. Right-angle connections are very pretty as lines of harmony, but in water-pipe practice they should never be allowed. The rule of following parabolic paths or curvatures in connections will largely lessen friction and preserve the continuity of a water column passing from one line of delivery to another.

HOUSE HEATING IN THE FUTURE.

OBERLIN SMITH in a lecture before the Franklin Institute, at Philadelphia, spoke as follows of the possibilities of the displacement of coal in favor of gas or electricity for heating purposes:

"In the matter of warmth there is certainly an inviting field for our future inventors. That our present methods of heating by the burning of coal and the non-burning of smoke, and of cooling by carrying in lumps of ice, are crude and wasteful, as well as extremely irregular and uncomfortable, it is not necessary to argue about. It seems probable that in the near future, at any rate for our cities, some system of gas heating will displace coal and wood to a large extent, and this is the more likely from the fact that our streets and houses are already supplied with the necessary pipes, which may perhaps be gradually thrown out of use, as conveyors of illuminating gas, by the improvement and development of electric lighting. There also seems a tendency among inventors in recent years to attempt some kind of artificial cooling by the distribution through pipes of cold air or freezing mixtures of varying kinds; also to contrive cheap ice-making or other cooling machines, which can be economically used in individual buildings. All this is in a direct line of progress, but it seems probable that at some time in the future we shall depend upon the electric current brought into each building through a single wire, not only for our lighting and power, but for our heating and cooling also. Just how the latter process is to be accomplished we do not yet know, but reasoning by analogy, it would not seem outside the range of possibility when we consider the fact that the burning of coal in a furnace can be made to produce heat or cold at will. It is true that while electric heating in itself has been proved to be perfectly practicable, yet at present it is not economical. This is owing to the fact that our best and largest steam engines by which we run our dynamos utilize only from 10 to 15 per cent. of the energy stored in the coal, lavishly wasting the remainder. Fortunately, our dynamos have reached an efficiency of about 90 per cent., so that there is not much waste in using the electric current after the power to produce it is once generated. It is probable, therefore, that the use of electric heating will for the present be somewhat limited, and confined to special places where its convenience will offset its extra cost. For an extension of its employment thus, as for certain other important uses of electricity, and upon a scale far beyond anything we can now imagine, we must wait until we learn how to produce this current of pure energy from the coal or other fuel direct. Than the accomplishment of this feat, there is to-day no more fascinating problem in the realms of science. Many are working at it, with as yet but small success. We need not despair, however, as it seems to be a logical possibility, and the only thing required is to find out how to do it."