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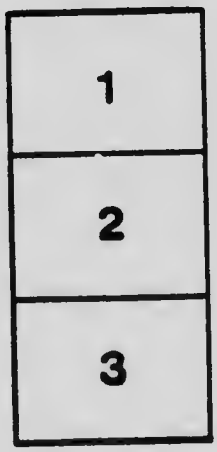

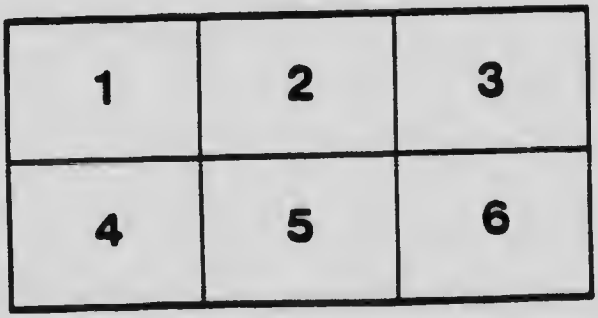

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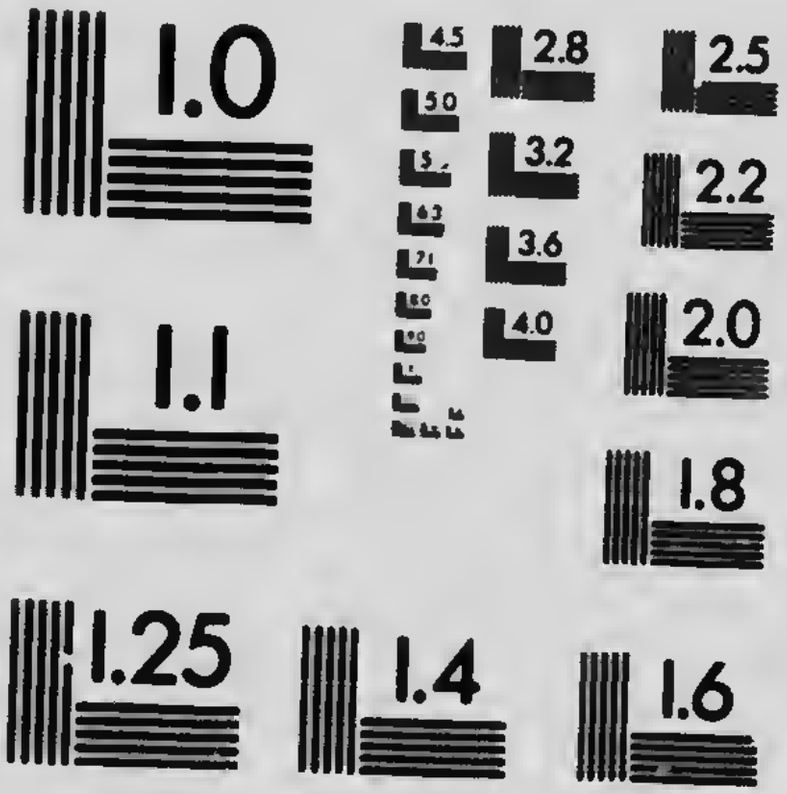

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LECTURE

DELIVERED BY

H. O'SULLIVAN, F.R.G.S.

Before the Quebec Board of Trade, on the 13th June 1911.

Pamphlet on Lac St. Charles

To the President and Members of the Quebec Board of Trade, and Fellow-citizens:—

GENTLEMEN,—

In coming before you this afternoon I do not come on the platform as a civil, or hydraulic engineer, although I may have a better right to claim that privilege than some of my neighbours; but I simply come as a private citizen, being a proprietor and elector of Quebec Centre, and living in Lorette, and using the Quebec Aqueduct waters there,—I claim the common right of all who have to use that water and have to pay for it: and therefore, I ask your indulgence while I shall endeavour to explain my views on the subject.

I have seen in the Quebec Morning Chronicle of the 26th April, 1911, the report of your waterworks Engineer, recommending the laying of a new pipe, 40 inches diameter, from Lorette to Grande Allee; approximate cost, $750,000.

Now gentlemen, as a citizen and rate payer, and with the knowledge that I have acquired during 42 years practice as a land surveyor and civil engineer, and further having had the advantage of living for the last thirty-nine years within one hundred feet of your line of Aqueduct, and having watched with interest the working of this more or less glorious system, and above all in the course of my professional practice, having had a better opportunity of observing and knowing the capabilities of the Basin of the river St. Charles, its advantages and its defects, as a source of water

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supply for the city of Quebec, I regret to have to say that I am diametrically opposed to the new proposition above stated.

1st.—Simply because we have been long enough drinking puddle, draining of manured farms, and cattle fields, and other impurities that shall always pollute the water between the Quebec Aqueduct and Lake St. Charles, during every freshet or heavy summer rains.

2nd.—Because the drainage area of the St. Charles basin above the present Aqueduct is not sufficient to justify the laying of a 40 inch pipe in addition to the 18 inch and 30 inch mains already laid: and in proof of this, allow me to submit the following arguments and truths, which cannot be contested.

Many years ago, when Hon. Francois Langelier was Mayor of Quebec, he had a knowledge of the scarcity of water in the basin of the St. Charles, and having learned from me that a large tributary of the river Jacques Cartier might be easily diverted into the basin of the St. Charles, he engaged me to make a survey and levelling, and a report on the same with accompanying plan and profile of the locality in question. Had Sir Francois Langelier remained as Mayor, probably the work might have been carried out; but he was succeeded by the late Mr. Fremont who did not view the project so encouragingly as his predecessor, and the matter fell through until it was too late to revive it.

I urged the matter all I could, for I knew that the river Caché was a pure mountain stream whose waters would never be polluted by settlements on its banks; and that while its volume was not so great as that of the St. Charles at average summer level, its volume is more steady throughout the year.

The River Caché, being fed mostly by clear mountain springs and bordered by a wild rocky uncultivatable country, its waters will never be exposed to pollution by settlements on its banks: and its basin being covered with virgin forest, which retain or retard the flowing off of the surplus water during freshets, and not being subject to loss by evaporation, I venture to say that during lengthened droughts, its volume

is not far short of that of the St. Charles river whose drainage basin is mostly cleared and cultivated land.

Had the Corporation taken action and diverted the Caché river into the St. Charles, then it could have been easily done, and there would have been little or no damages to pay: for no one on the Jacques Cartier river at that time used more than a third of its volume at its lowest stage. But since the Jacques Cartier Electric Power Company acquired the right to their water powers on both sides of the river, and erected the power house there, they find that the whole river is not sufficient to run their immense plant during winter: therefore no one can divert a drop of water from the river Caché, or any other tributary of the Jacques Cartier now, without paying extraordinary damages, and there is no other source from which the waters of the St. Charles can be augmented.

This being the case why should we plunge the city in debt to lay a new 40 inch main before knowing whether we will have water enough to fill it or not? Of course, during part of the season, there will always be lots of water, well charged with mud, and other impurities, to fill three or four extra pipes: such water as we are now drinking and have been drinking during freshets and heavy summer rains since ever the Aqueduct was laid.

If it was purposely intended as a feeder of dirt, bacteria and filth for the use of the city, it was a great success of engineering skill; for I do not hesitate to say that the two water mains, situated as they are to day, could not be laid worse, no odds how one might try to do it

It is well known, and it must have been well known before any pipe was laid, that there existed a low broad valley averaging nearly a mile in width and 3 3-4 miles in length, extending from the present Aqueduct dam and intake at Lorette up to Lake St. Charles, forming an approximate area of about 2400 acres, that is more or less flooded during spring and fall. Even in mid-summer it is sometimes considerably flooded during lengthened heavy rains. Consequently, we can never expect to have pure water except during the winter months, while the intake is at Lorette Chateau d'Iau.

Aqueduc Rivière St Charles Québec

Although the W. W. Engineer does not speak of filtering, the idea has been mooted since several years, but in my opinion it would be a very expensive and rather problematical experiment. I have been trying for some time past to get more definite knowledge regarding filtration, but the best I could learn is, that in more southern climates it succeeds well enough; but in our northern regions where we are subject to severe frosts, it is not always a success. The experiment would be too expensive to run the risk of its adoption.

But there would be no necessity for filtering, if, instead of laying a new pipe from Lorette to Grande Allee, 40 inch diameter, whic is altogether too large for the capacity of the river, for one half of the year, we would extend, say, a 40 inch main from the present Aqueduct to upper lake St. Charles, it would be ample to fill with pure water, both your 18 inch and 30 inch mains now laid.

Upper Lake St. Charles, as you will see by the plan, is a splendid reservoir, measuring nearly a mile and a quarter

View of Upper Lake St. Charles from St. Jacques Camp.

in length by about one third of a mile in width: its shores are rock bound to a great extent, its waters are deep and clear, and there are very few settlers, nor there never can be much more cultivation of the land around its shores.

In fact, it is an ideal reservoir for the domestic supply of the city at all seasons. But the supply is limited at dry seasons, and the water required for factory, and insurance purposes, street cleaning, etc., must be had from another source.

If Quebec is ever to grow to be a city to take its place among the foremost of Atlantic seaboard ports, what nature destined her to be, and which we all devoutly hope that she will be, in spite of all odds, we cannot ignore the fact, that the limited drainage area of the St. Charles basin cannot suffice to supply the additional demands for water supply, which, I venture to say, should be made within the next ten years: and the only way to meet this demand is to pump the water from the River St. Lawrence—You cannot get it anywhere else ! !

Why, then, should we be beating around the bush and spending money by the million dollars on projects that must certainly prove inadequate, perhaps before the works are completed?

Why not go to Upper Lake St. Charles at once for a pure unsullied water supply for domestic purposes, and secure all the lands around that lake so as to ensure a clear unpolluted supply for the city homes, and begin at once in the right direction by pumping from the River St. Lawrence what we require for all other purposes?

I may be considered too much of an optimist, but, allow me to say that I never lost confidence in the future of Quebec, and in view of the facts so clearly shown by the Hon. S. N. Parent, (as we find published in the Quebec Daily Telegraph of the 5th May last), (which reads as follows): I would not be surprised to see our population doubling in the first decade after our projected railway improvements, which are now well under way, and must be completed in order to meet the demands for access to our port, soon as the bridge over the St. Lawrence shall be completed.

Of course, the city of Montreal, like a great magnet, attracts everything to herself today; and we are all, as true Canadians, proud of her, but her capacity is limited both as to depth of water way, and length of open season for navi-

gation: and soon as our northwest is sufficiently settled to make their weight felt in the management of public affairs at Ottawa, things will take a change.

Our trade with the European markets is no longer to be done with small craft, every year calls for larger ships, which has been amply proved to reduce the cost of transportation; and is any sane man going to tell me, that when trains are loaded in Winnipeg or further west and come thousands of miles eastward they are going to stop short at Montreal to ship their exports by inferior vessels, while by coming another hundred and fifty miles on a level or nearly level track, (whether they come by the Transcontinental or any other railway to Quebec) to deposit their freight where the largest ships afloat can come at all seasons?

I say at all seasons, for I virtually believe that if the same amount of energy was directed to ascertain whether winter navigation was practicable in the Gulf of St. Lawrence, that is yearly expended in trying to prove the practibility of commercial navigation through Hudson straits; I am fully convinced that this great and shortest water way would prove to be a success. At least, the best and most reliable ship captains who have been navigating the Gulf for the last quarter of a century are of that opinion. Capt. May, of Str. Constance who has been navigating the Gulf for a quarter of a century says:

"Of course, we all know that they cannot go to Montreal during winter, and here hangs the tale: I can take a ship to Quebec any day in the year, unless during a heavy snow storm, and even then I can anchor in shelter until it blows off, and still reach Quebec sooner than any one starting from Liverpool with me can reach any port in the United States."

It may be possible that for two or three months the navigation of the Gulf may not be commercially practicable, but during that time they can go to St. John's or Halifax, and the trade will be done through Canadian ports: for, once eastward to the meridian of Quebec, it can never go by any United States port. At all events, we are sure to have at least a month, and probably two months longer

open season from Quebec than from Montreal, and this will turn the scale sooner or later.

In view of these facts, there is every reason to hope that our population ere long will be doubled; and once it begins to grow, like Montreal, it will keep on growing. Why then be hugging and depending on the St. Charles basin for a water supply, when we know that it is inadequate?

Perhaps our city officials are not aware of the fact that when we started our electric and hydraulic Power Company at Lorette, we found that there was not water enough in the river to run our limited plant under a 14 feet head, in dry seasons after the Quebec Corporation had served themselves Being one of the directors, I was asked by the Company to guage the flow of the riv

Considering myself too much interested in the business, I thought it was better to have this guaging done by a competent disinterested party. I therefore recommended Mr. C. E. Gauvin, C. E., a most competent man, who had been employed by the Quebec Government for doing such work for a number of years, which recommendation was adopted by a unanimous vote of the directors. And here is Mr. Gauvin's report. (Mr. Gauvin's report which was in the French language was here read by the lecturer.)

The idea of laying a 40 inch pipe in addition to the 18 and 30 inch mains already laid, cannot be sustained as the following facts will show:

According to the W. W. Engineer's own figures, our two mains already in operation can discharge ten million gallons per 24 hours. Now, supposing, that we extend the pipe to upper lake St. Charles, and dam that lake at the narrows and raise the water six feet there, which is all the country can afford without flooding the cultivated farms in Stoneham, it would still fall far short of the reserve necessary to tide us over dry seasons, and there is no other way of having a pure water supply for the city's domestic wants except by filtering which is problematical.

The area of this upper lake is about one third of a square mile, or 9,292,800 square feet, which multiplied by 6, gives a volume of 55,756,800 cubic feet, which would only be

View of Upper Lake St. Charles from proposed site of dam at Narrows.

sufficient to supply the three mains as recommended by Mr. Gallagher, for about 15 days, while we require a reserve of 3 months to tide us over dry seasons.

Of course, the flow of the river during these 15 days must be added; but in dry seasons the flow at the narrows of Lake St. Charles is very limited. I was there in April last, and we could hardly perceive any current. But there is this advantage, that when the water gets to a low stage, the whole river above the aqueduct dam is like a lake, and there is no sediment carried down; and the river being confined to its natural bed, with little or no perceptible current, we have pure water everywhere. Then the "18" and "30" mains can be used as they now stand without any filtering, when there is an unsufficiency of water to fill the pipes from the upper lake.

Allow me to say that it is more than ridiculous to pass a law preventing a man to go in a boat or a canoe, on the river St. Charles, while within less than half a mile from the mouth of the pipe, the river Grand Desert or Neilson river at Judge Larue's summer house, "Castorville," drains in all the filth and bacteria of the Valcartier road, and the cultivated farms along that road and deposits them into the St. Charles, I may say into the mouths of the pipes.

Now, by continuing a pipe to lake St. Charles of sufficient capacity to fill the two water mains already laid, as above stated, you would get clear of all this trouble, and have a pure water supply for domestic purposes for the city: and by lowering the dam at Lorette, which the Corporation had no right to raise 1 foot without paying for it, they would get clear of all the land damages along the river. By connecting the main from Upper Lake St. Charles with the two actual mains a short distance below the dam, the additional head of 6 ft. would accelerate the flow enough to compensate for the lowering of the dam one foot.

I know, of course, that the law allows the city of Quebec to take all the water required for an ample supply for the city wherever it can be found, within a radius of 50 miles: but it cannot be taken for nothing. Let them try to take the river Caché to-day, and I would not be surprised to see Mr. Rodolphe Forget lighting on them to the tune of a million dollars or so.

Now, let us take an approximate estimate of the damages below the dam for which the city will be responsible if this proposed 40 inch pipe is laid from the "Chateau d'Eau" to Grande Allee.

You will simply drain the river at low water; and less than 6 arpents below the dam there is a large factory including saw mill, grist mill, laths and turning machines, etc., owned by Mr. Maurice Bastien, Grand Chief of the Huron Indians. Mr. Bastien does a business of about $100,000 a year, and if you drain the river you cripple his business. About a third of a mile farther down, his son Ludger Bastien has another mill in which he does as much business, if not more than his father; and if the river is drained, you leave him stranded also.

Next, we have the Lorette Hydraulic Light and Power Company, of which I have the honor of being president; and I can assure the city that while I am president of that Company, we will not be put out of business for less than one hundred thousand dollars.

Of course they can arbitrate, but, I ask any of you gentlemen, who have been accustomed to using electric light for

a number of years, how you would like to go back to the old lamp and tallow candle; I do not think that any fair arbitrator would award us less than $100,000.

Besides this we have a good many other industries. Lorette is a growing town, and we are preparing to furnish power to a good many small factories, which we can do in day time, and the same power will serve for lighting the town at night. *Drain the river and you ruin Lorette.*

For my own part the Corporation has done me thousands of dollars damage, already, without paying me one cent, when they laid that 30 inch pipe.

They acquired the right from my auteurs above the Aqueduct dam for a mere bagatelle to lay an 18 inch pipe; but they never acquired any right at all, nor did they pay a cent to any body for laying the 30 inch pipe, until they struck Judge Stuart's property. There they had to pay ! !

I have a son, a lawyer who keeps his office in St. Peter St., and whom, I think, has given the Corporation ample proof that he will follow in the footsteps of the late Judge Stuart, in dealing with the Quebec Water works Department.

When I say that they have done me thousands of dollars damage, a word of explanation is necessary: I own the right to half the river for over a mile at Lorette. In this mile there is about 200 feet fall. These water powers, if we had only the 18 inch pipe would be worth a big pile of money to-day. They were crippled by the laying of the 30 inch pipe, and if another 40 inch pipe is laid, they will be rendered totally worthless.

I will not detain you by giving details of the other industries that will be put out of business between Lorette and Quebec if the river is drained by an additional 40 inch main, but the Corporation should have had experience enough in the Tremblay case at Little River to make them think twice before repeating it.

I will now read you a couple of paragraphs from a recent work by Hollis Godfroy, published in New York and Boston, entitled "The health of the City."

Gentlemen, I am no book agent, nor have I any interest in recommending it only for the common good; but I do

not hesitate to say that it should be in the hands of every alderman, and deligently studied by them, not only those of Quebec but of every city in Canada. There is a chapter on every subject that relates to the health of the city. It costs only $1.50 and here are its contents: * * *

"Be sure you are right, and then go ahead" is an American maxim and a good one. Are we sure that we are right? I see by the report of the last meeting of the Waterworks Committee, that a resolution was passed to lay a water main of 40 inches, as recommended by the City Waterworks Engineer; and that separate reports were to be drawn up by the representative of the insurance companies or underwriters, and the waterworks engineer for the guidance of the Council.

Now what security have we in this for the health of the city? What do the insurance companies care about the health of the city? All they care for is to make all the money they can out of us at the least possible risk.

Then we have only the W. W. Engineer to rely on. What does any of the Aldermen, from first to last, know about such questions? What are they supposed to know? Is there a single man among them that ever made any special study of such questions? No!

I have spoken to several of them during the last few months, and no one seems to know or understand anything on the subject, beyond what they have incidentally learned from their Waterworks Engineer.

The Waterworks Engineer may be a capable man, but there are other capable men; and men of more experience, and higher professional standing in this Canada of ours, whom I think, it would be very advisable to consult, *before committing the City to at least* $1,000,000 *dollars expense.*

The Waterworks Engineer says it will cost approximately $750,000, simply to lay the new main from Lorette to Grande Allee.

The Insurance representative says it can be done for less. This, in my opinion, is only the small end of the wedge. It may possibly do to satisfy the Insurance Companies, but, will it satisfy the health of the city?

What I would propose is this: Let the Waterworks Engineer and the insurance representative each submit their reports; not only for laying a pipe from Lorette to Grande Allee, but also their proposal for furnishing the city with an ample supply of pure water from Lorette or elsewhere, including cost of filtering, etc., for I maintain that *it is impossible to supply the City with pure water without filtering except from the upper lake St. Charles,* and there the quantity is insufficient to justify the laying of an additional pipe of 40 inches diameter from Lorette to Grande Allee.

I have not the figures for a 40 inch main, but the Canada Iron Corporation's quotation for 4ft. cast iron pipe for high pressure to stand over 400 feet head, or 173 pounds pressure to the square inch weighs about 12,600 lbs. per length of 12 feet, and costs about $16.00 per running foot.

But now as we have a head of 500 feet instead of 400, the pipes must be made correspondingly stronger, and therefore, it would be unsafe to rely on any form of pipe that could not resist a pressure, of at least, 200 lbs. to the square inch: and this would practically bring the cost of a 40 inch cast iron pipe to about the figures above quoted. *On this basis, the pipe alone from Lorette to Grande Allee would cost about* $675,000.

The W. W. Engineer says in his report "it would not be desirable for the sake of so small a difference in cost, to employ steel instead of the old well tried material cast iron.

Somehow the majority of the hydraulic Engineers, whom I have met in the last few years, prefer steel to cast iron pipe: and when the W. W. Engineer speaks of the old and well tried material, I sincerely hope he does not intend to furnish us with a service similar to the 30 inch main already laid, where, I believe, there have been as many breaks as there are lengths of pipe; and after each break, the water was undrinkable a considerable time afterwards.

But these are only matters of detail. The main question is, can we get enough of pure water from the St. Charles basin to supply the *City's requirements in the near future? I say we cannot, it is impossible.*

Quebec has been the cradle of the Dominion, and she shall yet be the Emporium of Canada. The prophetic words of Frontenac as given by Garneau on page 224 of his history of Canada. "Frontenac trouva la position de Québec des plus importants. Il écrivit au Ministere:" Rien ne m'a paru si beau et si magnifique qui la situation de la ville de Québec qui ne pourrait pas être mieux postée quand elle devrait devenir un jour la capitale d'un grand empire" must be realized sooner or later.

"I have never seen anything so fair or so grand as the site of Quebec. That city could not have been better placed had it been purposely founded as the expected capital of a great empire." (Page 224 of Garneau's French edition, translated by Bell.

Nature has done everything for Quebec, and it only remains for true Canadians to do their part, in developing her natural advantages which are exceptional as a shipping port.

I was Assistant Engineer to the late A. L. Light, on the reconnaissance surveys for the short line railway, for the continuation of the C. P. Ry. to the Canadian Atlantic ports in 1885; and I remember having written to Sir John A. Macdonald and dilating on one of the unique exceptional advantages which Quebec has over any Atlantic shipping port which is this: If lines of railway track were built along the face of the cliff from the bridge down to Dufferin Terrace, with several tubes from each track leading down to the wharves, all the grain in the Dominion could be shipped by gravitation instead of by elevators as they have to do everywhere else.

Yes, nature has done everything for Quebec as a shipping port; and somehow we are always trying to get away from her. I have even heard many Quebecers laud the idea of having a winter port on Labrador, with a railway from Quebec to there? Now, if such a thing were practicable. what would be the result?

In the first place you cannot cross the Saguenay river with any line of railway below the town of Chicoutimi. I know the Saguenay river as well as I know St. John St. I

have canoed it from end to end many a time. It is too broad to bridge over, and too deep to tunnel under.

Then, since we would have to pass by Chicoutimi, the result would be that a line would be built direct from Winnipeg or Norway House to that Labrador port, and both Montreal and Quebec would be in the isolated background, as far as the transportation of the grain of our Western prairies concerned us.

There is no trouble in building a railway line through the interior. I know the country, and I would safely undertake to locate a line from any part of the Harricanaw or Nottaway basins right to the discharge of Lake St. John without exceeding four-tenths of one per cent grade. But from all I could learn from the factors of the Hudson Bay Company, and chiefly from the late Peter McKenzie, who was in charge of the Company's posts, and resided there for many years, I do not think that it will be ever practicable to have a winter port on the Labrador coast. And the much talked of Hudson Strait route, owing to the shortness of open season, can never eclipse the St. Lawrence route.

The only competitor we can have to the north would be, if the Straits of Belle Isle were blocked by a permanent dam, and a line of railway built thereon, and through Newfoundland, which to the great majority, may appear more or less chimerical; but to my mind, it is within the limits of actual practicability.

I have taken the soundings across the Straits of Belle Isle at its narrowest point, and examined the shores on either side; and there is nothing impracticable about it. It is only a question of money.

If the great powers interested; the United States, Great Britain and Canada would agree to spend on this project a tithe of what they are willing to spend on dreadnoughts, it would soon be on the roll of practical accomplishments; and to the New England States and Eastern Canada its realization would undoubtedly have such an effect on climatic conditions along the Atlantic Seaboard that the beneficial results would be incalculable

But this, however, would not so seriously affect the shipping interests of Quebec as one might think, its only advantage would be in the line of rapid transit.

It is well known that railways can never compete with large steamers for the transport of slow-heavy freight, and that the farther inland you can send your ocean steamers of sufficient tonnage the railways' usefulness ends there, as far as the transport of slow freight is concerned.

Towards the South we have nothing to dread, if we are true to ourselves. Portland, Boston and New York are our greatest rivals, but as you will see by measuring on the map, Quebec, is by land, from 150 to 300 miles nearer to Winnipeg than any United States port; and if we take from Norway House, where the bulk of our wheat for the European markets must soon pass, the shortening will be almost doubled.

By water she is, according to the figures on the Canadian Pacific Railway map and time tables; 566 miles nearer to Liverpool than New York, 397 miles nearer to Liverpool than Boston and over 300 miles nearer to Liverpool than Portland.

Nothing can prevent Quebec from becoming one of the greatest shipping ports of the American continent.

You may talk of reciprocity, free trade, British imperialism, annexation with the "stars and stripes," independence of whatever you like, it has to come sooner or later and the bright day is now dawning.

Once our granary of the West is fully developed, as water must come to it's level, so must the shipping trade come to Quebec.

Therefore why spend a million of dollars on this project of water supply for the city when we know that it will be inadequate, probably before the work can be completed? Why not go at once to Upper Lake St. Charles, the only place in the whole St. Charles basin where we can get a pure and ample supply for domestic purposes during Spring and Fall freshets and heavy Summer rains, where a dam of the necessary height can be built between the two lakes for less than $1,000 and pump from the St. Lawrence River *all the*

water required to satisfy the underwriters, factories, street cleaning, etc.

New York is doing that now, in addition to their Croton Aqueduct they are laying another pipe to the Catskill Mountains to insure an ample supply of pure water for domestic use; and they are pumping the salt water from the Hudson River for protection against fire, street cleaning, etc.

MONTREAL.

The city of Montreal consumes to-day between 60 and 70 million gallons per 24 hours; partly furnished by the Civic plant and partly by the Montreal Water and Power Company and other plants. They are now laying a new main, in fact the work is almost completed. It is built of re-enforced concrete of horseshoe shape, inside measurements: 7 feet 8 1-2 inches in height by 9 feet horizontal.

On account of the impurity of the Ottawa water coming in at St. Annes and hugging the shore of Montreal Island they are extending the pipe 1,000 feet from shore to get the pure St. Lawrence water.

My nephew Eugene O'Sullivan, C.E., a former pupil of mine, is the engineer in charge, and I have had the advantage of repeatedly visiting the works with him at all seasons. Of course the Chief Engineer of the City, is Mr. George Janin, who projected the scheme and his first assistance is Mr. Lesage, but they chiefly attend to the office work while my nephew is the Engineer in charge of the entire work in the field.

A good report of this, illustrated with photos, etc., is given in the "Contract Record" of the 22nd December, 1909, published in Toronto.

Allow me to say that the engineering skill which satisfies Montreal where they are spending about $5,000,000 on their water supply should be good enough or at least worthy of being consulted by the people of Quebec.

Be that as it may I cannot close this lecture without acknowledging my sincere thanks to the Montreal Engineers, Messrs. Janin, Lesage and O'Sullivan for the information so generously given me, and further for their valuable ad-

vice on technical questions in Hydraulic Engineering more or less involved in the preparation of this paper.

I know that many will think me too much of an optimist, but I prefer an optimist to a pessimist, the optimist is the happiest man any way; and remark what I tell you gentlemen, there are many of our pessimists who have money rusting and will allow Montrealers, Torontonians and New Yorkers to get hold of our best business sites, and before another decade they will be biting their own finger nails, and saying to themselves "what a fool I was, I could have bought that property for $1,000 and now it is worth $10,000."

Yes, Quebec must grow and grow fast, once it starts on the ascendant, and to come back to the question at issue, the basin of the St. Charles above the Aquduct Dam can never furnish our growing city with an ample supply of pure water for other than domestic use and I hereby protest against any action of the City Council, that would commit the city to the expense of laying a new water main before submitting the whole project to a board of the most competent disinterested engineers that can be had in the country.

A hearty vote of thanks was proposed by Mr. J. H. Holt, of Holt, Renfrew & Co., seconded by Oscar Gagnon, of the Canada Life Assurance Co.

Indian Lorette, 12th June, 1911.

HENRY O'SULLIVAN.

To the Editor of the Quebec Morning Chronicle, Quebec:

SIR,—

Referring to your reproduction of part of my lecture in your issue of the 14th June, I must thank you sincerely for giving me so much space in your valuable paper. As regards the discussion thereon, I am sorry that the whole of what I said was not printed, but if you will kindly allow me space in your next issue I will try and correct some erroneous statements that were made during said discussion.

Mayor Drouin said that when he saw me on the 9th March last he told me that *they did not want the information* I proposed to give them, they had all this at the Water Works Department and if they wanted more they would send other engineers: This looks very plausible, but it is not in accordance with the facts, which are as follows:— When I suggested to Mayor Drouin the advisibility of doing this work at once, while the water was about at its lowest stage, he said that he could not make any engagement without consulting the Water Works Department.; I said that might take too much time and we might not be able to do the work at all this year, if there was any delay for the ice is generally unsafe after the middle of March, and I made this offer: "I will go at once and make the necessary surveys and levelling provided that as soon as my plans, profiles and report are ready you will call a meeting of the Council, and that I shall explain the whole affair, above board and if my work is approved of by the Council I shall be paid, and if not it would be charged to profit and loss.

This he agreed to on condition that I would show him my report before calling the meeting of the Council. I agreed to this and started at once on the work.

I found so little difference of level between the aqueduct dam and the mouth of the River Huron on Upper Lake St. Charles that it was useless to make a profile; but I made a regular survey of the river and lakes, and sketched the approximate width of the valley that would be more or less

flooded during freshets, or by the raising of the dam at Lorette. This work consisted of:—

1st. An accurate plan on a scale of 400 feet to an inch of the river and lakes from the aqueduct dam to the mouth of the Huron River at the north end of Upper Lake St. Charles. I did not follow all the sinuosities of the river, for lack of time and the failing ice, but an accurate continuous traverse was made from end to end.

2nd. Plan of survey of the narrows between the upper and lower lake showing proposed site of dam: Scale 40 feet to an inch.

3rd. A general plan of the entire basin of the River St. Charles, scale 4 inches to the mile, shownig thereon the approximate rim or summit dividing the basin of the St. Charles from that of the Jacques Cartier River, and the Montmorency watershed and other inferior streams bordering it on the South East, and the different public roads and routes, that traverse the several feeders of the St. Charles river above the aqueduct dam.

View of St. Charles Valley showing piles of manure washed by freshets half a mile from mouths of aqueduct pipes.

I also exhibited photos taken by my son, Pat. O'Sullivan, C.E., showing how piles of stable manure, deposited by the

farmers during fall and winter on the low cultivated lands on both sides of the river between the aqueduct dam and the lake were washed by the spring freshets into the mouths of the pipes that give the water supply to the city. Although I had previously taken the levels in different sections between the aqueduct dam and the lake, I had two different sets of levels taken by two qualified civil engineers, independent one from the other (two different parties) over the same ground, and they closed with a difference of one inch, one finding 8 1-2 inches and the other 9 1-2 inches, I took the mean at 9 inches difference of level between the top of the dam and the surface of the lake. There was then no perceptible difference of level between the discharge of the lower lake and the mouth of the River Huron on the upper lake. When all was ready I saw Mayor Drouin, and offered to show him what I had done, and what I proposed to say but he declined to have a meeting of the Council.

Now, it seems to me that after doing all this useful work at my own expense, I deserved at least to be heard before the City Council according to agreement; and I can safely say, that the data I was prepared to give them cannot be had at the Water Works Department. I did not expect that they would accept or approve of my views or my work before having it controlled by other competent engineers, but I expected that they would profit by the data, so generously offered, and that they would at least give me credit for it, whether they paid for it or not.

But instead of this I was ostracized, and as Mayor Drouin put it, I was only the representative of Lorette, a sort of obstructionist trying to throw cold water on his pet scheme.

I am no obstructionist and I have a right to discuss the affairs of the city as well as any other man, I own a three tenement house in Quebec Centre, and I ought to be intelligent enough to know that the success of Quebec means the success of Lorette, and that the ruining of the suburban towns and villages would be bad policy for the city while they can do cheaper and better otherwise.

Mayor Drouin said that they did not want my plans, etc., that this information could be had at the Water Works Department, and if more was necessary he would send other engineers.

Allow me to say that Mayor Drouin may spend thousands of dollars, and he cannot get the same amount of useful information that I was ready to give him on the conditions above mentioned: in fact it cannot be done at all during the summer season.

The strength of a chain is its weakest link; and if he contemplated to lay a new water main so hurriedly the engineers should have been in the field early last winter.

January, February and March are the months that we have to provide for, and this has not been looked into, but more of this anon.

Mayor Drouin also remarked during the discussion that he learned from Dr. Catellier that the water was as pure if not purer at the aqueduct dam than at Lake St. Charles. I saw Doctor Catellier the following morning, and asked him about it. His views agree exactly with mine. He said that they had analysed the water taken near the dam when the river was at a low stage, and it was as pure as at the lake. This I said in my lecture, that when the water was very low the river was like a lake and the water was good, but let them test it during freshets and heavy summer rains and they will find an awful difference. Dr. Catellier agrees with me in saying that the best and only way to get pure water, without filtering is to go to Upper Lake St. Charles for it.

Sir Francois Langelier spoke next and made some very interesting remarks but I regret to say that he relied a little too much on the informaton he had obtained from the Water Works Department. He said among other things that he was informed by them that there was always at least an inch of water flowing over the dam; and also that the riparian proprietors were more than amply paid for all damages past and future, caused by the damming or lowering the waters of the River St. Charles.

As Sir Francois had done me the honor of attending and listening attentively to my lecture, I considered that it would have been very inappropriate on my part to contradict him and for the same reason I did not offer any remarks on what Mayor Drouin said either; particularly as the lecture was advertized for 3 o'clock and it was after 4.30 p.m. before I could begin, every one was tired after sitting there in a crowded hall for nearly three hours I did not chose to prolong the discussion.

Sir Francois Langelier has been always, and is yet I hope, one of my best personal friends, and a man that stood by me when I wanted a friend; but if he has been misinformed at the Water Works Department it is not my fault. I know the weight that any opinion given by the Lieutenant-Governor may have on the question at issue.

I know that it may be considered very presumptious on my part, to attempt to contradict any statements made by such high authorities as the Lieutenant Governor and the Mayor of the City of Quebec.

But on the other hand, as a fellow of the Royal Geographical Society of London, England, of which our patron was the late King Edward the VII, and the Vice-Patron, his son, His Royal Highness the Prince of Wales, now George the V, patron and the Duke of Connaught, Vice-Patron. I can claim to be the compeer of any man living under the British flag· and when it comes to a question of land surveying and civil engineering being both a Provincial and Dominion land surveyor and a member of the Canadian Society of Civil Engineers I feel and know that I have a perfect right to discuss such questions with any man in Canada.

Therefore I can tell Sir Francois Langelier that he was misinformed at the Water Works Department, and that if he had been at the Chateau d'Eau with me in March last he would have seen that nearly one half of the dam was dry, not a drop of water running over it; on the east side. There was some water flowing over the west side, the top of the dam not being made level: but in any case there was not near enough to fill a 40 inch pipe. I can get 100 witnesses to prove this.

Now as regards the ample payment for land damages to riparian owners allow me to say that some of my auteurs may have been paid a paltry sum for land damages above the dam, but neither myself or any of my auteurs were ever paid a cent for the damage done to my water powers below the dam, where I own a mile of river front, and as I said in my lecture there is about 200 feet fall.

The Legislature can give the power to the city to take the water anywhere within a radius of 50 miles, but they cannot give them the power to appropriate acquired private rights without paying for them.

The day after I gave my lecture I was called as expert witness on behalf of the plaintiff in the case Elzear Renaud vs. City of Quebec, Louis Larue, Advocate.

The Water Works Engineer, Mr. Jer. Gallagher, was expert witness for the City.

Mathias Chouinard, Advocate.

As I was the first witness on the roll, the Water Works Engineer had to leave the room while I gave evidence, that apart from my own work I had two different sets of levels taken from Lake St. Charles down to the W. W. dam and that the difference of level was only 9 inches as above stated.

Mr. Gallagher was called next and here is his evidence:

Ques. Are you aware that in 1905-6 the aqueduct dam was raised about 1 foot? The question was asked in French and he answered in a peculiar kind of French, something about superposed woodwork that formerly existed, but finally admitted that they had raised the dam about a foot higher than it had been for several years previous.

Ques. Would that have the effect of changing the level of the water at Lake St. Charles?

Ans. No.

Ques. Have you ever taken the levels and can you state what is the difference of level between the dam and the lake at low water?

Ans. No.

Ques. Then how can you say, and on what can you base yourself, when you say that the raising of the dam one foot cannot affect the level of the water in the lake?

Ans. Oh: we can see that by the eye without any instrument.

Now here is the Water Works Chief Engineer who admits under oath that he does not know the difference of level between the Lorette Aqueduct dam and Lake St. Charles at low water, but that he can detect by the naked eye a difference of level of only 9 inches in a distance of nearly 8 miles.

Really his power of vision must be equal if not superior to the nasal power attributed to Doctor Hornbook by the poet Burns.

"E'en them he canna get attended,
Altho' their face he ne'er had ken'd it,
Just sh—— in a kail-blade and send it,
As soon's he smells't
Baith their disease and what will mend it,
At once he tells't."

If all the other information Mayor Drouin gets from his Water Works Engineer is on a par with this, it is no wonder that he may sometimes make a mistake; and I think it should be the duty of our City fathers to have more light thrown on this subject before committing the city to the expense of laying a new pipe from Lorette to Grande Allee.

I emphatically protest against being classed as the representative of Lorette vs. Quebec. It is simply a blind thrown out purposely to belittle anything I may say for the good of the whole.

"A prophet is always a fool in his own land" is an old saying." I do not claim to be a prophet, but what I do claim is that I know more about the basin of the river St. Charles and its capabilities than any other engineer in Canada.

We read in the Chronicle of the 22nd June last, the offer made to Mr. Forrester to become Consulting Engineer of the Water Works Department; winding up with his pedigree as a member of the Canadian Society of Civil Eng-

ineers, etc., etc. Now, Mr. Forrester may be a very good man and a competent engineer and all that, but allow me to say that there may be a shade of incompatability in a man being at the same time the representative of the underwriters and consulting engineer for the city?

Now, as regards professional standing in the Canadian Society of Civil Engineers, as mentioned in the Chronicle he is only in the same class since two years that I have been in for 15 years. Mr. Gallagher is in an inferior class, being only an associate member since 12 years.

How these men can say at once after a visit or two to the river and Lake St. Charles, when the water was at a high stage, certainly far above ordinary summer level that there is amp[illegible] water there for all the future requirements of Quebec, is to say the least very astonishing!

What proof have they given or what proof can they give [illegible] the truth of this statement?

Of course seeing the fact of Mr. Forrester having been "educated in Edinburgh and Glasgow," it must be taken for granted that he knows more about the geography and topography of the Province of Quebec, since he has been here two years than the Government Inspector of Surveys and Provincial Topographer who has been steadily employed specially on such work, since over a quarter of a century.

The fact is the doings of the Quebec Water Works Department, may be defined better by the word farcical than by any other word or phrase that I know of in the English language.

They will not let poor Jean Boivin, their guardian at the Chateau d'Eau, who furnishes ice to the families in Lorette take his horse across the ice and he is obliged to do all his hauling around by the Valcartier road to supply the houses between the St. Charles River and the parish of Charlesbourg.

Now where Mr. Boivin takes his ice is within a stone-throw of the aqueduct dam, and consequently any dirt or polution that might possibly be left there would be carried off over the dam with the spring freshets before it could possibly mix with the city's water supply; while there are

nine public roads, crossing the River St. Charles, and its feeders between the lake and the dam, at convenient distances to allow their filth and bacteria to get properly mixed with the Quebec Water Supply before it enters the pipes.

I simply mention these facts, as it may possibly make interesting reading for some of our confreres of the Canadian Society of Civil Engineers, and possibly for some of our city fathers also.

By the same article in the Chronicle Alderman Jobin "expressed pleasure on hearing that there was sufficient "water in Lake St. Charles to supply all that was required "by the city, contrary to what had already been stated. "Moreover, the city could boast that no epedimic nor dis- "eases had been caused by drinking water taken by the "citizens from that source."

Must we wait until there is an epedimic to force us to do what science and common sense clearly show that we should do right off? Let samples of the River St. Charles water immediately above the aqueduct dam be taken and analysed every day from the middle of March to the middle of December, and I venture to say that the result would prove that no other city in Canada or the United States would suffer such an impure supply to be served for domestic use.

Now, as regards the abundance of water to be had at Lorette for all present and future requirements of Quebec City, a few figures may be sufficient to show quite the contrary.

From my own personal surveys and from the best previous surveys compiled in the Department of Crown Lands the basin of the River St. Charles above the aqueduct dam only comprises an area of about 130 square miles. Compare this with other river basins throughout the Province, as given by Mr. Gauvin, C.E., and others which I read in French in the course of my lecture; and as will be seen by the dates on which they were guaged, were not taken at the lowest stage, which is generally from the 1st January to the 15th of March, in our Province.

	Cub. ft.
River Becancour guaged 5th December, 1903, flow per second, per square mile of drainage area of entire basin	0.22
River Jacques Cartier mean of winter months	0.26
Ottawa River, guaged by the Georgian Bay ship canal engineers	0.30
River Richelieu	0.23
River Rimouski, by Gauvin, 23rd March, 1905	0.12
River Causupscal, by Gauvin, 24th March, 1905	0.15
6	=0.213

The result of the guaging of these six rivers gives an average flow of 0.213 thousands of a cubic foot per square mile of drainage area per second; and taking the area of the St. Charles basin above the dam at 130 square miles, as above stated, according to this average we can only expect a flow of between 14,000,000, 15,000,000 gallons at low water per 24 hours.

According to the Water Works Engineers' figures the two mains already laid supply the city with 10,000,000 gallons per 24 hours.

What will be left to fill the proposed 40 inch main in dry seasons, when its capacity under the same head, will be one fourth greater than the other two put together?

Hoping that the above facts and figures may have the effect of causing the Mayor and Councillors, before they commit the city to a million dollars for laying a new main to pause and ascertain:—

1st. Can sufficient water be had from the St. Charles Basin for the requirements of Quebec in the not too far distant future?

2nd. What will be the cost of filtering so as to furnish the city with pure water, and what will be the damages to riparian owners?

3rd. What will be the result of filtering in our cold climate, and the continuous cost of maintaining the same?

4th. How this will compare with pumping the water from the River St. Lawrence, to satisfy the underwriters, etc., etc.

When we propose spending a million of dollars in improving our water supply, common sense dictates that we should leave no stone unturned in trying to find out how it should be spent in the best interests of the city.

I am no obstructionist, nor have I any axe to grind. All I desire is that the wisest, most economical and at the same time the surest and best adequate water supply for the health and increasing requirements of the city shall be secured; and when this has been decided on by a competent disinterested board of the best hydraulic engineers and medical scientists we can get in the Dominion, let me be right or wrong, then and not until then shall I be satisfied; and I think that every intelligent man who is interested in the welfare of the city of Quebec should be of the same opinion.

Yours truly,

HENRY O'SULLIVAN, F.R.G.S.,

P. and D.L.S., Mem. Can. Soc. C.E.