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DAILY HERALD

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FREDERICTON'S WATER SUPPLY

The Herald surrenders considerable of its space today to the publication of the reports of Engineer Jack and Dr. Mason respecting Fredericton's water supply, and the steps in their opinion necessary for its purification.

The recommendations of the engineer, it will be observed, involve an expenditure of over \$76,000 for the removal of the intake pipe further up the river, and the installation of a filtration plant.

The propositions will strike the ratepayers of this city as rather overpowering from a financial point of view, the estimated expenditure for the changes being well up to the original cost of the water works system, and the matter is one that will require a great deal of consideration.

It is generally admitted that there is need for improvement in the conditions surrounding the intake of our water supply, but there are plenty of people who deny very emphatically that the water is impure, while others believe that the pollution if any, is due to the lack of sewerage.

All these classes of people think they can make out a good argument from their respective standpoints, but it is evident to the most casual observer that the intake as at present situated, is subjected to conditions which should not surround the source of a city's water supply. Whether the danger is sufficiently threatening to justify the expenditure of over \$76,000 is a question that must not be decided off hand in either direction, but will require patient study and a full discussion.

The Ross government of Ontario, overwhelmingly defeated in the recent general elections, resigned yesterday, and Mr. Whitney announces his cabinet, the first Tory administration in the premier province since 1872.

DR. MASON'S REPORT.

Bacteriological Expert Thinks the Intake Should be Removed.

Appended to Prof. Jack's report was the following report from Dr. W. P. Mason, of Troy, N. Y., the expert who lately inspected the water supply here and subsequently analyzed samples of the water.

Troy, N. Y.,
Jan. 7, 1905.

Mr. E. Brydson-Jack,
City Engineer,
Fredericton, N. B.

Dear Sir,—Acting upon your instructions, on September 9th and 10th, 1904, I visited Fredericton, N. B., examined into the conditions of the water supply of the city and made a sanitary survey of both banks of the river St. John as far as Lunt's Ferry, including Keswick river, and indicated points from which samples of water were to be shipped to me for analysis.

Allow me to submit the following report together with the analytical data:

The city's water supply is at present taken from an intake in the St. John river some 300 feet from the right bank. The point of intake is opposite city limits, and the volume of water pumped amounts to some 600,000 imperial gallons per day. The population of the city is about 7,000, and numerous sewers empty into the river at various points along the city front. One of the nearer of these sewers to the water intake comes directly from the city hospital.

Numerous rafts of logs line the shore above the intake and two large saw mills, producing great quantities of saw-dust are also there located, one of them within half a mile of the intake crib. Every opportunity is present for woody extraction matter to pass into solution in the water with consequent deepening of the water color.

This increase in depth of color can scarcely be looked upon as pathogenic, in character, nevertheless, the tendency of the public demand is towards a colorless water as well as one which is wholesome, and it would be wise to be prepared to meet their wishes.

The rafts of logs immediately above the intake tend to entangle and retain in position any decomposing material, such as the dead bodies of animals, thereby causing the putrefaction of carcasses to take

place in such a position as to pollute the intake water during a long period of time; whereas, were the river open, the objectionable material would float onward towards the sea. On the opposite side of the river from the city, and but a short distance upstream, there is likewise a great amount of log rafting, and the men in charge of such work constitute a force of several hundred strong during the months between June and October. The excreta of all these men must reach the river more or less directly, and constitute an item of contamination not to be overlooked.

The current of the river is normally too strong to permit of an upstream floating of material from the sewer outfalls of the city itself, yet, under certain conditions of the wind and tide, there is every possibility of city refuse reaching a point as high as the intake. In other words I believe the water of the intake to be at times polluted with Fredericton sewage. It is worthy of note, also, in support of this contention, that I observed in places distinct evidence of an upstream eddy along the right shore.

I made an examination of the graveyards located about three quarters of a mile above the intake, and noted that the character of the soil is sandy for a number of feet in depth, and that it rests upon a clay bottom which dips towards the river with an outcrop at or near the water's edge. The depth of the sand layer appears to be about twenty-five feet near the river and thins out south of the Woodstock road. In my opinion, interment in this graveyard will not effect the character of your city water, provided that no graves be permitted along the edge of the river bluff. At the time of my visit I was informed that it was the intention of the authorities to utilize the portion of the cemetery bordering upon the bluff for single grave lots. I would suggest that it would be unwise to use that part of the cemetery for interment purposes because of its small distance from the river shore line.

I drove and walked up the river bank as far as Lunt's ferry, nine miles above the city, observing the dwellings on the right bank. At Lunt's ferry the river was crossed and the return journey was made on the opposite shore, which was examined in similar manner.

The land upstream beyond the intake is flat and very desirable for building sites, hence it is likely that the city will, in no great number of years, be extended to cover that section of the valley. Under such circumstances the sewage of the new portion of the town would enter the river at a point above the present intake, thereby rendering the water distinctly unsanitary were it then secured from the present site. It must be remembered that water works are very properly built with a view towards meeting the demands of a future reasonably distant, for that reason the conditions now obtaining at Fredericton would warrant looking in advance some years towards the city's probable expansion.

I was informed that the town of Woodstock with a population of 4,000 is situated upon the St. John river sixty miles up the stream from Fredericton, and that such town is sewerage and dumps its sewage into the river.

It will be observed upon inspection of both the chemical and bacteriological data, that the influence of Woodstock sewage upon the character of the river water is apparent at a point below the town. How far down the stream such influence will extend, it is not possible to accurately state.

The self purification of running water is a fact to be recognized, but no sufficient or general rule can be laid down to mark the distance to which water must flow in order to rid itself of organic pollution. Each case must be determined upon its own merits. Let it here be said however that the fact of its being a running water is not one to be given much credit when rating its powers for self-improvement. Still water other things being equal, will, after pollution, accomplish more towards recovering its portable qualities than will that which encounters falls and rapids in its course. In other words the conditions obtaining in a lake are better adapted to the improvement of water than are those found in a river.

Does Woodstock sewage reach Fredericton? Surely not all of it travels so far, but possibly some of it does, and how much, none can say. One thing is certain, there is greater danger of contamination of the water supply from the sewage of Fredericton itself and its immediate surroundings than could arise from the presence of Woodstock upon the upper portion of the river.

Beyond danger from the city sewers proper it is to be noted that frozen excreta collecting during the long winter near the houses just beyond

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the upper limits of the city, might, during the thaws of spring, rapidly run into the river over the still frozen soil, and serious consequences might result as in the instance of Plymouth and New Haven.

You will observe from an examination of the analytical data for the intake samples, that the waters vary in composition upon different dates, and though at times free from the bacillus coli communis at other times that organism is present.

My opinion is that the water supply of Fredericton is unsuitable for municipal purposes because of its physical appearance, and that at times it is unsafe because the presence of sewage material. I furthermore believe that as the city extends upstream this adverse criticism should very properly be strengthened because of the increased opportunities for contamination which would then exist.

Believing, as I do, that the present water supply of Fredericton is not as satisfactory a one as your city should possess the question arises, what change should be made to improve the existing conditions?

Would it be well to seek water from another and a purer source? I am strongly of the opinion that such a move should not be attempted, firstly, because naturally pure waters are becoming more and more difficult to find, and there is no guarantee that if one be discovered it will continue pure during the next generation, and secondly, for the reason that the water which can be had in unlimited quantity from your river can be rendered entirely safe and suitable for all uses at a very reasonable cost.

My recommendation is that you remove your intake upstream to a point a little lower than Kaskisebo where the influence of the logging industry will be less pronounced, and that you purify the water there obtained by a modern system of mechanical filtration.

Your river water is too highly colored to get the best results from slow sand filtration, and moreover, your city is of rather too small size for the economical installation of that character of plant. The form of filter I would recommend is of the open or gravity type, using alum as a coagulant, and there should be arrangements made for thorough coagulation by the alum before the water reaches the sand bed.

For so highly colored a water as yours, and containing so much vegetable extractive matter, there should be a considerable interval between the time when the alum is added and when filtration begins, so that the flocks of aluminum hydrate may form and do the work required of them.

It is unnecessary to add, at this late day, when mechanical filtration is so widely employed and understood, that the alum added to the water on its way to the filter is thoroughly decomposed in a properly constructed plant and never reaches the consumer. Free alum in the filtered water is unnecessary and inexcusable.

For so cold a climate as yours, the filters must, of course, be housed, and I would suggest that the filter tanks be of steel rather than wood. The coagulating basin and the tanks themselves for that matter, can be constructed of concrete, if you so prefer.

With such a plant well constructed, and intelligently managed, your city can be furnished from the St. John river with a water supply of excellent character.

Yours very truly,
(Sgd.) WILLIAM R. MASON.

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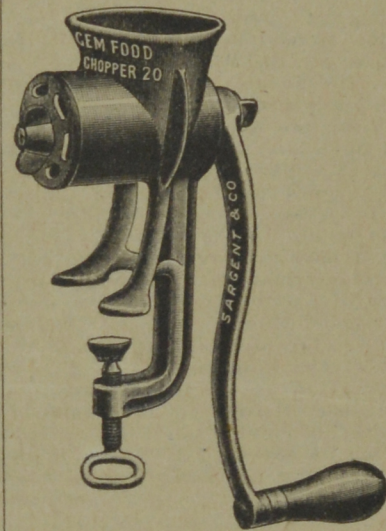
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