

WATER SUPPLY.

Prof. Jack's Preliminary Report to City Council.

SHOWING CHARACTER AND EXTENT OF HIS ENQUIRIES.

Before Submitting Opinion in Changes Necessary.

Following is the full text of Prof. Jack's preliminary report to the city council on the Fredericton water system, submitted to the city council at last night's meeting:

To Mr. J. S. Scott, chairman, Dr. F. A. Barbour, and John Maxwell, members of the Water Committee, Fredericton, N. B.

Gentlemen,—In presenting to you this preliminary report on the investigation in regard to the city's water supply, I propose to outline the extent of the work on hand, the facts to be determined, the means to be used for determining facts and obtaining data, and the progress so far made on the work.

In my final report I expect to lay before you the facts and data obtained, together with estimates of cost and relative efficiency of the different methods that can be employed for remedying any evils that may exist.

In making the investigation I may say that the conditions existant here in regard to tides or back water, sewers discharging into the river, direction and velocity of surface and subsurface currents, locality of sand bars and channels in the river, require a very careful consideration of all the facts and conditions existing before proper conclusions can be drawn and before any recommendations can be made in regard to correcting any evils which may exist.

The main questions to be definitely settled are:

1. Is our water supply impure, and if so from what source is it contaminated?

2. What are the best means to employ for its purification?

As an aid in determining what is to be done, it will be well also to know how many cases of death from typhoid fever or other diseases arising from impure water have occurred in Fredericton for the past few years, and how this number compares with the number of cases in other cities which have been subject to epidemics of typhoid and with those that have not been troubled with typhoid.

In order to properly answer the first question as to whether our water supply is impure, and if so from what source it is contaminated, we must take into account the character of the river, the population and industries along its banks, the sewers and refuse discharged into the river, together with the probable effect of graveyards and sewerage from towns above the city, etc., the location and depth of the main channels and bars, the direction and velocity of the surface and subsurface currents, the variation in these currents due to tides (or backwater) winds, general elevation of water in the river and the possibility of these currents carrying sewage or refuse towards the present or future intake pier, either directly or indirectly.

In addition to this we must have analysis, both chemical and bacteriological made of samples of water taken from different places and at different times according to the tides (or backwater) the direction and amount of winds and general elevation of water, care being used to get the worst conditions possible occurring when the wind is blowing strongly from the east and the tide is rising and the water is the lowest possible.

In order to properly answer the second question as to the best means for purification, requires an extended investigation of the various means that we could use in the case under consideration. These means may be enumerated as follows:

1. Removal of intake and pumping station.

2. Use of pressure mechanical filters at present pumping station.

3. Rebuilding present intake and so constructing it that the proper filtering material may be placed around the sides or at the bottom in such a way that it may be easily renewed or cleaned.

4. Use of reservoir on the hill together with either gravity mechanical filters or sand filters which must be covered for protection from frost.

5. Combination of either 1 and 2, or 1 and 3, or 1 and 4.

6. Supply from artesian wells.

In considering the removal of intake, we have had numerous and diverse suggestions from our citizens, some advocating its removal to the mouth of the Nashwaaksis, others to a point opposite Government House, others to a point half way between the city and Springhill. I may say that we cannot decide intelligently

on any of these localities until we have full and complete information in regard to the various channels, and sand bars, the direction of surface or subsurface currents and their relation to the sewage and refuse discharged into the river, the effect and extent of tides, the effect of winds and the character and probable growth of population and industries along the banks between the city and Springhill at least. It would be sheer nonsense to remove the intake to some locality where the conditions might be as bad or perhaps worse than they are at present.

Outline of Work.

In view of these considerations I propose making a survey of the river between Estey's wharf and the graveyards above the city with a view of determining the channels, sand bars, currents, tides in the river, character and extent of population along the shores and in the river. This data will serve the double purpose of both determining any probable source of contamination and of deciding as to whether it would not be advisable to remove the intake as well as furnishing the data as to the proper place to place it if it were removed.

I propose collecting statistics from the Board of Health as regards the prevalence of diseases due to impure water and comparing it with the statistics from other places. I propose having analysis made of the water from different sources in order to find out in connection with the data obtained in regard to currents and tides and winds, whether our water supply is contaminated, and if so from what source, as well as finding out in connection with the other data as to where we may expect to secure a purer supply.

I propose to get information from the manufacturers of the different mechanical filters, as regards cost and efficiency of same, together with information as regards the satisfaction given by these filters in the different cities where they are installed.

I also propose making an approximate estimate of the cost and relative efficiency of the various means of purifying the water.

With these facts before us, a satisfactory and intelligent conclusion can be drawn as to whether our supply is so impure as to warrant a large outlay in expenditure, and if so we can tell the best possible solution as to the proper means to be employed.

Work Done.

In regard to the work that has already been done, I may say, that a survey of the river and banks (in order to get the data in regard to channels, sand bars, tides, currents, sewage discharged into the river, character of population and industries along bank) has been practically concluded with the exception that it will be necessary to make a few observations in regard to the currents when the water is lower than at present, and it may be necessary for a few days work to locate the place for a reservoir (if it is needed) on the hill.

I am now engaged in making a map to show the location of channels, sand bars, currents, and character of population along banks.

I have had a tide gauge put on the intake pier which takes a complete record of the rise and fall of tides (or back water) and general height of water in the river and which is indispensable in forming a guide for determining the worst conditions and when to expect the tide to rise and when to expect low water, and in finding the general elevation of the water.

The mean elevation of the water is now about 2½ feet above the extreme low water used by Mr. Beck with as a datum for city level.

I have sent four samples of water (one taken from the crib well, one taken from the river beside the crib well, one taken from the pump well and one taken from the service pipe in R. T. Mack's drug store) to Ottawa for analysis by the chemists of the Dominion Experimental Farms. They agreed to make analysis for nothing provided we pay the expressage. I sent them the samples in order to get a comparison of results obtained with different heights of water, and will send them another lot when the water is lower.

I have also been in consultation with several analysts as regards prices for water analysis (both chemical and bacteriological) and asked Dr. Weaver to advise me in regard to a first class analyst in Canada. He has recommended Mr. Hersey of Montreal. As soon as the water is low I would recommend sending Mr. Hersey some samples and it may also be advisable when our data is complete to request him to spend a day here. His charges are \$25 per day and expenses, and \$15 per sample for analysis.

The Board of Health has furnished me statistics in regard to cases and deaths from typhoid and diptheria, from 1895 to 1903, inclusive and have promised to obtain statistics from St. John, Woodstock and Moncton. I already have statistics of other cities which have been subject to epidemics. These will have to be used with caution as all cases may not have been reported.

I am in correspondence with the Federal Filtration Co., New York, the Pittsburgh Filter Manufacturing Co. of Pittsburgh, the New York Continental Jewell Filtration Co., New York, the John McDougall Caledonian Iron Works Co., Montreal, Agents in Canada for Continental Jewell Filters, all of whom have furnished more or less data in regard to cost, capacity and efficiency

together with plans of plants and circulars.

I have received a reply from the city of St. Thomas saying that their direct pressure filters are giving complete satisfaction.

Work to be Done.

Although I have been able to draw some of my conclusions from the data I have already obtained, it will be necessary for me to compile and compare all the data I have on hand together with the results from analysis of samples of water before I can finally determine on the best method of remedying any evils existing in the present water supply.

At the same time I have to make an estimate of the relative cost and efficiency of the different methods which can be employed for purifying the present supply, using for this purpose the data I have already on hand and that which I am procuring.

I hope to be able to let you have my final report about the first or second week in September, depending on the height of water in the river and on the receipt of results of water analysis and in it will cover the ground as fully as possible considering the shortness of the time and the magnitude of the work.

Yours respectfully,

E. Brydone-Jack,

City Engineer.

City Engineer's Office,
August 2nd, 1904.

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