

**CIHM
Microfiche
Series
(Monographs)**

**ICMH
Collection de
microfiches
(monographies)**



Canadian Institute for Historical Microreproductions / Institut canadien de microreproductions historiques

© 1996

Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

- Coloured covers/
Couverture de couleur
- Covers damaged/
Couverture endommagée
- Covers restored and/or laminated/
Couverture restaurée et/ou pelliculée
- Cover title missing/
Le titre de couverture manque
- Coloured maps/
Cartes géographiques en couleur
- Coloured ink (i.e. other than blue or black)/
Encre de couleur (i.e. autre que bleue ou noire)
- Coloured plates and/or illustrations/
Planches et/ou illustrations en couleur
- Bound with other material/
Relié avec d'autres documents
- Tight binding may cause shadows or distortion
along interior margin/
La reliure serrée peut causer de l'ombre ou de la
distorsion le long de la marge intérieure
- Blank leaves added during restoration may appear
within the text. Whenever possible, these have
been omitted from filming/
Il se peut que certaines pages blanches ajoutées
lors d'une restauration apparaissent dans le texte,
mais, lorsque cela était possible, ces pages n'ont
pas été filmées.
- Additional comments: /
Commentaires supplémentaires:

- Coloured pages/
Pages de couleur
- Pages damaged/
Pages endommagées
- Pages restored and/or laminated/
Pages restaurées et/ou pelliculées
- Pages discoloured, stained or foxed/
Pages décolorées, tachetées ou piquées
- Pages detached/
Pages détachées
- Showthrough/
Transparence
- Quality of print varies/
Qualité inégale de l'impression
- Continuous pagination/
Pagination continue
- Includes index(es)/
Comprend un (des) index
- Title on header taken from: /
Le titre de l'en-tête provient:
- Title page of issue/
Page de titre de la livraison
- Caption of issue/
Titre de départ de la livraison
- Masthead/
Générique (périodiques) de la livraison

This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	14X	18X	22X	26X	30X
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12X	16X	20X	24X	28X	32X

The copy filmed here has been reproduced thanks to the generosity of:

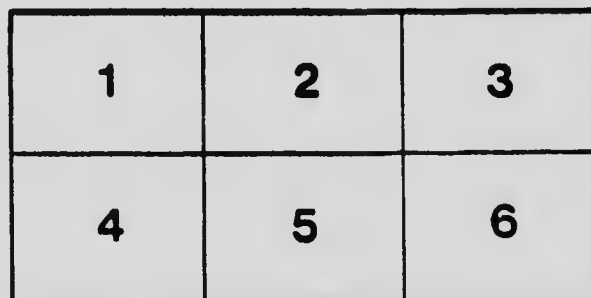
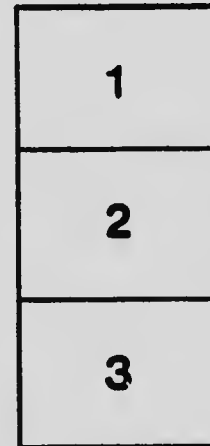
Canadiana department
North York Central Library

The images appearing here are the best quality possible considering the condition and legibility of the original copy and in keeping with the filming contract specifications.

Original copies in printed paper covers are filmed beginning with the front cover and ending on the last page with a printed or illustrated impression, or the back cover when appropriate. All other original copies are filmed beginning on the first page with a printed or illustrated impression, and ending on the last page with a printed or illustrated impression.

The last recorded frame on each microfiche shell contain the symbol \rightarrow (meaning "CONTINUED"), or the symbol ∇ (meaning "END"), whichever applies.

Maps, plates, charts, etc., may be filmed at different reduction ratios. Those too large to be entirely included in one exposure are filmed beginning in the upper left hand corner, left to right and top to bottom, as many frames as required. The following diagrams illustrate the method:



L'exempleire filmé fut reproduit grâce à la générosité de:

Canadiana department
North York Central Library

Les images suivantes ont été reproduites avec le plus grand soin, compte tenu de la condition et de la netteté de l'exempleire filmé, et en conformité avec les conditions du contrat de filmage.

Les exempleires origineux dont la couverture en papier est imprimée sont filmés au commencement par le premier plet et en terminent soit par la dernière page qui comporte une empreinte d'impression ou d'illustration, soit par le second plet, selon le cas. Tous les autres exempleires origineux sont filmés en commençant par la première page qui comporte une empreinte d'impression ou d'illustration et en terminent par la dernière page qui comporte une telle empreinte.

Un des symboles suivants apparaître sur la dernière image de chaque microfiche, selon le cas: le symbole \rightarrow signifie "A SUIVRE", le symbole ∇ signifie "FIN".

Les cartes, planches, tableaux, etc., peuvent être filmés à des taux de réduction différents. Lorsque le document est trop grand pour être reproduit en un seul cliché, il est filmé à partir de l'angle supérieur gauche, de gauche à droite, et de haut en bas, en prenant le nombre d'images nécessaire. Les diagrammes suivants illustrent la méthode.

THE SENATE DEBATES

FOURTH SESSION—TENTH PARLIAMENT

SPEECH

OF THE

HON. SENATOR CASGRAIN

ON

THE GEORGIAN BAY CANAL

OTTAWA, THURSDAY, FEBRUARY 6, 1908

The notice of motion being called :

By the Hon. Mr. Casgrain :—

Will call the attention of the Senate to the importance to Canada of the early construction of the Georgian Bay Canal.

Hon. Mr. CASGRAIN said : I have been asked to call the attention of the Senate to the importance of the early construction of the Georgian Bay canal. I accept cheerfully the task of addressing the House on that question, because I know of no body better qualified to appreciate the merits of this work. I believe this is the kind of question to which the Senate should devote some of its valuable time, and I know that hon. gentlemen will give all the attention which the magnitude of the enterprise deserves. In this House, better I believe than in the House of Commons, we are in a position to study the great questions which interest the whole of Canada. In the other House, members, through local influence, may be obliged to attend more to local wants ; but in this House we are free to attend to measures which interest the country as a whole. Hon. gentlemen who compose this House have nearly all had long training in public affairs and are

well qualified to deal with such important questions. It is an incentive to most of us to work, in studying out these larger problems, because we know that the permanency of our tenure of office in this House lasts as long as our natural life, and gives us a chance to see some of the measures and reforms we advocate carried out before we pass from the political arena. Of the Commons the same cannot be said. Some able man who might have been capable of rendering great service to this country may see his political career nipped in the bud, because the particular constituency which he represents may not like the party with which he is affiliated, or may prefer a party who has the good fortune to have for leader a man who enjoys the esteem and confidence of almost the entire electorate of the country. A very good and able man may be driven out of public life and fall almost into oblivion, not through any fault of his own, but simply because the party to which he is opposed has at its head an abler man than the party with which he is affiliated. I believe that this House, because of its independent position, is capable of judging of the very best

scheme by which to carry out this important project. We are not tied either to the St. Lawrence or the Ottawa routes. We are perfectly free to look at both sides of the question, and if this House should conclude, after mature study, that the enormous amount which would be required to construct the proposed canal should be spent in improving the St. Lawrence waterway, then it is for the Senate to express approval or disapproval of either one or the other. I wish to put before the House some of the facts I have collected after considerable research during the last two months, because there has been so much said about this question which has been before the public of Canada for more than fifty years that it is very difficult to advance anything new on the subject. I shall try to avoid following the beaten track and to find something new which will be interesting to this House. This question might be divided into four great sections, there are so many considerations involved in it. First, there is the engineering feasibility; second, the commercial potentialities of the enterprise; third, the water powers and their utilization; and, fourth, the transportation problem. Allow me first to refer to the engineering problem, because I have had more occasion to study that particular branch of the subject. The most important point, to commence with, is the selection of the route.

On this the 300th anniversary of the founding of old Quebec, when we are commemorating the foundation of that city, could anything be more appropriate than to recall at the very outset that the first man who explored the Ottawa route and made it known to civilization, was the distinguished traveller who founded the city of Quebec—Samuel de Champlain. Three hundred years ago, in 1613, this bold and brave man, accompanied by four Frenchmen and one Indian, went from Quebec to Montreal and thence penetrated up the Ottawa river as far as the county now known as Renfrew. There he had to winter, not being able to proceed further. I may relate a small incident which happened at that point. The only astronomical instrument he had was an astrolabe, an instrument to tell the elevation of the sun, and thereby approximately find the

latitude. This instrument was lost, and, strange to relate, it was found by an Ontario land surveyor, in June, 1867, just at the time of confederation. It is now, I understand, deposited in the Department of Crown Lands at Toronto. In 1615, Champlain resumed his exploration, determined this time to push as far as he could westward, as we all know in those days the idea was to find a way across this continent to the China sea. On his second trip he was accompanied by ten Indians, one interpreter, and one man-servant. It was a very small party to penetrate through the wilderness at that time, and with which to contend against hostile tribes; but nevertheless his voyage, as we know, was successful. He ascended the Ottawa, as far as the Mattawa river and seeing that the Ottawa branched north and that the Mattawa lay more directly in his course, he took that branch. After ascending the Mattawa river, he entered lake Talon, and from lake Talon into Turtle lake and from Turtle lake into Trout lake, and there he crossed the summit dividing the waters which flow east towards the St. Lawrence from the waters that flow west, towards Georgian bay. I may say here that the only elevation between the level of Trout lake separating the waters flowing east from the waters flowing west, is a small one of four feet, necessitating a very small portage in order that a canoe may proceed westward. After having ascended to that altitude, Champlain crossed lake Nipissing, made a careful survey of some parts of it, descended the French river, and entered Georgian bay. There he saw for the first time the Huron Indians who inhabited the shores of Georgian bay, and who were in a far more advanced state of civilization than the other tribes inhabiting the North American continent. Hon. gentlemen will see that before any European had ever heard the roar of Niagara Falls, the Ottawa and French river route and waterway was already known. These early explorers were certainly wonderful men. Last year, in this House, I spoke of these adventurers leaving Montreal on snowshoes and going to Hudson bay. The La Verendrye brothers not only followed the route that Champlain explored in 1613, but penetrated lake Huron and ascended the rapids of Saint

Ste. Marie, crossed lake Superior, continued up Rainy river, and Lake of the Woods, and finally pushed their way across the Rocky Mountains. Those two brothers unaccompanied, crossed the Rocky Mountains somewhere, as far as we can ascertain, about the route the Canadian Pacific Railway has followed, descending on the western coast of the Rockies, and taking possession of all that immense territory in the name of the King of France. These brothers made a map of their journey. Many years ago I had occasion to see that map, and it is wonderful to observe the accuracy with which they have indicated the various routes through this continent. The places where they indicated that posts should be established are the places where posts were subsequently located, either by the Company of the Hundred Associates, or by the Hudson Bay Company, or the Northwest Company, and are now the sites of towns and prosperous cities. Champlain returned to Quebec in the year 1615. I may say he had also explored many other parts of the country; in Nova Scotia, in Cape Breton and in Prince Edward Island. For 240 years the Ottawa River route saw a picturesque procession of missionaries, trappers, and all the Hudson Bay Company employees who carried furs down to Montreal, and the shores of that river echoed with many a hoat song sung by the French Canadian trappers and voyageurs. Fully one-half of the supplies that passed across this continent were forwarded by that route. These pioneers were really wonderful men. The knowledge that they had of the country; the knowledge that they had of the various routes was certainly greater than the knowledge of many people in our own day, notwithstanding all the modern facilities we possess. They recognized that there were three principal routes along the great water sheds in this northern continent—three great water sheds east of the Rocky Mountains. The first water shed, starting at the foot of the Rocky Mountains, and extending to a point about 100 miles east of Winnipeg, and reaching to the south as far as the Missouri plateau, all drained, as hon. gentlemen know, into the Hudson Bay by the various large rivers flowing into it. This route was followed until not very long ago. I

was attached myself to a gentleman who came out to this country by Hudson Bay, landing at York Factory. He came with the intention of being a missionary, but he afterwards gave up that idea to become a surveyor. He came from Hudson Bay to the settled parts of Canada by following these waterways.

The second water shed, and one of equal importance, and one which was travelled over and over again in the olden days, was the water shed to the south extending again from the Missouri plateau down to the Mississippi to the Gulf of Mexico, lastly, the third route comprises all that vast extent of territory draining into the great

Lakes Superior, Huron, Michigan, and Ontario, that immense plateau drained by the St. Lawrence, the route which we are most familiar. These three great plateaus were well defined, and, if we reflect, we must admit that it is almost absolutely necessary there should be on the northern part of the continent these terraces, and that there must necessarily be breaks in the water flow, in order to keep the water from flowing too fast from the centre of the continent to the ocean. Were it not for Niagara and other great falls; if there were one steady grade without these obstacles to navigation, the whole interior of the country would be a barren desert. But the Divine architect of the universe constructed these dams in order to conserve moisture throughout the length and breadth of the various plateaus.

Now after these 240 years of pioneer work, we come, with the advance of civilization to the year 1856, when for the first time, fifty-two years ago, actual surveys were made of the Ottawa River route. The first survey made by the then Department of Public Works was under the supervision of Mr. Walter Shanley, a distinguished engineer who passed over to his reward not many years ago, and who for many years was member for the county of Grenville. Mr. Shanley then thought, as most people did in those days, that a channel with a draft of ten feet was amply sufficient for all the trade that would be offered. His estimate of the cost of a ten foot channel was some \$24,000,000. Later on he was asked if an eight-foot draft would not be sufficient. Other calculations

were made; which reduced the cost by eight million, leaving an estimate of sixteen million for the total cost of the canal from Georgian Bay to Montreal. It may be interesting to members from Montreal to know that in 1863 the Montreal Board of Trade had a report on the Ottawa and French River navigation problem. You see, hon. gentlemen now the boards of trade, even in that remote period, took an interest in this question. The report of Mr. Shanley, as was the later report of Mr. Clarke, was unfavourable in one respect. Between Georgian Bay and the summit there is a difference in level of some 99 feet to be overcome; and, naturally, from this summit all the water necessary for the operation of the canal must be obtained from the very highest point. Mr. Shanley reported that, in his opinion, the watershed falling from Trout Lake and Talon Lake was not sufficient to supply a canal of ten feet or of eight feet and that even by uniting these lakes, enough water could not be got. In 1858, Mr. T. M. Clarke, another engineer, also employed by the government of United Canada, made a report, very much on the same lines as that of Mr. Walter, and a large book of some three or four hundred pages, as large as our Debates, was then published on the subject. I have had possession of that book for the last few weeks. Mr. Clarke, like Mr. Walter Shanley, advised that the supply at the summit was insufficient, but Mr. Clarke proposed to raise the level of Lake Nipissing by some 15 feet, and lower the level of those three lakes I have mentioned, in order to make one long water stretch. I may say that that scheme would have been the best if it were practicable; but the expense would have been enormous on account of the rock-cutting through the summit necessary to make the level. And now that the town of North Bay has been built on the shore of Lake Nipissing, and the town of North Bay and the Canadian Pacific Railway are at such low level—I think some fourteen feet, if my memory serves me right, above the level of the lake—it would be almost impossible to raise the level of the lake without flooding the town of North Bay, and the Canadian Pacific Railway works. That project has consequently to be to be abandoned. But.

I may be able later on to show that even this obstacle has been overcome by the able engineers whom the government has had for the last few years making a study of the surveys and plans of this great scheme. It may be of interest to this House to know that at the present moment, and for the last three or four years, some \$600,000 has been expended by the government in surveys, plans and explorations. It shows that this question has become a practical issue, and, I may be pardoned if I go into it, somewhat at length. The surveys made fifty years ago were brought to a sudden stop. Ten years ago a committee of this honourable House was formed, composed of eighteen members, eleven of whom are still living and are active members of this House. They, after going into this question very thoroughly and hearing evidence of surveyors, and reviewing the engineering aspect, the commercial aspect, even the military aspect of the question, strongly recommended to the government the advisability of proceeding with the construction of this work. That was ten years ago. No further move was made for six years; and four years ago surveys were again started, and now it has been proposed to construct a canal with twenty-two feet of water to accommodate vessels drawing nineteen and twenty feet, leaving enough water under the keel of the keel of the vessel for stowage way. Here comes the question, whether it is wise to undertake the project at enormous cost, for although the final estimates are not yet completed, it is well known that the work will cost about a hundred million dollars. Is it wise to undertake a canal twenty-two feet deep, or would it be better to make it fourteen feet, the same draft as the canals on the St. Lawrence at an expenditure of about \$30,000,000. Hon. gentlemen may be amazed at the extraordinary difference in cost between a canal twenty-two feet deep and one fourteen feet deep and that eight feet more in depth should make the huge difference of \$10,000,000; but you must remember that in increasing the depth the quantities are increased in the cubical ratio. It is not the length or breadth merely, but the cube of the contents, and so the quantities are multiplied three times over, thus account-

ing for this immense difference. Some hon. gentlemen may say that if the one hundred millions were spent on the St. Lawrence route, perhaps it could be deepened to twenty-two feet draft. I was at first inclined to believe that fourteen feet would be sufficient, but fourteen-foot canals do not seem to be able to compete with modern railways, as the smaller boats do not carry freight very much cheaper than do the railways, and are not able to materially divert commerce from railway lines. It appears from all that has been written lately on the subject, that the only canal that will successfully attract the traffic is one of twenty-two feet, and that if we were to build only a fourteen foot canal, it would be a disaster for Canada to save the money as we already have a canal drawing fourteen feet. Canals of that depth have proved a failure in diverting traffic from United States ports. They have not succeeded in bringing freight to Montreal, and it may be astonishing to hon. gentlemen to hear that no fleet of vessels with fourteen feet draft has ever been built. When the St. Lawrence canals were to be deepened to fourteen feet that was considered the maximum draft of vessels on the great lakes; but before our canals were opened the tonnage of these vessels had increased over and over again, and to-day we have on the great lakes ships 600 feet in length, with 60 feet beam and drawing from twenty to twenty-one feet of water. Moreover, if it were possible or feasible to deepen the St. Lawrence canals, it would cost, according to the best information I can get, but for which I am not to be considered responsible, two hundred million dollars. The length of the St. Lawrence canals being so much longer than on the Ottawa route accounts for the greater cost. A barge canal, as you know, is much more economical. Two barges to be used as consorts, and a small barge run by steam is a very cheap way of carrying freight; but it necessitates transshipment at the entrance of the canal. That is why ships coming to Port Colborne have to discharge their cargo. All the craft of fourteen feet draft have disappeared from the lakes. The ore trade, the grain trade, and all the other heavy cargoes are carried in vessels with a draft of twenty feet and consequently

there would be no advantage in having a canal of only fourteen feet. Other hon. members of this House may entertain a different opinion, and, if there is to be a discussion on this question, I hope they may be able to prove that a fourteen-foot canal will be just as good as one of twenty-two feet, for if that can be established, it will save the country an expenditure of seventy million dollars. Now, coming to the Ottawa waterway, we find that the level of Lake Huron and Lake Michigan is 580 feet above the sea, and the fall from Chicago by way of the Mississippi to the Gulf of Mexico is equally 580 feet. Our neighbours are a very wide-awake people and are seriously thinking of constructing a canal from Lake Michigan by way of the Mississippi river to the Gulf of Mexico a fact which should spur us on to immediate exertion. Ship canals save the transferring of cargo, and that is equal to a thousand miles distance, because a ship can go a thousand miles further with less expense than it can tranship its cargo from a twenty foot vessel to a fourteen foot vessel and time and cost are saved, because you do not have to break hulk. What is wanted is a uniform draft throughout the route equal to that in the Sault Ste. Marie canal. Immense ships are able to carry a ton of cargo twenty miles for one cent, or one-twentieth of a cent per ton per mile and no small boat and no railway can compete with that. The Canadian fourteen-foot canals have proved that such competition is impossible. Mr. George Y. Wesner, a member of the American Society of Civil Engineers, says that no great commercial importance can be attached to any route unless the largest vessels can utilize it. That is the experience of the Erie which at one time was the only water route between the great lakes and sea level, and which gave the start to that great and wonderful city of New York. In the early days the Erie canal carried a large proportion of the freight from Buffalo to New York, but with the improvement of railways the canal gradually lost the traffic until, from carrying nearly all the trade, it diminished last year to about one-tenth of the total. The decrease of the business on the Erie canal led railway men to believe that railways could compete successfully with water-

ways. That is a question that has been agitated over and over again, but without entering into a discussion of it now, there is no doubt that small canals with small barges cannot compete advantageously with railways, while large vessels on large waterways have no difficulty whatever in securing the traffic. The people of the United States have now come to realize that it would be to their advantage to ship their products by Canadian routes to tide water at Montreal or Quebec. Mr. Gardner S. Williams, of Cornell University, strongly advocates a twenty-two-foot draft for the Georgian Bay canal to Montreal. He says that starting from either Chicago, Duluth or Fort William the distance to Montreal by the Ottawa route, would be only one day more than via Buffalo. Another immense advantage of the twenty-two-foot draft is that the great fleets of vessels drawing twenty feet which are locked up idle in the lakes during the winter season, would be enabled to get to tide water and though they could not cross the Atlantic with safety, they could be employed in the coasting trade along the Atlantic coast during the winter months.

Coming back to the Ottawa route, I may say that the entrance to French river will require very little improvement to make it a very satisfactory harbour indeed. Some slight excavation will be required, but when it has been properly buoyed and lighted, and furnished with proper facilities for unloading and reloading, ships drawing twenty feet of water will be able to ascend with perfect safety to the first lock. The construction of the French river section of the canal is the very crux of the question. It is not building a canal, properly speaking; it is simply improving the navigation of French river. There are three great lakes, as it were, divided by three falls, and these lakes are joined together by narrow gorges from 200 to 400 feet in width, across which dams could be built and the water backed up. There will be three ascents, one starting from Georgian bay, which has a lift of 22 feet. Then ascending the river for some twenty miles or so, the next defile is reached and there another dam will be constructed. The third dam would bring vessels to the level of Lake Nipissing. The total ascent from Georgian bay to Lake Nipis-

sing is sixty-eight feet. Then the route crosses Lake Nipissing eighteen miles, to a point a mile and one-half east of North Bay. At North Bay there are no facilities for landing goods from ships of heavy draft, but by raising the level some six feet we would have good deep water almost close to the shore. At North Bay two plans have been proposed, one of which to build a large pier into the lake in order that an elevator might be constructed on that pier for the transshipment of freight to be carried from North Bay to Montreal, the grade being downward almost the entire distance. The other plan proposed is to excavate part of the canal which would be used as a continuation of the project and one side of the canal would be lined with cribwork forming a very good wharf and giving ample railway facilities along the bank of the canal. I may say that these works at North Bay would cost about a million and a half, but all that work will be useful when the canal is continued further on. From Lake Nipissing there is a rise of 28 feet to the summit. This summit is the difficult part of the project, and the part which baffled former engineers, but the difficulty seems to have been solved by the engineers employed on the present survey by allowing the water on that water shed to flow through Trout lake, Turtle lake and Lake Talon. They have also found south of these lakes another water shed with an extent of 305 miles, and by diverting only one river and making it flow into these lakes and uniting them together, we have a water shed of over 600 miles in area, which it is claimed is amply sufficient to give all the necessary water for the operation of the canal. Then, after having crossed these lakes, we descend by the Mattawa river, the great problem of sufficient water at the summit having apparently been solved, notwithstanding the adverse reports made by such eminent men as Mr. Walter Shanley and Mr. Clarke. The diversion of the river seems, like the discovery of America, simple enough now, but nobody discovered America before Columbus. A canal system has been advocated. Supposing this water shed had not been found, it was proposed to supply water by electrical pumps. Remember, there is only a lift of eighteen feet, and with electrical pumps operated by

the water-powers in the vicinity a sufficient quantity of water could be pumped to supply any deficiency, and we are further informed that hydro-electric power for the purpose would not be expensive. This system I do not recommend, as I think it would be, perhaps, a little too much to ask any one to go on the hustings to advocate pumping water into a twenty-two-foot canal to make it navigable. Now we come to the descent to Montreal, a total fall of 646 feet from the summit to Montreal harbour. The Mattawa river is very like French river in forming deep ravines with wide expanses intervening, but the construction of a few locks will give the necessary facilities for navigation. There is a drop in the Mattawa river, before it enters the Ottawa, of 177 feet. The distance from the junction of the Mattawa to the capital is 195 miles, and the fall is 360 feet, leaving the descent from Ottawa to Montreal 122 feet. Now, it may be a wonderful thing to realize that the long distance of 440 miles from the mouth of French river to the foot of Montreal Island requires less than 30 miles of canal. The rest would be open navigation and in that open navigation there would be only fifty-seven miles of improved channel where dredging might be required. Apart from that eighty-seven miles of canal and improved channel, the rest is absolutely open navigation, so that vessels could traverse it at the same speed as on the great lakes or the ocean. Now, here is a point which I understand is absolutely new, although hon. gentlemen will be ready to assert that there can be very little new on this question which has been before the people for fifty years. However, after half a century there is this new consideration; we are all aware of the great fluctuation in the water levels of the Ottawa river, nay of all our rivers in Canada, owing to the rapid melting of the snow in the spring of the year. We call it the spring freshet. The St. Lawrence is not affected to the same extent as other rivers, and the volume of its waters is scarcely more than double at high water what it is at low water, which means that the flow at low water is not quite doubled in the spring. But the Ottawa river in flood time, is fourteen times greater than at low water, and consequently, another problem was before the engi-

neers, for if that immense quantity of water was allowed to rush down the river there would be such currents that it would be impossible to navigate the river during the months of May and June. Moreover, the whole of the works would be flooded, locks and all, with a rise of twenty feet or so. Therefore it became absolutely necessary to have some control over the river, and it has been proposed to store the waters in the upper lakes. This is where, I think, a nice point arises for the consideration of hon. gentlemen of this House who are strong on constitutional law. At the head waters of the Ottawa river we have the great Lake Victoria and other lakes, and is proposed erect dams at the outlets of these lakes in order to store the water, and it is also proposed to impound the water of Lake Timiscaming. Now, how far can this government encroach on provincial territory for such a purpose, and how far would a province allow them to interfere with their territory? It is fortunate that there is no settlement where these lakes are situated, and no damages can be claimed; but there is a point whether the federal government can impound water in Ontario or Quebec without the sanction of the provincial authorities. This question I leave to the lawyers of this House who will be able no doubt to elucidate it.

Hon. Mr. BELCOURT—Has the hon. gentleman considered that the Ottawa river, of which Timiscaming lake forms a part, has been declared a navigable river, and as such is under the control of the federal power?

Hon. Mr. CASGRAIN—The impounding of the water in the Gatineau river would also be necessary, and I do not know that the Gatineau river is a navigable stream.

Hon. Mr. BELCOURT—I am speaking of the Ottawa.

Hon. Mr. CASGRAIN—The impounding of the waters of all the large tributaries of the Ottawa would also be necessary, and we all know that the province has the disposal of the water-powers. Now the immense water-power which will be developed in that drop of 790 feet between Georgian bay and Montreal, amounting altogether to a million horse-power, will have to be con-

sidered; will the provinces allow the central government to dispose of this large amount of power which will be of great value? We know at Lachine canal, and we heard the other day at Montreal about the federal government farming out the water-power of the Beauharnois canal. There is no doubt as to the federal power over these canals, but whether the new canal could be dealt with in the same way, or whether the water-power developed along the new canal could be disposed of by the province, is something that I leave to be discussed by other members of this House. I may say that the storage of water is carried on to-day in many countries, Russia, Germany, France and even in the province of Quebec. Some are inclined to think that Quebec is somewhat backward, yet in the Lake St. John district the provincial government is impounding water for the use of the water-powers at Chicoutimi, a distance of 100 to 150 miles above the mouth of the river.

Hon. Mr. CLORAN—The waters of the River Nile are retained in the same way.

Hon. Mr. CASGRAIN—Yes, and our neighbours in the United States have no less than forty-one reservoirs proposed to impound the surplus waters of the Mississippi. Most of these are situated in Minnesota and Wisconsin, and they so regulate the flow of the Mississippi river, that the gauge at St. Paul, which during dry weather in former years was at zero, is now kept at a height of three feet, improving immensely the navigation of the and preventing floods, which at one time they were threatened with along the Mississippi; but by means of these dams they have retained over sixteen billion cubic feet of water thereby preventing immense destruction of property and perhaps of life.

Returning to the Georgian Bay route; the high banks on both sides of the Ottawa affords a ready means of raising the level of the various water stretches. Then the excavation for locks will be made nearly all in solid rock, and that means a great saving in cost, it being only necessary to cement the sides of these locks to make them smooth. We all know that the immense expenditure involved in constructing locks is the masonry. The rock must

be cut to dimensions to fit closely together and made absolutely water tight. Every stone in a canal lock must be cut so true that no water will leak through between the courses. Therefore there is an immense advantage in having nearly all the twenty-seven locks needed on this route hewn out of the solid rock, so that the work to be performed will consist principally in the construction of the gates at both ends. These locks will be of very great length. It is proposed to make them 650 feet long, in order to accommodate the ships I have spoken of, 600 feet in length. At Ottawa, the canal would pass on the north side of Hull increasing considerably the water-powers used by the industrial establishments there. From Ottawa to Montreal, there would be considerable flooding, because the banks are low. There will be no less than 15,000 acres of land flooded, but it will be cheaper to expropriate that area of land than to excavate, because rock excavation under water is very expensive, almost as expensive as rock excavation in a tunnel, costing from \$3 to \$3.50 a year. Therefore it is desirable, as far as possible, to avoid excavation and to build up the sides in order to secure the necessary depth of water. At Montreal it is proposed that there should be two routes, one passing in front of the city, and the other via the Back river.

Hon. Mr. CLORAN—Will the present canal at Grenville be utilized?

Hon. Mr. CASGRAIN—The present Grenville canal would be absolutely of no use. The route in front of the city of Montreal starts near the Victoria bridge, at what is called the Mackay pier, along the guard pier, and by the embankment. The water would be brought to the same level as the water at St. Ann's. The embankment would proceed in the stream as far as Nun's island, and thence continuing on to outside of the shore, would cut the Lachine canal somewhere near the centre, and then follow the shore up to St. Ann's. Then another lock would be necessary, making three locks on the route in front of the city of Montreal. The other route which would be by the Rivière des Prairies, or what we call the Back river, which is a branch of the Ottawa, would, in my

opinion, he a much preferable route. It is proposed to bring it to the level of the Lake of Two Mountains, and maintain that level to a point about a thousand yards east of where St. Denis street strikes the shore of the Back river. There there would be a fall of thirty-five feet, creating an effective water-power of sixty thousand horse-power at that point. It was also proposed to have another lock at Bout de l'Île, which would be the end of this Ottawa waterway and where there would be a lift of twenty-four feet, giving also a water-power of some 40,000 horse-power. This would mean 100,000 horse-power available within almost a mile of the city of Montreal. This 100,000 horse-power could be framed out, and people would gladly pay \$10 a year, horse-power running for twenty-four hours a day, which would make no less a revenue than \$1,000,000 yearly from the power generated at these two dams. These figures may appear exaggerated; they may seem like the calculations of a dreamer, but what is the fact? The president of the Shawinigan Falls Power Company is an hon. member of this House—I am sorry he is not in his seat just now—but he will vouch for the fact that at present from Shawinigan Falls 16,000 horse-power are brought to Montreal, a distance of eighty miles, and the price paid, and cheerfully paid by the Montreal Light, Heat and Power Company, is \$15 per horse-power, or \$240,000 a year to that one company. I may say that the Shawinigan Power Company also sell power to such an extent, that their annual statement of revenue last year was very nearly \$650,000 and for the current year it will be over \$700,000. The Ottawa and Georgian Bay canal construction would develop 100,000 horse-power within one mile of the present limits of the city of Montreal, and even if the Georgian Bay canal were never built, I would strongly advocate the development of these powers. It would be a revelation to people living all their lives in Montreal, to see that a dam across the Back river, (near the church and the convent of the Sacred Heart), would develop at that point 60,000 horse-power. That is about one-fourth or 25 per cent of the horse-power required for all the lighting, heating and street car traction power in the metropolis of Canada.

Hon. Mr. DeBOUCHERVILLE—How much flooding of land would there be?

Hon. Mr. CASGRAIN—There would be no flooding, because the level of the Lake of Two Mountains is not very much higher than the banks of the river, and the level of the canal would not be more than seven or eight feet higher, and jetties will be built on each side to prevent the water spreading and in such a way as not to interfere with the drainage of the farmers.

Hon. Mr. DeBOUCHERVILLE—If they built retaining walls on both sides, they will not permit the water to overflow and drown these villages. This is an immense water power.

Hon. Mr. CASGRAIN—Precisely. Even if no canal is built, it would be a great advantage to have those two magnificent sheets of water. The water hack of the Island of Montreal would be dammed at Bout de l'Île and there would be a lift of twenty-four feet there. I may say that the intention is to make it thirty feet on the mitre sill of the entrance of that lock, in order that ocean vessels might come up to the second dam, and for all that distance of twelve miles in length you would have a depth of thirty feet. Therefore not only would Montreal have its present harbour, but you would have at the back of the city of Montreal an immense dockage space, which would give splendid shipping facilities. The other basin would be above the dam and you would have a stretch of water of 3½ miles intervening. The working classes could leave Montreal and in twenty or twenty-five minutes be on the shores of those two magnificent sheets of water for a five-cent fare. Think of the magnificent park that would be erected where people could go to breathe the fresh air. Think of the countless yachts, boats and skiffs that would ply on the lakes; and what an ideal residential city it would make of Montreal. Even if the Georgian Bay canal project should be abandoned, if it were possible to build this dam it would be a great boon to the Island of Montreal generally and particularly to the working classes of that city. Why, Montreal would have a million population in a short time. Now, as to the commercial potentialities

of this work; every owner of a steamer is a corporation in himself and can regulate his own freight rates. It is not like a railway company. A railway company may be a system of one, two or three roads and they may pool their interests, but the experience is that vessel-owners will not and do not pool their interests. Therefore, every vessel-owner has a personal interest in regulating the rates, and the producers and the shippers get the advantage.

A ship canal can transport freight for lower rates than can a barge canal, as has been shown in the case of the Erie canal, which was not built so as to compete advantageously with the railways from Buffalo to New York. By no other route than the Ottawa waterway can the products from the great lake ports be taken to tide water without breaking bulk. The Omaha Grain Exchange says in its last report that if grain could be carried from lake ports to the sea-board without breaking bulk, it would be worth ten million dollars to Nebraska farmers. I do not know to what extent this is true, but if it is worth that much to the farmers of one state of the American union, how much more will it be worth to that illimitable wheat producing country that we have in the Canadian Northwest? Would it not prove a very profitable investment indeed? All we have to do is to divide the wheat area of the Northwest by the wheat area of Newbraska to see how many tens of millions would be coming to us if the statement made by the Omaha Exchange is correct. Then again, by this Ottawa waterway, the meat product of Chicago (the very centre of the United States) could be shipped in refrigerators, and taken to any port in the world. The trade of the great lakes is greater than the coasting trade of England, of France and of Germany together. The annual coasting trade of these three countries does not aggregate 70,000,000 tons, while the annual trade of the great lakes was 75,000,000 tons according to the immensity of the steamers which are now plying on these great lakes. let me state that the steamer 'E. H. Garrick,' passed through the Sanit Ste. Marie canal with 12,386 net tons of cargo. These big ships are called big lakes, a new and a very appropriate name, and they require to earn to meet maintenance of the crew, cost

of coal, small repairs, and for interest on cost of vessel, \$400 per day of twenty-four hours. Now from Fort William—and when I say Fort William I might say from Duluth, or from Chicago, because there is very little difference in the mileage—from Fort William to Montreal it would take one of those big lakers some ten days for the round trip, and allowing five days for detention, you have a total of fifteen days at \$400 a day or \$6,000. Now what would the earnings be? Assuming for comparison they would carry 10,000 tons at \$1 a ton which is a very high rate, it would leave a net profit each trip of \$4,000, even if the ship went back absolutely empty. If it carried any cargo at all on the return trip, the freight it would get would command the regular price of \$3 a ton, and if they only had one-third of a cargo, they would make \$10,000 on the western trip, \$14,000 for the round voyage. These figures indicate the possibilities and the potentialities of these great ships. If you have ships of the Welland canal type, 250 feet in length, 42 feet wide and 14 feet draft, the cost of operation would be \$125 a day. By the unimproved St. Lawrence this ship would take seven days' detention, making in all 20 days, which at \$125 a day would amount to \$2,500, and what would she carry? The carrying capacity would be 2,000 tons; the expense would be \$2,500 and she could not get any higher freight rate than the big lakers got which being one dollar a ton would amount to \$2,000 earning capacity and the expense of the round trip would be \$2,500, leaving a deficit of \$500.

Hon. Mr. MacKEEN—What is the draft of the large lakers?

Hon. Mr. CASGRAIN—Twenty feet.

Hon. Mr. SULLIVAN—Why do you have six days' detention?

Hon. Mr. CASGRAIN—There is the loading and unloading, and there is a day more detention for the small ships, because they can better afford to remain idle at \$125 a day than the large ships can at \$400 a day. Every provision is made that the large ship coasting \$400 a day must find means of being unloaded immediately upon its arrival. The time of arrival is noted, and the necessary appliances are there, and every-

thing is in order to facilitate her return. When it is a matter of \$125 a day, she may be used for storage room for a day or two, and you can see the difference is not so great in the cost. Therefore it is absolutely necessary that these fourteen foot draft vessels should get a cargo to return. If they have one-third of a return cargo at the same rate as the large steamer gets it amounts to \$2,100, and that would leave a surplus on the round trip of some \$1,600. Assuming that Fort William, Duluth and Chicago are about equally distant from Buffalo, and that the same ports are also equidistant from Montreal, and that a vessel from any one of these large ports will carry grain at a cent and a half a bushel to Buffalo; let us say that a large laker will carry wheat to Montreal from any one of these three ports for two cents a bushel, which is 25 per cent more, and you will have a rate to Montreal of 2 cents, and to Buffalo 1½ cents. But from Buffalo to New York the rate is 4 cents a bushel; so that a cent and a half and four cents will make five cents and a half from Duluth to New York by the Erie canal, to which must be added the transferring charges at Buffalo and New York, which at a very low estimate will cost one and a half cents. Consequently you have from these upper lake ports to New York a rate of seven cents before you reach the ocean steamers.

Hon. Mr. SULLIVAN—Are you calculating by the new canal or the old one

Hon. Mr. CASGRAIN—Kindly allow me to proceed. If the same grain were routed via Montreal, there would be a freight rate of two cents to Montreal, half a cent for the ocean voyage from Montreal to Liverpool, making 6½ cents. Consequently by the Georgian Bay and Ottawa route you would land wheat in Liverpool cheaper by half a cent than you can land it in New York. I must say, in all fairness, that when the grain gets to New York you will get lower rates to Liverpool than you will from Montreal, the New York ocean rate being 2½ cents as against 4 cents for Montreal; but there is still a difference in favour of Montreal, because adding 2½ cents to the 7 cents you have 9½ cents via New York, whilst by the Georgian Bay ship canal route you will have 6½ cents to Liverpool,

making it 50 per cent cheaper than the United States route. There you see the immense potentiality that this route will have. The Liverpool market, as hon. gentlemen know, governs absolutely the price of wheat. It does not matter whether the wheat crop has been grown in India, in the Argentine Republic, in Russia or in the United States, or in the Dominion of Canada, the price is fixed in Liverpool, and every bushel of wheat on the face of the earth represents the Liverpool price minus the transportation. The position of our people is that in Fort William we would have the Liverpool price, less 6½ cents, for every bushel of wheat our three great railways will bring there. You know what immense grain emporiums Port Arthur and Fort William will be. You know the Canadian Pacific Railway are doubling their track between Port Arthur and Winnipeg, that the Canadian Northern have huge elevators there, and that the Grand Trunk Railway are building a mighty grain chute from the Transcontinental line at Superior Junction, for a distance of 240 miles, on low grades, aiming for Fort William. All that immense wheat supply which will be stored there, could be carried across the ocean to Liverpool at the small charge of 6½ cents per bushel.

The last point that I have to make is in regard to the water-power that will be generated—the white coal of Canada in which this country abounds. We shall never be under necessity of using as much coal as they do in the United States, or in European countries for our natural water-powers will generate immense energy to operate our industries and public utilities. It is safe to assume that the Ottawa, the Mattawa and the French river could easily develop one million horse-power. I am reasonably sure that those three rivers would certainly develop one million horse-power at least. Now, supposing one dam—and there are to be 27 of them—would develop 60,000 horse-power, and bring a revenue of \$600,000, as would be the case at Back river, the drop or fall at the head of that river is only one-twentieth of the total head. Thus we would have over a million horse-power which could be sold at the small price of ten dollars per horse-power. There will be industries to use all this water-power just as soon as

It is available, and that will mean no less than \$10,000,000 revenue from this source. What does it cost? It takes 7 tons of coal to generate one horse-power per year, and basing the cost of coal at \$3 per ton per year, that makes \$20 per horse-power per annum. Then there is the handling of the coal and the work in connection with it, which easily represents \$10 additional, making it \$30 per horse-power. How long would the railway companies take to electrify all their works provided they could purchase electricity at ten dollars per horse-power, when they are paying thirty dollars to-day? Take an enterprising company like the Canadian Pacific Railway, with the able men at the head of it, do you think they would hesitate very long if the government said to them, 'Prepare for the electrification of your road,' we will give you the power at one-third of what you are paying; the electrification of railways would not be a dream of the future. We all know that for a radius of fifteen miles from New York every train is brought into that city by electric motors. In the first place electricity would be utilized for lighting the river for the 440 miles, making a beautiful avenue as bright by night as by day, rendering navigation just as easy at night as by sunshine, and illuminating the harbour of Montreal. Then there would be many industries and manufacturing centres at North Bay, Ottawa and Montreal, and all these towns would want electric power. I am told—but of this I have no personal knowledge—that immense iron deposits exist also all along that route, and if that is so, we have the white coal with which to smelt that ore. It can be smelted, as it is smelted in France successfully to-day, by an electrical process, and I think the hon. Speaker can tell us it has been done also at Sault Ste. Marie. I do not know whether it has been successfully used there or not, or whether it has been fully tried, but I know the government is having ore smelted by electricity at Sault Ste. Marie. It is said that a French metallurgist who has been looking into the possibilities of the Ottawa valley as a manufacturing centre has declared that we would see there within ten years the largest electric ore smelting industry in the world. I forget the name of the gentleman at the moment, but he is a very eminent scientist who is

engaged in this electrical smelting in France. In that country they have to gather power from here and there, perhaps 100 horse-power here, and perhaps a thousand horse-power there; but in the Ottawa valley the supply would be unlimited. Then there are other industries. There is the manufacture of aluminium which the hon. gentleman from Rothesay has been advocating, and there is also the manufacture of carbide of calcium for a acetylene gas. We all know that in the last few years the United States have attained supremacy in the manufacture of iron. To-day the United States of America manufacture more iron and steel than Great Britain does altogether. For a long time Britain ruled the world in that manufacture. Let Canada in the next few years help to recover that supremacy. Let us manufacture iron and steel, and in a few years help to make up the small deficiency which now prevents British iron and steel products from occupying the first place.

I wish to deal briefly with the transportation question. We all know that the greatness of a nation depends on its agriculture, its mines, its forests and its manufactures. The lowest cost at which you can transport these products to the markets of the world with the greatest of advantage you can give the producers of those articles, to that extent you increase his purchasing power. It is unnecessary to repeat the long discussion about competition between rail and water transportation. Suffice it to say that it would seem as if the railways of to-day had reached the maximum size for their locomotives and freight cars. The locomotives are more than twice, even three times as heavy as they were twenty or fifteen years ago.

Hon. Mr. DeBOUCHERVILLE—Can the hon. gentleman tell us what will be the cost of deepening the Ottawa river? The whole river cannot give an average depth of twenty-two feet. How much would have to be excavated to give that depth, and what would be the cost.

Hon. Mr. CASGRAIN—I have already stated it.

Hon. Mr. DeBOUCHERVILLE—I am speaking now of deepening the river. If instead of allowing the water to flood the land you were to deepen the Ottawa in

order to provide a twenty-two-foot channel, what length of river would require to be excavated and at what cost.

Hon. Mr. CASGRAIN—it would be absolutely impossible to carry out the hon. gentleman's suggestion, for this reason, that it would necessitate excavating rock under water, and, as I have said, that is very expensive, costing \$3 to \$3.50 per cubic yard. Then again it would have to be excavated perhaps for the whole length. That is why I say a good deal of land must necessarily be flooded, and it would be cheaper to expropriate 15,000 acres of inundated land than to excavate a channel. Out of the whole distance of 460 miles only 57 miles requires dredging, the remainder being open navigation. I do not know exactly how much of this is in the section between Ottawa and Montreal.

Hon. Mr. DEBOUCHERVILLE—I understand it is almost impossible to dredge the river, and that you will have to allow the water to flood the banks and build embankments; but according to Mr. Shanley's report the cost of a fourteen-foot canal from Montreal to Georgian bay was estimated at \$20,000,000. Mr. Clark's estimate was only \$12,000,000. Did Mr. Stanley take into consideration the deepening of the Ottawa river so as to give a depth of fourteen or fifteen feet?

Hon. Mr. CASGRAIN—I see the hon. gentleman is very familiar with Mr. Shanley's report. Mr. Shanley says that between Ottawa and Grenville there would not necessarily be very much excavation, because there would be enough water; but below Grenville and through the Lake of Two Mountains considerable excavation would be necessary, even for a ten or an eleven-foot canal as then advocated by Mr. Shanley. But it is now proposed to raise the level of the Lake of Two Mountains to the spring level, and when raised to that extent, very little excavation is required to give a depth of twenty-two feet.

I was about to show that locomotives are now as large as they can advantageously be made. They cannot be increased in width, because they would not pass through tunnels or bridges. The increase can only be in height. The locomotives have been

raised, higher and higher above the rail, and those monsters which you see pulling forty or fifty cars are now so high that the centre of gravity is *tr* as high as it was when locomotives were originally designed to rest upon a basis of four feet eight and one-half inches; consequently the top-heaviness has increased two fold. These very heavy cars when loaded with material which is more hulky than heavy, and these high locomotives, make the trains so top heavy that the outer rail being elevated, the train, if brought to a stand, on the curve would be liable to topple over. In this country we have no tracks made specially for freight and others specially for passenger traffic. In the United States, the Pennsylvania and the New York Central have four tracks. The two inside tracks are for freight only, and there the elevation of the outer rail on curves is not so high, because the speed of the freight trains is not so great; but on the passenger tracks the outer rails are very much more elevated on curves so as to resist the centrifugal force in rounding the curve at high speed. No less an authority than Mr. J. J. Hill—and he was the pioneer of large locomotives and cars, low grades and easy curves—admits that the business of the country is increasing to such an extent that railways cannot pretend to cope with the necessities of trade, and that none of the railways can do it. That is why he advocates the making of a canal from Chicago to New Orleans, a project which has met with the approval also of President Roosevelt. Railway facilities have increased about one per cent per year, while the business of the country during the last ten or eleven years has increased about ten per cent. There is no chance for the railway catching up with the ever increasing demands on them, so it is absolutely necessary to rely on the water courses and natural highways with which Providence has endowed this country. The first route of travel, three hundred years ago between Quebec and New Orleans was by the route I am advocating, and down the Mississippi, so it will not be the first time that the Ottawa and the French river route has been linked with the Mississippi. Our neighbours are a wide-awake people, and are alive to the impor-

tance of this project. Notwithstanding some protest from our government they have constructed the Chicago canal under the pretext of disposing of the sewage of Chicago with its two millions of inhabitants. But it is something more than a sewage canal when you come to consider that it is 200 feet wide and the depth of water is twenty feet. It has a length of forty miles, and at the southwest end there is a fall of forty feet developing to-day 40,000 horse-power. That power is sold by the promoters of the canal to the industries in the vicinity, and they are deriving from it a fair proportion of the necessary return on the cost of the canal. Congress voted \$31,000,000 for the canal. It was cut through solid rock, but the elevation was not very great. The Chicago canal empties into the Des Plaines river, which, in its turn, empties into a tributary of the Mississippi. You see the idea of making a canal to connect the great lakes with the

Mississippi has already been put in practice by the enlightened people of Illinois. The Ottawa water-way, the great lakes, the Chicago canal and the Mississippi, form an inland water route such as does not exist in any other part of the world. If Champlain, who came dreaming of finding a route to the China Seas, were to come back to-day, he would rejoice that at the beginning of the twentieth century a project is within reasonable distance of accomplishment by which the products of the Orient would be carried through the Panama canal, thence up the improved Mississippi and the Chicago canal to the great lakes, across Lake Huron, up the French river, through Lake Nipissing, down the Mattawa, down the Ottawa and down the St. Lawrence to the old citadel city of Quebec, the tercentenary of whose foundation I trust all patriotic Canadians will join in celebrating this year.

