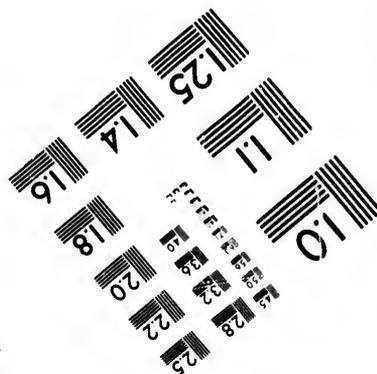
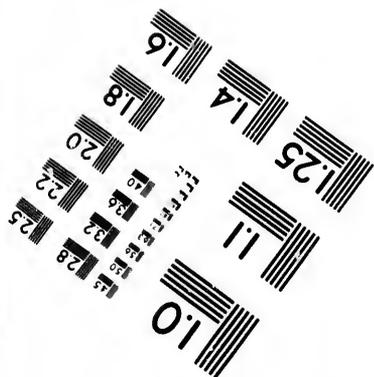
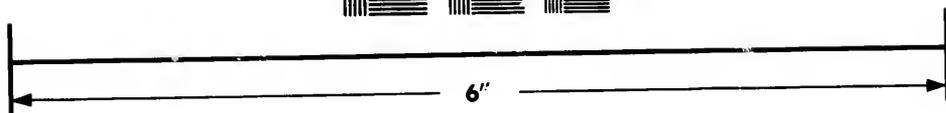
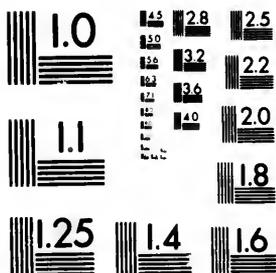


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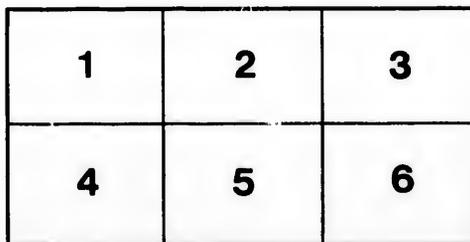
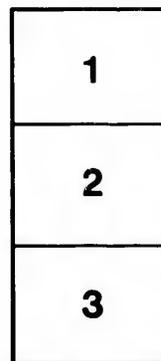
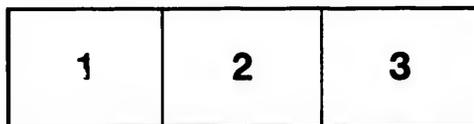
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REPORT

ON

THE LINE OF ROUTE

BETWEEN

LAKE SUPERIOR AND THE RED RIVER SETTLEMENT,

By S. J. DAWSON, Esq.,
CIVIL ENGINEER.

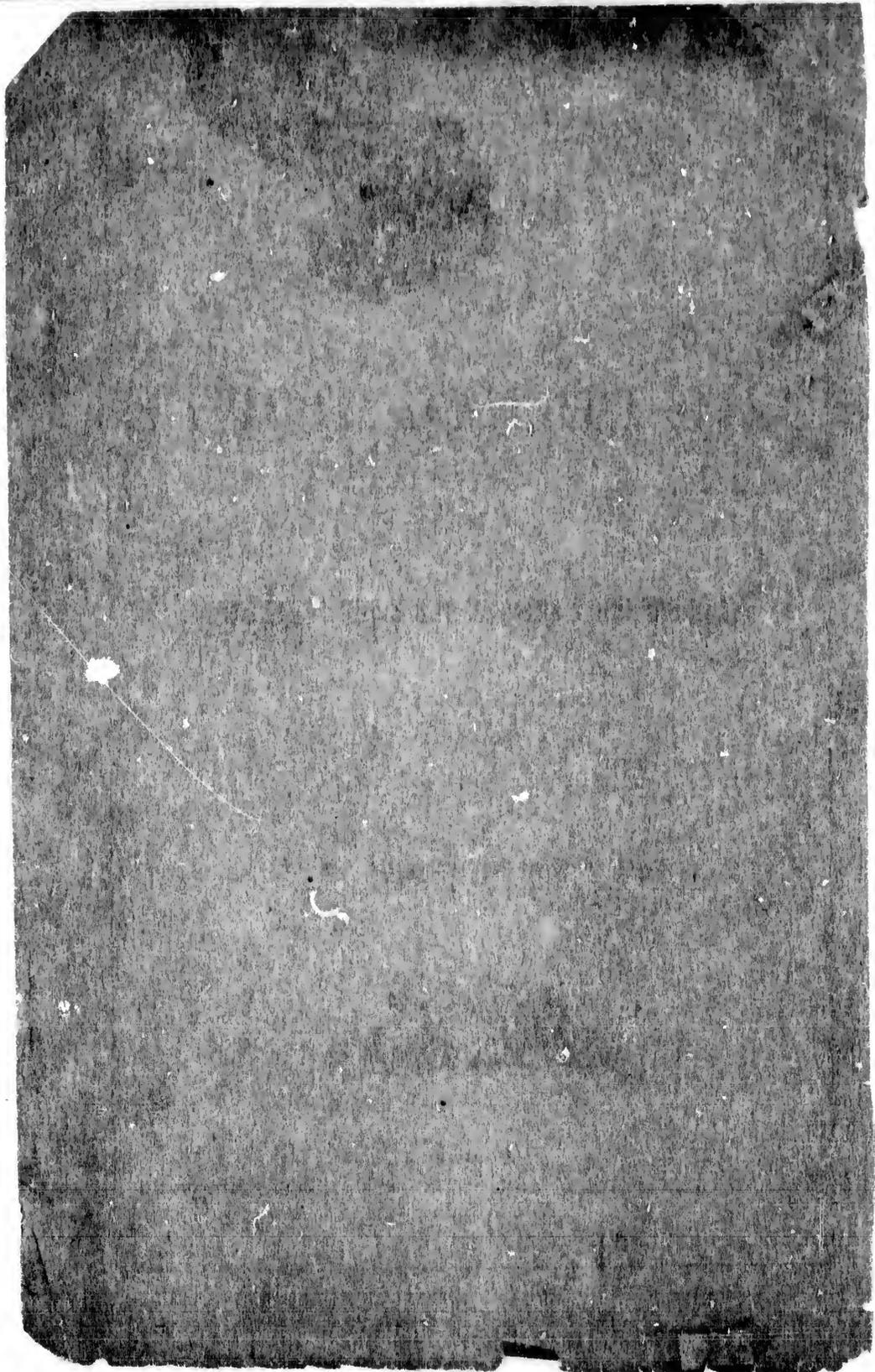
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OTTAWA, 1st May, 1869.

SIR,—

I have the honor to submit to your notice a report on the subject of opening the communication between Lake Superior and the Red River Settlement.

The country to be traversed is rocky and mountainous on the borders of Lake Superior, but, at a short distance in the interior, a high plateau is attained, where the waters of the St. Lawrence and the Winnipeg have their common source. The lowest pass in this elevated region is 839 feet above the level of Lake Superior, or 1479 feet higher than the surface of the sea. Proceeding to the westward, the descent, by the water courses, is very gradual, amounting only to 450 feet in a distance of some three hundred miles. The country, nevertheless, continues rocky and mountainous as far as Fort Frances, where the eastern border of the great silurian belt, which underlies the flat region to the west, is reached, and from thence to the Lake of the Woods the country is comparatively level and the navigation uninterrupted.

In the region between the high plateau of the water-shed and Fort Frances, the valleys between the mountain ranges are occupied by deep lakes, and those on one of the routes which have been followed occur in such close succession, and are, otherwise, so advantageously situated in relation to each other, as to afford an easy means of obtaining continuous navigation, at a moderate outlay, and this, too, in a region where rock, mountain and water are so commingled as to render it exceedingly difficult to establish lines of land transport.

The scheme of opening the communication proposed in the following and in previous reports, has for its ultimate object a railroad from Lake Superior to the navigable waters of the interior; navigation rendered continuous, by means of lock and dam, from its terminus to the north-west angle of the Lake of the Woods, and a railroad from the latter point to Fort Garry.

The railroad at Lake Superior would be forty miles in length. The navigation, commencing at its terminus, would cover a distance of three hundred and eleven miles, and would be connected, at its western extremity, by a railroad of ninety miles with Fort Garry.

Some years must elapse in carrying such extensive works to completion. In the meantime, it is proposed to open the communication as speedily as possible, by good waggon roads connecting the navigable waters of the central section with Lake Superior, at the one end, and with Fort Garry at the other. And, at the same time, to lessen the number of trans-shipments, in the region of the Lakes, by such preliminary works as could be rapidly carried out.

By adopting a progressive system of this sort, a first class communication would be attained as quickly as by any plan that can be adopted.

The first preliminary works would attract the trade of the North-West Territories to Lake Superior, and their enlargement and extension might be proceeded with as fast as possible, or as the means of the country would permit, always going on with those which were most wanted and would in turn produce the greatest effect, until the whole were completed.

Good waggon roads at either end of the navigable section, combined with a little improvement in the region of the Lakes, would at once give to the people of the Red River Settlement a better means of obtaining their supplies than that which they now possess, and would, at the same time, afford to immigrants the means of reaching the Prairies of the West.

I have the honor to be, Sir,

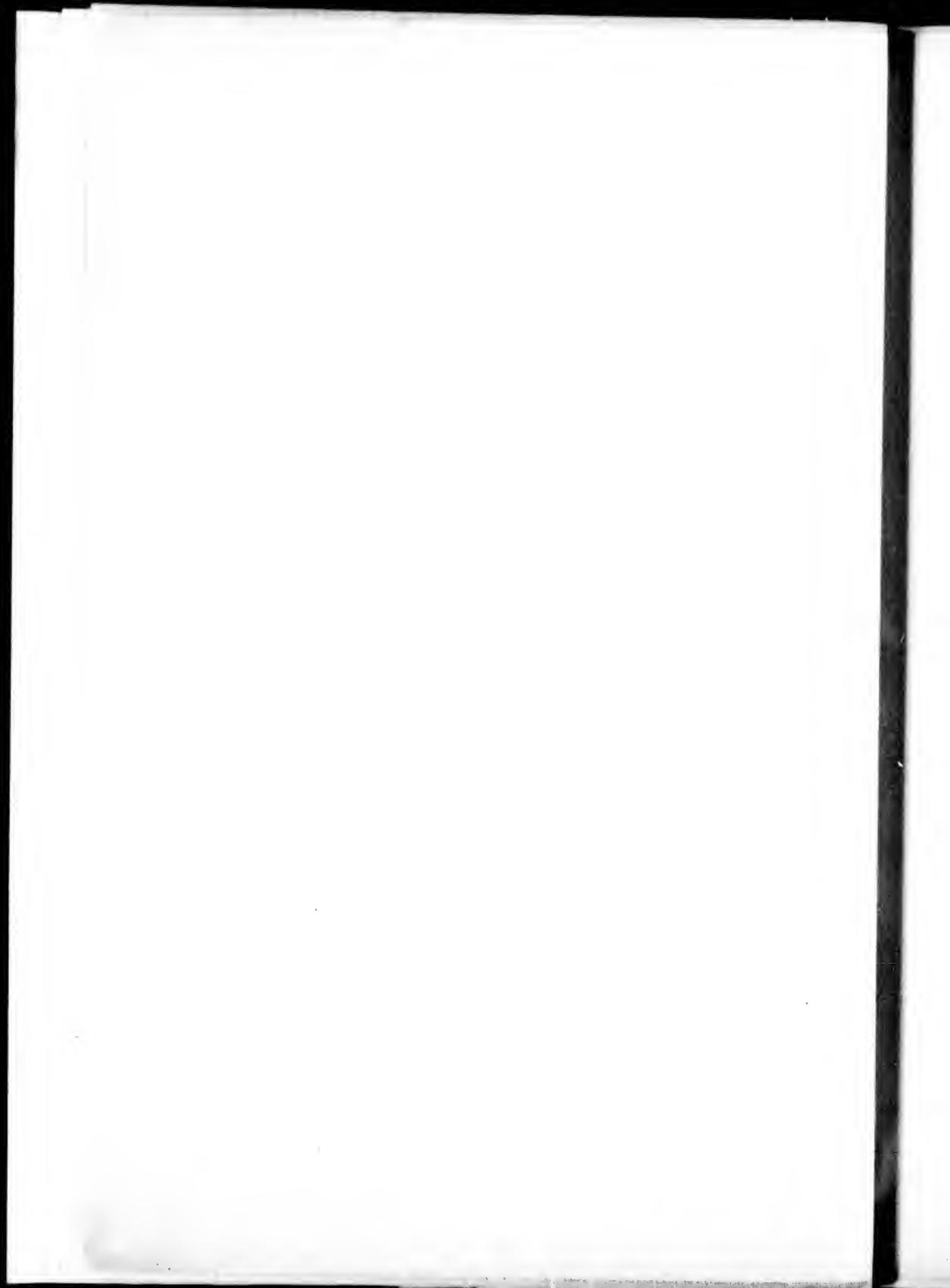
Your most obedient servant,

(Signed), S. J. DAWSON.

Hon. William McDougall, C. B.,
Minister of Public Works,
&c., &c., &c.,
Ottawa.

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R E P O R T
ON
THE LINE OF ROUTE
BETWEEN
LAKE SUPERIOR AND THE RED RIVER SETTLEMENT.

EXPLORATION OF 1868.

My report of last year contained a brief description of the country between Lake Superior and the Red River Settlement, with an estimate of the cost of opening the communication in such a manner as I believed would involve the least possible outlay, while it would, at the same time, have the effect of attracting the trade of the North-West Territories to Canada, and serve as a preliminary step to works of a more comprehensive character in the future.

I have now the honor to report on the operations of last summer, undertaken and carried on under the direction of the Department of Public Works, with the view of ascertaining whether an improvement might not be made in the Eastern section of the route, by deviating from the projected Dog Lake road and adopting the West instead of the North branch of the Kaministaquia, as the basis of a line which should embrace all the navigable water which could be rendered available.

It was known, from the reports of the Red River Expedition, that a series of large lakes existed at the source of this branch, and it appeared probable that the navigable water which they afforded might admit of being utilised as a link in the line of communication; and as their value in this respect depended, in the first place, on their level relative to each other and to the lakes on the opposite side of the water-shed, and, in the next, on the practicability of rendering them accessible from Lake Superior, the first step taken was to determine the levels and the next to look for ground practicable for a road through the broken and mountainous region which lies between them and Thunder Bay.

In describing the result of these operations, I would invite notice to the maps which are hereunto annexed for convenience of reference. These are:

1. A plan on a scale of two miles to one inch, exhibiting the position of the lakes at the summit of the water-shed and the deviation from the Dog Lake road.
2. A map on a scale of ten miles to one inch, shewing the entire route between Thunder Bay and the Red River Settlement.
3. A map on a scale of twelve miles to one inch, shewing the relative position and length of the Canadian and United States routes to the Red River Settlement.

4. A plan, in profile, shewing the relative altitude of the lakes between Lake Superior and Fort Frances on the line of route

5. A plan, in profile, shewing the routes by Pigeon River and Rivière la Seine.

On reference to plan No. 1, it will be seen that at the head of the Matawin, or West branch of the Kaministaquia, there are two large lakes named, respectively, Shebandowan and Kashaboïwe. These are on the Eastern slope, and immediately opposite to them, on the West side, is the large basin of Lac des Mille Laes, which sends its waters to Rainy Lake.

The distance between Kashaboïwe Lake and Lac des Mille Laes is one mile and sixty chains, including an intervening lakelet or pond. This pond is distant from Lac des Mille Laes 50 chains and on a higher level by $14\frac{13}{100}$ feet. Between the two runs a gully, the highest point in which is 25 feet over the level of Lac des Mille Laes and $10\frac{87}{100}$ feet higher than the pond. This is the lowest pass existing between the waters flowing Westward to Rainy Lake and those running Eastward to Lake Superior. That is, between the boundary line and Nipigon Bay.

The pond just referred to is the source of the Matawin, and it sends its waters by a small rivulet, making a descent of $4\frac{22}{100}$ feet in a distance of 9 chains, to Kashaboïwe Lake, which latter is $91\frac{13}{100}$ feet above the level of Lac des Mille Laes. The stream by which Kashaboïwe Lake discharges its waters is of considerable volume, and descends $29\frac{22}{100}$ feet in its course of 70 chains to Shebandowan Lake, making the latter $20\frac{19}{100}$ feet below the level of Lac des Mille Laes.

Fifty miles Westward of the pass above referred to, that is, by way of the Baril and Windegoostegon Lakes, the water level at the head of the French Portage is 55 feet below that of Lac des Mille Laes.

Such differences of level are not very formidable, and might in this case be easily overcome, as will be explained further on. In the meantime, I may remark, that these Lakes differ so little in level as to afford the means of obtaining, at a moderate outlay, seventy miles of unbroken navigation, through the high region which separates the two great river systems of the Winnipeg and St. Lawrence, and that not by narrow and tortuous channels, but through Lakes affording ample room for navigation.

This navigable section might be extended and rendered continuous to the Westward, by means of lock and dam. Its Eastern extremity would be within forty miles of the Depôt at Thunder Bay, with which point it can be connected by a land road for the present and a Rail Road in the future. The pass, as stated, is the lowest which can exist on the British side, as determined by the explorations, and yet these waters are at an elevation of 839 feet over the level of Lake Superior, or 1479 feet higher than the surface of the sea.

It is a matter of no small importance to have such an extent of navigation in the highest part of the route to Red River, and in a region very difficult for roads.

In regard to the country intervening between these waters and Thunder Bay, it is rough and mountainous; but, with the aid of the Indians, who have their hunting grounds in that region, after a good deal of exploration, a line practicable for a road was discovered.

The different routes examined may be briefly noticed as follows:—

On the recommendation of the Indians, a line was first run from the 18th mile of the Dog Lake Road quite through to the Shebandowan Lake. This line crosses the North branch of the Kaministaquia, about two miles and a half above the mouth of the Matawin, and from thence winds to the Westward among the high table lands and mountains to the North of the latter stream. The Indians professed to have followed the best ground, and no doubt did so, but the route, although not absolutely impracticable, was found to be very rough.

Another line was then laid out from the eighth mile of the Dog Lake Road to the mouth of the Matawin, and the valley of that river itself adopted from thence to the Shebandowan Lake. It was found to be a great improvement on the first, but the route by the Kaministaquia had been recommended, and before coming to any conclusion it also was examined.

Taking as a starting point, lot 18, in the first concession of Nee-bing, a line was run to Island Portage on the Kaministaquia, with the view of continuing it on a North-West course to the valley of the Matawin. It came, however, upon very rugged and mountainous ground on the borders of the Kaministaquia, and had to be abandoned, notwithstanding that no serious difficulty was encountered in the first ten miles of its course.

In view, therefore, of all the circumstances, the line which has been adopted as the best is that already referred to as leaving the Dog Lake line at the eighth mile, striking from thence to the mouth of the Matawin and following the valley of that river to the Shebandowan Lake, or rather to the first chute below it, where it is proposed to construct a dam.

In further reference to the waters of the summit region, Shebandowan Lake on the Eastern side of the water-shed and Lac des Mille Laes on the West, are both fed by the drainage of areas sufficiently extensive to afford a supply of water for a canal, but Kashaboïwe Lake, which intervenes between them, is on a higher level, being 9 $\frac{1}{2}$ feet over Lac des Mille Laes and 29 $\frac{3}{4}$ above Shebandowan Lake and it is doubtful if it could afford a supply for a canal both ways.

It is quite practicable, however, to bring either Lac des Mille Laes or Shebandowan Lake, or both of them, to the level of Kashaboïwe Lake, but there would be an evident advantage in raising Shebandowan Lake and making it the summit level and source of supply, as a considerable amount of lockage would thereby be saved and the road from Lake Superior would at once strike the highest water level on the whole route. If, on the other hand, Lac des Mille Laes were raised to the level of Kashaboïwe Lake and made the source of supply, there would be an ascent of 30 feet from Shebandowan Lake, which would have to be overcome by locks. It is possible, as stated, to raise both Shebandowan Lake and Lac des Mille Laes to the level of Kashaboïwe Lake, and if this were done and a cut made through the dividing ridge, there would be a canal without locks extending across the summit of the water-shed.

The raising of Lac des Mille Laes, however, would not eventually save lockage, and although the level is in its favor, as compared to Shebandowan Lake, it is doubtful if it could be more economically brought to the necessary height. On some parts of its Western coast the country is low and the height and nature of the dividing ground between its waters and the streams running off from its borders, on that side, would require to be ascertained before attempting to raise it beyond the extent of three or four feet, which, in any case, will be necessary, in order to give a sufficiency of water in the direction of Baril Lake and the French Portage, and so small a difference would be unattended with any risk of sending the water in other directions.

As regards Shebandowan Lake, the country around it is moderately high, and it receives the drainage of a considerable area on either side, so that, in all probability, its surface could be raised to the necessary level by damming its present outlet only.

It will occur, however, that Kashaboïwe Lake, which is already on the highest level, might be so arranged as to afford a supply of water for a canal both ways. It has a surface area of about eight square miles and it receives the drainage of a considerable tract on both sides, besides which there are lakes on its tributary streams, which could be converted into reservoirs to afford a supply in periods of extreme drought. But, even if the supply were so ample as to pre-

clude all doubt as to its sufficiency, there would be nothing gained by adopting Kashaboiwe Lake, for both Lac des Mille Lacs and Shebandowan can be raised to its level at less outlay than would be involved in connecting the latter with it by means of locks.

A dam which should raise the surface level of Shebandowan Lake to the extent of 30 feet over what it is at present, would be equivalent to 30 feet of lockage and would be far less costly.

In respect to the Summit Pond, it may be regarded, to all practical purposes, as a part of Kashaboiwe Lake, for it can, at small outlay, be reduced to the same level and still have a sufficient depth of water.

The dividing ridge is, as stated, 50 chains in width and 25 feet over Lac des Mille Lacs at its highest part; through the ridge runs a gully which, apparently, is filled with boulders and fragments of rock, and it could be easily excavated to a sufficient depth.

Such, in a brief view, is the route by the Matawin or West branch of the Kaministaquia. As compared to the Dog Lake route its principal advantages are, first, that the navigable waters of the summit plateau can be reached in an unbroken line of road from Lake Superior; whereas, by the Dog Lake line the land carriage would be in two sections, one of twenty-five miles from Lake Superior to Dog Lake, and another of ten or twelve miles across the Height of Land.

In the next place, the navigation of the upper waters of Dog River and the Savanne would be tedious, on account of the narrowness and tortuosity of the channels, whereas, by the Western route, once the Lakes were attained, there would be ample room for navigation; and, lastly, by adopting the Shebandowan line, a saving in distance of about twenty miles will be effected, as will at once appear on reference to the plan.

Both routes are practicable, and the Dog Lake line would be attended with the least outlay in the first instance, but would be more expensive to keep in operation, on account of the difficulties of the navigation, the additional transshipment, and the long land carriage, in such an isolated situation as the height of land on that route.

By adopting the West, instead of the North branch of the Kaministaquia, there will be no change in the starting point, and as the divergence occurs beyond the point to which the work on the Dog Lake road has, as yet, reached, the outlay so far made, on that line, will not be lost, and some timber prepared for a dam at Dog Lake can be floated down and used in the construction of a bridge over the Kaministaquia.

Apart from the deviation proposed in the Eastern section, as above set forth, I believe the scheme suggested in my report of last year embodies the principle which should be adopted in opening the communication, as a first step towards works of a more extensive character, in the future. I would remark, however, that the information which has been obtained since that report was written, as to the Traffic likely to arise, would seem to warrant additional expenditure over what was then proposed, so as to diminish the number of transshipments, and this can be done without greatly increasing the outlay. Before proceeding to details, however, I would invite attention, for a moment, to the more striking features of the country which has to be traversed.

THE COUNTRY BETWEEN LAKE SUPERIOR AND THE RED RIVER SETTLEMENT.

Between Lake Superior and Rainy Lake, the face of the country, as a general rule, is rugged and cut up with Lakes. The summit of the water-shed or

dividing ridge, is quite near Lake Superior, being forty-five miles distant at Pigeon River, and, measuring in a direct North-East course to the sources of the Kaministaquia, about seventy at the bottom of Thunder Bay. The passes in the dividing region vary in height from 840 feet to 1100 feet above the level of Lake Superior—that is by following the water courses, but the general elevation of the country is considerably higher. As may be supposed, the streams running down from such a height, in so short a distance, have a very rapid course, and, as a consequence, could only be rendered navigable at an expenditure which, whatever the future may require, is quite out of the question for the present.

Proceeding from the head of the water-shed to the Westward, the descent is much more gradual, the difference of level between Lac des Mille Lacs, which is close to the summit, and the Western extremity of the Lake of the Woods, being only 450 feet in a distance of 300 miles. Between the height of land and Rainy Lake, the Lakes are so numerous and so large, that it would be difficult to say whether land or water predominates. The Lakes, however, afford the means of making a very good water communication, at a moderate outlay.

From Fort Frances, at the foot of Rainy Lake, to the North-West angle of the Lake of the Woods, the navigation is uninterrupted save by two little rapids, easily overcome. From the Lake of the Woods Westward to Fort Garry, the country is low and level, but although swampy, quite practicable for a road by a line which has been explored and on which a good deal of work has been already done in the Western section.

There is thus, between Lake Superior and the Red River Settlement, a country presenting very different characteristics in different sections. First, a rugged and broken region, extending from Lake Superior to the summit of the watershed, in which the rivers are not navigable and the ground is difficult for roads.

Next, a country extending Westward from the water-shed, still very rough and broken, but intersected in every direction by deep lakes, which occupy a very considerable portion of its area, and which, on one of the lines explored, can easily be connected so as to render the navigation through it uninterrupted.

This section ends at Fort Frances, where there is a complete and sudden change in the character of the country, and from this point the navigation becomes continuous to the North-West angle of the Lake of the Woods.

From the latter point to Fort Garry the distance is 90 miles over ground which the explorations have proved to be practicable for a road.

The entire distance between Fort William and Fort Garry, by the route which it is proposed to open, is 441 miles, as follows:

From Lake Superior to the navigable waters of the Summit region...	40 miles.
From the terminus of the Lake Superior Road to the North-West angle of the Lake of the Woods.....	311 miles.
North-West angle to Fort Garry.....	90 miles.

441 miles.

OPENING OF THE COMMUNICATION.

The scheme proposed has, for its ultimate object, a railroad from Lake Superior to the navigable waters of the Summit region, navigation rendered continuous, by means of lock and dam, from the terminus of the same to the North-West angle of the Lake of the Woods, and a railroad from the latter point to the Red River Settlement.

The railroad at Lake Superior would be forty miles in length, succeeding which would be navigation of three hundred and eleven miles, which latter would be connected by a railroad of ninety miles with Fort Garry.

These are works which, to carry them out completely, would occupy some years, and in the meantime, as a preliminary step, it is proposed to make a good waggon road from Lake Superior to the waters of the dividing plateau, improve the navigation from thence Westward in as far as it can be rapidly done, in the first instance, and make a good waggon road from the Lake of the Woods to Fort Garry. This I conceive to be an absolutely necessary and essential step towards making the country accessible, whatever scale of improvement may be adopted in the future, and it would have the immediate effect of opening a channel by which immigration could reach the country, while it would, at the same time, draw the trade of the North-West Territories to Canada.

Before specifying in detail the various works necessary to give effect to this plan, I may notice the scheme of

A CONTINUOUS RAILROAD FROM LAKE SUPERIOR TO THE RED RIVER SETTLEMENT.

Such a work will, doubtless, become necessary as the regions of the North-West fill up with settlement, and it should be placed in such a position as to be available as a link in the railway system which will, no doubt, at some future day span the continent from the Atlantic to the Pacific, within British territory.

On reference to the map it will be seen that a railroad, to be continuous, must pass to the North of the Lake of the Woods, and it will also be observed that a line from Canada, after passing over the high plateau which is said to exist to the North of Lakes Huron and Superior, would first come upon Lake Superior at Nipigon Bay, and that its direct course from thence to Fort Garry would be by Lac Seul and the North end of the Lake of the Woods. These are facts which should always be kept in view in considering the project of a continuous railroad from Lake Superior to the Red River Settlement.

A railroad made on the line indicated would be the most direct possible, and it would, at some future period, serve as a link in the extension of Canadian Railways to the prairies of the Saskatchewan.

Now, a railway starting from any point West of Nipigon Bay would not meet these conditions; and all that is claimed for the comparatively short line of 40 miles which I have recommended at Fort William, is that will serve as a connecting link between Lake Superior and the navigable waters of the interior.

In regard to the practicability of a line of railroad between Nipigon Bay and the North end of the Lake of the Woods, no decided opinion can be offered until the country is explored. It is probable that, by keeping up the Valley of the Nipigon for some distance, so as to get clear of the rugged country on the immediate borders of Lake Superior, and then striking North-West to the vicinity of Lac Seul, a practicable line might be found. From Lac Seul to the North end of the Lake of the Woods, I apprehend there would be little difficulty if, as is reported, the flat silurian strata of Hudson's Bay send a spur in that direction. It might, however, be better to keep down the valley of the English River to its junction with the Winnipeg and strike direct from thence to the Red River.

In view of the importance which must soon attach to the project of a continuous railroad from Lake Superior to the Red River Settlement, I would suggest the expediency of sending an exploring party to examine the route above indicated, during the ensuing summer.

It would, also, be advisable to have a thorough examination made of the country to the North of Lakes Huron and Superior. A line was at one time run conforming to the line of coast, about twenty miles back, from Lake Superior, but the country over which it passed, as shewn by the very interesting report written by Mr. Herrick, who conducted the survey, is rough and broken. The line was entirely too near the coast, and I am of opinion that the best ground will be found in the high region where the waters running to Hudson's Bay and the tributaries of the St. Lawrence have their common source.

Mr. A. J. Russell, of Ottawa, in a work which will soon make its appearance, gives an epitome of all the information which has been obtained of the high plateau at the sources of the streams flowing to Lake Huron, but the country North of Lake Superior and East of Lake Nipigon is unknown, except from the reports of *voyageurs*, beyond the extent of Mr. Herrick's survey, which, as stated, was confined to a limit of about twenty miles from the coast.

ROUTE TO THE PACIFIC.

It must, in course of time, become a matter of great importance* to open a line of communication completely across the continent within British territory, but whether this should be effected solely by railroads, or partly by rail and partly by taking advantage of the navigable water which is so plentifully distributed, at least to the East of the Rocky Mountains, is a question for the future.

By Railroads.

The country is well adapted for railroads between the Red River Settlement and the sources of the Saskatchewan and Athabasca Rivers. Practicable passes have been found, too, in the Rocky Mountains, and in these the ascent is generally easy from the East. It is only when the summit has been crossed that serious difficulties present themselves. Between the Fraser River and the forty-ninth parallel, British Columbia is one sea of mountains, but through these the persevering efforts of explorers have led to the discovery of lines said to be practicable for railroads. In regard to the passes in the Rocky Mountains, Captain Palliser, who was sent out by the Imperial Government, speaks favorably of the British Kootanie Pass, near the boundary line, where explorers from Montana are now said to be mining for silver and gold. Dr. Hector, a gentleman whose researches are of great practical value, was favorably impressed with the Kicking Horse Pass, somewhat further to the North, but probably the best of all would be the Athabasca Pass, which has been the longest used and is the best known. Mr. Waddington gives the latitude of this Pass as 52° 54' North and its height as 3760 feet above the sea level, and describes several routes by which it may be reached from the Pacific.* He says, also, that the upper Fraser is navigable for 280 miles of its course.

The same authority maintains that by adopting the Athabasca and *Tete Jaune* pass, or, as it is sometimes called, the Leather Head Pass, a railroad from Edmonton House, on the Saskatchewan, to Bute Inlet on the Pacific, would only be 654 miles in length.

Until the country becomes better known, all that can be done is to indicate the probable position of an inter-oceanic railroad, and, if one should ever be built, as it doubtless will, in British territory, the following will likely be its general course.

* The elevation of the best known passes at the sources of the Saskatchewan is as follows:—
British Kootanie Pass, 5960 feet; Kananaski Pass, 4600 feet; Vermillion Pass, 4944 feet; Kicking Horse Pass, 5420 feet; and Howse Pass, 6347 feet above the level of the sea.

The valley of the Ottawa, and its tributary the Montreal River, might be followed to the meridian of 82° West longitude, from thence the direction would be North-West to the outlet of Lake Nipigon, where it would join the line above suggested, for a railroad from Lake Superior to the Red River Settlement, passing by Lac Seul and the North end of the Lake of the Woods. From the Red River Settlement the ground would be very favourable to Edmonton House, on the Saskatchewan, and from thence the route indicated by Mr. Waddington might be followed to the Pacific.

By this route the distance from Montreal to the Pacific, as computed by Mr. Russell, would be as follows :

Montreal to Fort Garry.....	1367
Fort Garry to Edmonton House, over the prairies.....	825
Edmonton House to Bute Inlet.....	654
Total.....	2846

If this line—the practicability of which has yet to be ascertained—were carried out, it might be tapped by an extension of the projected Toronto and Nipissing railroad, and it would thus be in connection with the Railway system of the Dominion at its most important points.

There is no doubt a great deal that is grand and imposing in the idea of a railroad which should span the continent from the Atlantic to the Pacific, and grasp in its embrace the united Colonies of British America—which should become an avenue for the trade of the Indies, China and Japan, and a highway for the nations of the world.

But, in considering schemes so vast, it is well, at the same time, to calculate their cost, and in drawing attention to this unavoidable phase of such projects, I cannot do better than avail myself of a calculation made by Mr. Fleming, the eminent engineer, under whose able direction the Intercolonial Railroad is now being built.

In a very interesting pamphlet, written by him some years ago on the North-West Territories and the best means of their development, speaking of a railway of 2000 miles in length and its accompanying telegraph line, he remarks:

“That a just conception may be formed of the real magnitude of the project under discussion and the means necessary to its attainment, attention may for a moment be drawn to a few leading details. The construction of 2000 miles of railway, measured by the average standard of similar works existing in this country, implies the performance of laborers' work sufficient to give employment to 10,000 men for five or six years. It involves the delivery of 5,000,000 cross ties or sleepers and over 200,000 tons of iron rails for the permanent way. It comprises the erection of 60,000 poles hung with 1000 tons of wire for the telegraph. It necessitates the creation of motive power equivalent to over 50,000 horses, which power would be concentrated in 400 locomotives. It involves the production of from 5000 to 6000 cars of all kinds, which, coupled with the locomotives, would make a single train over 30 miles in length. And lastly, it implies gross expenditure on construction and equipment of not less than \$100,000,000.

“It will likewise serve as a salutary check on hasty conclusions to weigh, beforehand, the cost of operating a truly gigantic establishment of the kind after its perfect completion; a few figures derived from actual results will shew that the first construction of a railway through British North America is even a less formidable undertaking than that of keeping it afterwards open in the present condition of the country. For operating the line successfully, the fuel alone required in each year and estimated as wood, would considerably exceed 200,000 cords. For keeping the road in repair, a regiment of 2000 trackmen would constantly be employed in small gangs throughout its entire length; for the same purpose there would, on an average, be annually required 600,000 new cross ties, as well as nearly 30,000 tons of new or re-rolled iron rails. The annual repairs of rolling stock would not cost less than one million of dollars. Over 5000 employees of all kinds would constantly be under pay, and as these men would usually represent each a family, there would not be far short of 20,000 souls subsisting by the operation of the road. The aggregate amount of wages in each year, after the road was in operation, would swell out to nearly \$2,000,000, while the gross expenditure for operating and maintaining works would annually exceed \$8,000,000.

"Again, if to the last sum be added the interest on first cost, it becomes evident that until the gross earnings of the railway in each year come up to the enormous sum of \$14,000,000 it could not pay interest on the capital invested."

Railway and Water Communication Combined.

Thunder Bay, Lake Superior, is already accessible to any class of vessels which can navigate the great lakes. From thence westward to Red River, the route is, as already described, forty miles of land road, succeeded by three hundred and eleven miles of navigation now broken, but susceptible of being rendered continuous, and which, again, is followed by ninety miles of land road, ending at Fort Garry.

Commencing at Fort Garry, the navigation might be rendered continuous, at small outlay, by way of Lake Winnipeg and the Saskatchewan to Edmonton House, a distance of 1060 miles. Edmonton House is within 500 miles of the Pacific Ocean, and the distance might be surmounted, according to the best information which can be obtained, by a railroad of 654 miles, or by taking advantage of the navigable waters of the upper Fraser and following a more tortuous route, the distance would be 841 miles, of which 309 would be by water and 532 by rail. So small an amount of navigation would not compensate for such an increase in distance, and in this instance the continuous railway would be the best.

By this route the total distance from Thunder Bay to the Pacific would be as follows:

	MILES.	
	LAND.	WATER.
Thunder Bay to the inland water at Shebandowan Lake.....	40	
From terminus Lake Superior road to North-West angle Lake of the Woods.....		311
North-West angle to Fort Garry.....	90	
Fort Garry to Edmonton House.....		1060
Edmonton House to Gulf of Georgia.....	654	
	784	1371
		784
		2155

It is quite practicable to make the navigation continuous from a point within 40 miles of Lake Superior to Lake Winnipeg; and, if this were done and the few impediments in the Saskatchewan removed, there would be continuous navigation from the base of the Rocky Mountains to the ocean, with one break of only 40 miles at Lake Superior, and this break might in time be overcome by lockage.

So great an extent of navigable water, or water susceptible of being made navigable, running through British America, traversing the vast prairies of the West and ending at the seaports of the Atlantic, is a feature in connection with the Western Territories the importance of which it would be difficult to overrate.

It is well known that railroads cannot compete with water in the transport of bulky and heavy freight, and if ever a line of communication should be established across the continent in British territory, and, providing it combined with the necessary amount of railway, all the navigable water which could be rendered available, I believe that no other trans-continental line which can be put in operation, north of the Gulf of Mexico, would be in a position to compete with it.

Everything in this regard, however, must be the merest conjecture until the country is opened up and becomes better known. The first grand step is to open the communication between Lake Superior and the Red River Settlement in the

manner in which it can be most rapidly done, to be at the same time effective; and if the barrier is thus broken through, even in a moderate way at first, many additional influences will be brought into play and improvement urged on until a first class line of communication has been obtained. Before concluding this subject, I may state what is known of the Saskatchewan in regard to its capacity for navigation.

The Saskatchewan

is not a river of such great volume as might be supposed from the immense area which it drains. It gathers its waters from a country larger than Canada, and yet it is not equal in size to the St. Lawrence. The precipitation is less in the prairies of the West than in Canada—less snow in winter and less rain in summer, but yet enough of both to make the Saskatchewan a very large river.

There is a fine harbour on Lake Winnipeg, just at the mouth of the Saskatchewan. Ascending from thence for a mile or so, the first and greatest impediment presents itself. This is called the "Grand Rapid," and here the river makes a descent of about 43 feet, rushing with great impetuosity over flat ledges of limestone rock. Between the Grand Rapid and Lac Bourbon there are several little rapids, having an aggregate fall of about 20 feet.

Lac Bourbon is distant from Lake Winnipeg about twenty miles, and from thence Westward to the Rocky Mountains, or at least to a distance of eighty miles beyond Edmonton House, the navigation is reported to be uninterrupted except at two points, where there are impediments, it is said, easily overcome.

The first is at a rapid called Tobern's Falls, about 140 miles above Lac Bourbon, where, from all that can be learned, a lock of moderate lift might be required. The next is at Coles' Rapids, on the North Branch, just above its junction with the South Branch. Here a series of swift runs and little rapids, extending over a distance of eighteen miles, would require in some places to be cleared of boulders, and probably a few glance dams might be necessary.

These impediments cannot be considered serious in a navigation of eight hundred miles, otherwise uninterrupted.

ESTIMATE OF THE COST OF PRELIMINARY LINE OF COMMUNICATION.

In estimating the cost of work in a distant region, where labour is not to be obtained, regard must be had to the expense of taking men to and from the ground, and the time lost on the way, for which there is no return in labour.

In the Lake Superior Section, it would be a safe estimate to allow about twenty days for the journeys to and from the localities in Canada where labour is cheapest and workmen of the class required can be engaged. For passage, going and coming and time on the way, each man would cost, at an average, \$40, which allowing that 250 men were employed during summer, would reach the serious item of Ten Thousand Dollars.

In the Lake Region, west of the height of land, a still larger allowance would have to be made.

I draw attention to these circumstances, inasmuch as my estimates for roads, more especially, may appear to be high; whereas, when the expenses above referred to, as well as the cost of transport for supplies are taken into account, they will be found to be as low as it would be safe to make them. Moreover, the experience of the section of road already partially made, although it passes over comparatively easy ground, affords a criterion as to what the cost will be in more difficult sections, and with this in view the estimate has been framed.

Roads Lake Superior Section.

The main road which it is proposed to open through this section, as shown on the accompanying plan, No. 1, has its starting point at the depot on Thunder Bay, from whence it strikes in a tolerably direct course to the mouth of the Matawin, following from thence the valley of that river to the first chute below Shebandowan Lake, where it is proposed to construct a dam. The extent of road remaining to be opened is 36 miles, and a specification marked No. 1, shewing the manner in which it is to be constructed, is hereunto annexed. Its probable average cost is set down in the accompanying estimate at \$1800 per mile. Some further expenditure will be required, too, on the section of road already partially made, more especially at a hill near Thunder Bay, where a detour has to be made, and for this purpose I have set down \$2,000.

In my report of last year, for reasons therein stated, it was proposed to run a branch line of road from Fort William, to connect that very important point with the main road, and for this purpose a sum of \$7,000—was included in the estimate then submitted. During the past summer this branch line was very carefully surveyed. The country through which it runs is somewhat low and swampy, and two small rivers have to be bridged, but a very good line, made in conformity with Specification No. 2, can be obtained at an outlay, as above stated, of \$7,000. The length of this line would be 7 miles.

Pier at Thunder Bay.

In last year's report, it was proposed to sink an isolated pier in front of the depot at Thunder Bay, at which vessels could discharge their loads. It would be placed in a depth of 16 feet of water. Its dimensions would be 150 feet in length by 20 feet in breadth at top, and its cost \$2,500.00. This work may be said to be indispensable, for at present there is great difficulty, not to speak of expense, in getting articles landed at that place.

Bridge over the Kaministaquia.

This would be a rough but substantial structure, supported by piers of crib work, filled solidly with stone, of which there is great abundance in close proximity. The stream is 300 feet in width, shallow, and running on a bottom paved with boulders. Wood is scarce in the vicinity, the country having been swept by fire, but the timber got out for a dam at Dog Lake, can be taken down and used in the work. Its cost would be about \$4,500.00.

In the Lake Superior Section the total proposed outlay would thus stand as follows:

36 miles main road	\$1,800 00	\$64,800 00
7 miles Fort William Branch Road	1,000 00	7,000 00
Grading Hills, Lake Superior, and completing road partially made		2,000 00
Pier at Thunder Bay.....		2,500 00
Bridge over Kamanistaquia.....		4,500 00
		\$80,000 00

A specification for the road and estimate of material are hereunto annexed.

Lake Region.

In former reports the designation "Lake Region" was applied to the section between the summit of the water-shed and Fort Frances, but Shebandowan and Kashaboie Lakes, immediately to the east of the water-shed, as they are on the line now proposed to be followed, may properly come under the same head.

In the estimate submitted last year will be found a statement of the sums required for each work then proposed as follows:—

Dam at French Portage	\$1,600 00
Dam across Sturgeon River at Island Portage	18,000 00
Dams at Nequaquon.....	4,000 00
Dam at Two Falls Portage on River Seine	20,000 00
6½ miles road and Tramway, on portages between Lac des Mille Lacs and Rainy Lake.....	10,400 00
	\$54,000 00

Since the estimate on which the above is founded was made, the circumstances have so far altered, that companies are already being organised for the purpose of providing the means of transport, and have it in contemplation to place steamers on such of the navigable reaches as may be of sufficient extent to render their employment profitable. It will, therefore, be a matter of importance, even at the outset, of opening the communication to lengthen the navigable reaches where practicable, and lessen the number of transshipments, and with this end in view it will be advisable to extend the works in certain sections.

Shebandowan Lake.

At the first chute on the Matawin, two miles and a half from Shebandowan Lake, and 16 feet under its level, there is a favourable situation for a dam, and one of small dimensions would extend the navigation of the Lake to that point, and save the cost of three miles of roadway, which would otherwise have to be made over very rough and broken ground. It is, however, proposed to raise the level of Shebandowan Lake to the extent of 30 feet, so as to give uninterrupted navigation to the height of land, and it would be better, at once to put up a dam of dimensions sufficient to produce this result. Before a precise estimate of the cost can be given it will be necessary to examine the ground about the Lake in order to ascertain whether on raising its surface level the water might not find outlets besides the present one. The country is so high that I believe it would not, and if this should prove to be the case \$12,000 would provide for the dam. Material for the work is in unlimited abundance. Timber can be cut on the shore of the Lake, and floated off without any expense in hauling, and stone can be easily obtained either in the bed of the river, or by blasting from the high rock on the banks.

The Summit Pond.

This little lake has to be reduced in level to the extent of five feet, and the channel between it and Kashaboiwe Lake deepened so as to admit of vessels passing from one to the other. The rivulet which connects the two is 600 feet in length, and the fall in that distance 4.99 feet. The bed of the stream is of loose stone, earth and decaying timber, without any apparent solid rock. To form a channel for such vessels as would be used, in the first instance, say 30 feet in width, the excavation would amount to 5,000 cubic yards and the cost, always supposing no solid rock to be met with, about \$3,000 00.

The Dividing Ridge.

This ridge is 50 chains in width, and the gully, already referred to as running through it, affords an easy means of making a cut so as to connect the waters of the western with those of the eastern side. Eventually, when the communication comes to be opened on a large scale, a lock of 7 feet lift will be required. At present it is proposed to place in the gully a wooden tramway at a cost of about \$2,500 00.

Lac des Mille Lacs to French Portage.

In this section last year it was proposed to raise the water of Lac des Mille Lacs, by means of a dam at the Two Falls Portage, and to deepen the water in the Windegoostegon Lakes by means of a dam at French Portage. It is, however, a matter of such paramount importance to avoid transshipments, in the conveyance of freight that I believe it will be better to incur a little additional expenditure, and do away at once with the Baril and Brulé Portages. This can be effected by a dam at the outlet of Lac des Mille Lacs, which will raise the level of that lake to the extent of say 4 feet, a cut between Lac des Mille Lacs and Baril Lake and a dam, of 55 feet in height, at French Portage.

It was proposed (see report of last year) to raise the level of Lac des Mille Lacs by a dam at the Two Falls—sometimes called the Little Falls—Portage, a point on the Seine, about ten miles below its outlet, where there is an excellent natural position for a work of the kind. The situation at the immediate outlet is not very favorable; nevertheless, as explained in my report of last year, I believe a dam could be constructed there to raise the water to the extent contemplated (only four feet over its present level), at less cost than at the Two Falls; and this would leave a portion of the estimate for that work to be applied to making the navigation continuous to French Portage, where it is now proposed to construct a dam, of height sufficient, to raise the water to the level of Baril Lake. In regard to the excavation necessary between Lac des Mille Lacs and Baril Lake, only an approximate estimate can be made, as the ground has not been measured with sufficient minuteness to admit of a statement in detail; but for this section, and having in view the doing away with no less than two transshipments, I would propose increasing the estimate of last year, which was \$21,600, by \$9,400, making the total \$30,000.

Other Works, Lake Region.

For the other works required in the Lake Region, I would respectfully refer to my report of last year. They may be briefly stated as follows:

At the French and Dieux Rivières Portages, it is proposed to make good wagon roads or place tramways. They are each about two miles in length, and, intervening between them is Kaogassikok Lake, 15 miles in length.

Succeeding Dieux Rivières is the Sturgeon Lake Section, which can be rendered navigable, in one unbroken reach of 27 miles, by means of a dam at Island Portage. This dam, measured by the immediate effect it would produce, is the most important work in the whole region of the lakes.

Following Island Portage is a navigable reach of 17 miles, through Nequaquon Lake, ending at Nequaquon Portage, which leads to Nameukan Lake. This Portage is two miles in length, and until locks can be constructed to connect the navigation of the two lakes, it must be used and a tramway placed upon it.

Besides the Portage, there are two other ways of reaching Nameukan Lake. One by the high water channel, which passes off on the South side, and the other by the main channel, known as the *Rivière Maligne*, breaking off about the middle of the lake, on the North side. In these two channels there is an admirable natural arrangement for commanding the water, when locks come to be constructed in either one or the other.

From the Nequaquon Portage to Fort Frances the distance is 56 miles, and the navigation uninterrupted, except by a fall of 8.55 feet, at the head of Rainy Lake, and at this point a lock should be made as soon as possible.

At Fort Frances there is another carrying place, but it is the last and its length only ten chains.

Lake of the Woods Division.

In regard to this section, I would also refer to my report of last year. The navigation is uninterrupted except by two little rapids, easily stemmed by a steamer of moderate power between Fort Frances and the North-west angle of the Lake of the Woods, a distance of 120 miles.

Lockage to the extent of only 35 feet lift, would add to this section the navigable waters of Rainy and Naminikan Lakes, giving 56 miles additional; but, to carry the scheme out a little farther, lockage amounting in all to 151 feet lift, would render the navigation uninterrupted between Dieux Rivieres Portage and the North-west angle, a distance of 222 miles. This would be half the entire distance between Lake Superior and the Red River Settlement.

Mr. Russell in his work, from which I have already quoted, suggests the expediency of perfecting the navigation at once to the head of Sturgeon Lake (Dieux Rivieres Portage), and connecting it by a railroad of 122 miles with Lake Superior. He did not, however, know at that time that the navigation could be so easily rendered continuous, as determined by the explorations of last summer, to within 40 miles of Lake Superior; and the difference in cost of a railroad of 40 miles and one of 122 miles would be several times greater than that of the lockage, necessary to overcome the difference in distance.

If the navigation were rendered continuous between the Dieux Rivieres Portage (head of Sturgeon Lake) and the North-west angle of the Lake of the Woods, and a lock made at the Summit Pass, the following would be the distances by land and water respectively:

	MILES.	
	Land.	Water.
Thunder Bay to navigable water of Summit Section.	40	
Terminus of Road to the French Portage.....		70
French Portage.....	2	
Kaogassikok Lake.....		15
Dieux Rivieres Portage.....	2	
Dieux Rivieres Portage to North-west angle of Lake of Woods.....		222
North-west angle to Fort Garry.....	90	
	<hr/> 134	<hr/> 307
		<hr/> 134
Total.....		<hr/> 441

There would thus be two trans-shipments only, between the terminus of the Thunder Bay Road and the North-west angle of the Lake of the Woods, in a distance of 311 miles, and between these two there would be an interval of 15 miles of navigable water, afforded by the Kaogassikok Lake.

Improvement to this extent might very rapidly be carried out, and there would then remain the French and the Dieux Rivieres Portages, where the works would be extensive, requiring a little further time to carry them to completion.

The total amount of lockage—as will be explained further on, required to render the whole distance between the north-west angle of the Lake of the Woods and the Thunder Bay road navigable, without a break, amounts only to about 430 feet in a distance of 311 miles, or about 1.35 feet to the mile, whereas the Rideau has 457 feet of lockage, in a distance of 126 miles, equal to about 3.63 feet per mile, so that, as compared to the distance, the section under consideration requires but a little over one third part of the lockage of the Rideau canal.

Fort Garry Section.

This embraces the country between the north-west angle of the Lake of the Woods and Fort Garry. Much fruitless exploration had been made in this section, both by the Red River Settlers and parties sent out by the government, without finding a line practicable for a road through the swamps, which cover a great portion of its area. Towards the close of the explorations, a rapid reconnoissance made by the Red River Expedition party resulted in establishing a line on which the country could be crossed and on this line, during the past winter, a good deal of work has been performed as reported on by Mr. Snow. The sum set down in the estimate of last year should be ample for a road, as regards the wooded section, but it is likely that to make a good road on the prairie an increase would be necessary, when it comes to be greatly travelled. All that can be done for a prairie road, without going to very great expense, is to drain it thoroughly and fascine it in the wet parts. Specification No. 1, hereunto annexed, should be adhered to as closely as possible in making the road through the wooded section.

To sum up the amount required for the preliminary works, now proposed, would be as follows :

Lake Superior Section.

Thirty-six miles main road, at \$1,800 per mile.....	\$64,800 00
Seven miles, Fort William, at \$1000 per mile.....	7,000 00
Grading hill, Lake Superior.....	2,000 00
Pier at Thunder Bay.....	2,500 00
Bridge over Kaministaquon.....	4,500 00
	<hr/>
	\$80,800 00

Lake Region.

Dam at first chute below Shebandowan Lake.....	12,000 00
Excavation at Summit Pond, to reduce it to level of Kashaboive Lake; and for channel for vessels.....	3,000 00
Dividing Ridge tramway.....	2,500 00
Lac des Mille Lacs works, and thence to French Portage.....	30,000 00
Dam at Island Portage, per estimate of last year.....	18,000 00
Dams at Nequaquon.....	4,000 00
Six and a-half miles road and tramway over portages between Lac des Mille Lacs and Rainy Lake.....	10,400 00
	<hr/>
	79,900 00

Fort Garry Section.

Twenty-five miles Eastern portion, at \$1,600 per mile.....	40,000 00
Thirty-five miles Middle section, at \$1,000 per mile.....	35,000 00
Thirty miles Western section, over low prairie, at \$400 per mile.....	12,000 00
	<hr/>
	87,000 00
	<hr/>
	\$247,700 00

The sum required for the preliminary communication, which it is proposed to open, would thus stand at \$247,200.00, or say, in round numbers, \$250,000.00.

This may, at first sight, appear to be a small sum with which to undertake the opening of the territories of the North-West, amounting as it does to little more than the cost of eight or ten miles of railway.

These preliminary works will, nevertheless, be of a permanent and substantial character, and will form a step in the general plan. Improvement in new regions should be progressive, and in the present case, works of great extent can not be advantageously undertaken, until the country shall have been so far opened as to admit of the introduction of material and supplies for large parties of workmen.

The region between Lake Superior and the Red River Settlement is as yet but a wilderness, utterly uninhabited except by the red men of the forest. It produces nothing to sustain human life, except game, fish, berries and wild rice, and the birchen skiff of the natives, stitched with fibres of roots, affords the only means of locomotion.

In the heart of this wide region, is a tract of navigable water, which will greatly facilitate operations, but it is cut off from Lake Superior on one side by a formidable barrier of mountain and rock, and from the Red River Settlement, on the other, by a region of quagmire and swamp.

The first step taken, must be to render these waters accessible from either end, and, when this is accomplished, the communication will be in a measure open, and any number of workmen can be employed to carry further works to completion, with all the speed which the means of the country may render advisable.

PROBABLE ULTIMATE COST, COMBINED RAILROADS AND CANAL, BETWEEN LAKE SUPERIOR AND FORT CARRY.

During the progress of the preliminary works, set forth in the foregoing, measurements can be taken on which to base detailed estimates, both for the railroads at either end of the route, and the locks necessary to connect the intermediate navigable sections. Until this is done any estimate, founded on the general measurements already made, must be taken with considerable latitude, and the safest criterion to go by, making due allowance for the difference in circumstances, will be the known cost of similar works now in operation in North America.

In respect to railroads, it is easy in this way to arrive at an approximate estimate; but, as regards a canal, much will depend upon the scale of navigation to be provided for. Locks of very limited dimensions would be equal to one line of railroad; and a canal of the size of the Rideau, for example, would be equal in its capacity for the conveyance of freight to many railroads.

In the present undeveloped state of the North West Territories, it would perhaps be better to commence on a moderate scale, adopting wooden locks, for which substantial structures of stone might be gradually substituted. Mr Stevenson, in his very valuable work on American Canals, says:

"One of the most important advantages of constructing the locks of canals, in new countries, such as America, of wood, unquestionably is that in proportion as improvement advances and greater dimensions or other changes are required, they can be introduced at little cost, and without the mortification of destroying expensive and substantial works of masonry. Some of the works on the great Erie Canal are formed of stone, but had they all been of wood it would, in all probability, have been converted into a Ship Canal, long ago."

He says further, that

"At the time when canals were introduced into America, the trade of the country was small and did not warrant the expenditure of large sums of money in their construction.

"the chief object being to form a communication with as little loss of time or outlay of capital as might be consistent with a due regard to the stability and safety of the work."

These remarks are quite applicable to the present condition of the North-West Territories.

Canal.

The navigation, which it is proposed to open would be of that description, which is called in the United States "Slack Water Navigation." There would be but very little canal, properly so called, for the cutting would not amount to a mile in the entire distance of 311 miles.

The accompanying map, on a scale of two miles to one inch, and the plan in profile, shew the position and relative altitude of the lakes on the line of route. Shebandowan Lake, for reasons already explained, would be adopted, as the summit level, and it is, of itself, fed by the drainage of an area sufficiently extensive to ensure an ample supply of water. Between it and Lac des Mille Lacs, however, there would only be a lock of seven feet lift, and the latter lake receives the waters of an area of no less than seven hundred square miles, so that from thence westward, with Shebandowan Lake, Lac des Mille Lacs and the areas which pour their drainage into them, combined, there would be water at command, at the very source of supply, more than sufficient for a canal of any dimensions, and any traffic that can arise.

By means of dams and sluices at Lac des Mille Lacs, the supply of water could very easily be regulated along the route proposed to be followed as far as Sturgeon Lake, which receives a large river from the South. Throughout the entire distance from Lac des Mille Lacs to Rainy Lake, the river channels are everywhere of rock, and the water tumbles step by step from the higher levels to the lower, so that the natural facilities for producing slack water navigation—or rather for connecting the slack water sections which already exist—are all that could be desired, and the question in the first instance to be decided would be whether the locks should be of stone or wood?

In either case material is abundant. The hard Laurentian gneiss of the country, although somewhat difficult to work, would answer well for the rougher portions of the stone structures, and limestone, which could be made available for the portions requiring to be highly dressed, is abundant on Rainy River and at the Lake of the Woods. Timber, such as Red Pine, White Pine and Tamarac, is in unlimited quantity all along the route, and Elm and a species of Oak, can be had on Rainy River.

Wooden Locks, in the first instance, would cost greatly less than stone structures, however small the dimensions of the latter might be, and even by adopting wood for the locks, the greater part of the work in forming a canal would be of a permanent character, and necessary for stone locks afterwards, as, for example, the dams and the excavation.

As regards dimensions, the locks, to accommodate the largest class of vessels adapted to the navigation, should be about 130 feet in length by, say, 30 in breadth, with five feet of water on the sills. In the Lake Region, vessels of a large class might be employed, but Rainy River is not adapted to a greater draught than five feet.

The locks on the Rideau Canal are thirty-three feet in width by one hundred and thirty-three feet in length, with five feet of water on the sills. The Rideau has been a very expensive work on account of the excavation which, in length of cutting, exceeds sixteen miles, and the enormous stone dams at Jones' Falls, Hartwell's, Long Island, &c. Apart from these, and the land claims, which also added considerably to the expenditure, the cost per foot lift of the lockage has been about \$4,300. The magnificent locks at the entrance to the Canal at Ottawa,

eight in number, and overcoming a fall of eighty-two feet, cost \$4,296 per foot lift.

Work of such a costly description would, of course, be unnecessary on inland navigation, which, in the first instance, would only be used to the extent of the capacity of the railroads at either end.

I find in looking over the statistics of some of the cheaper canals in the United States, the following approximate cost per foot lift of lockage, including dams and all expenses connected with the original construction:

New Hampshire and Merrimac	\$1173
Delaware and Hudson	1827
Morris Canal (New Jersey)	1930
Cincinnati and Dayton	2485
Philadelphia and Reading.....	4098

On the Morris Canal the rise and fall amounts to 1557 feet, of which 223 feet are overcome by locks, and 1334 feet by inclined planes, over which vessels are moved from one level to another by means of machinery driven by water wheels.

The Erie Canal, the work on which consists in great part of excavation and embankment, affords no criterion by which to judge of the cost of lockage on such a route as that under consideration.

I have adduced the above instances to show what the cost of some of the best known canals of moderate dimensions has been. Ship canals would, of course, be vastly more expensive, and need not be considered in connection with an inland navigation west of Lake Superior.

Locks of the dimensions I have suggested, would accommodate vessels of a class sufficiently capacious to meet the wants of the country for a long period, and they would be more than equal to the capacity of a single rail road for the conveyance of freight.

From the east end of Shewandowan Lake to the north-west angle of the Lake of the Woods, the distance is 311 miles, and the total fall about 450 feet, of which 430 feet has to be provided for by lockage, the balance being accounted for in the current of Rainy River and other parts.

Supposing the locks to be of wood, I make *very ample* allowance in setting the cost at \$2,500.00 per foot lift, which should cover the excavation necessary for the lock beds, crib work, approaches, dams, &c.

This would give the entire cost of the lockage at.....	\$1,290,000
The excavation, other than that included in the above.	
will not exceed 120,000 cubic yards, and reckoning	
the whole of this as rock, at \$1.75 per cubic	
yard, we have.....	210,000

Making the total cost... .. \$1,500,000

Or, reckoning by distance about \$4,823 15 per mile, equal to about one sixth part of the average cost of the cheapest railways.*

Railroads.

Of these there will be two, one of about 40 miles between Lake Superior and Shebandowan Lake, and one of 90 miles between the north-west angle of the Lake of the Woods and Fort Garry. The former will be over very rough

* The above is given merely to convey a general idea of the probable ultimate cost of rendering the navigation continuous between Shebandowan Lake and the North-west angle of the Lake of the Woods. The measurements to be taken during the present summer will supply material for estimates in detail.

ground, with difficult grades, and its least average cost may be set at that of the general cost of railroads in this country, say \$40,000 per mile, making its entire probable cost \$1,600,000.00. In regard to the line between the Lake of the Woods and Fort Garry, it will pass over very level ground, and its cost may be safely set at \$30,000.00 per mile, equal to \$2,700,000.00 for the entire distance of ninety miles. The two Railways at either end of the navigation would thus involve an outlay of \$4,300,000.00.

Total Cost.

40 miles Railroad, Lake Superior to navigable waters of interior	\$1,600,000.00
311 miles of continuous navigation, improved by locks and dams.....	1,500,000.00
90 miles Railroad, North-West angle Lake of the Woods to Fort Garry.....	2,700,000.00
Total.....	<u>\$5,800,000.00</u>

Cost of Transport.

Supposing a scheme of railroad and canal, as above indicated, to be carried out between Lake Superior and the Red River Settlement, the transport of heavy freight, according to McAlpine's scale, which is generally adopted, would be nearly as follows, from Toronto to Fort Garry:

94 miles railroad, Toronto to Collingwood, at 12½ mills a ton per mile	\$1.18
534 miles by lakes, from Collingwood to Fort William, at 2 mills per ton a mile	1.07
40 miles by rail, from Fort William to navigable waters of interior section, at 17 mills per a ton a mile.....	0.68
311 miles lake and river navigation, from terminus of Lake Superior Railroad to North-west angle Lake of the Woods, at 4 mills per ton a mile.....	1.25
90 miles rail, North-west angle to Fort Garry, at 15 mills per ton a mile	1.35
1069 miles. Total cost.....	<u>\$5.35</u>

The distance from Toronto to Fort Garry, by way of Detroit, Chicago and St. Paul, is 1572 miles, and supposing the railway communication to be complete, the cost per ton, reckoned at 12½ mills per mile, would be \$19.65. Nothing could show more clearly the vast superiority of the Canadian line in point of natural advantages.

RESERVES OF LAND.

Wherever Public Works are likely to be required it will be necessary to reserve a certain quantity of land, not very extensive, but enough to cover the works and the approaches thereto, as for example, at all localities where locks or dams have to be constructed.

It would be well, also, to reserve an ample area at every point where villages or cities were likely to arise, so as to prevent the land from falling into the hands of individuals, who are always ready to purchase in such situations for purposes of speculation.

Between Lake Superior and Red River Settlement, the localities which strike me as being the most likely to become the sites of villages are Fort Frances, on

Rainy River, the North-West angle of the Lake of the Woods, and Oak Point Settlement

Fort Frances.

This point is at the outlet of a spacious lake, into which several rivers of great volume discharge themselves, after draining an area in which timber fit for commercial purposes is very abundant.

The Falls just in front of the Fort present unlimited water power, which is all the more valuable from the fact that there is none to compete with it within a distance of 150 miles, on the course of the river to the westward. Fort Frances is, moreover, at the commencement of a fine tract of land, which extends along the winding course of the Rainy River to the Lake of the Woods, and which being on the high road to the West, will rapidly fill up with settlement.*

It is likely also to become the centre of a mining district. Schists of Silurian age, traversed by lodges of quartz, are plentifully distributed at Rainy Lake and gold has been already reported.

Already, too, Gold mines are being worked at Vermillion Lake, which is on the United States side, but sends its waters to Rainy Lake.

With a vast district covered with groves of pine timber to the east, a large tract of the finest conceivable land to the west, and a region likely to prove rich in minerals in close proximity, Fort Frances must soon become a place of importance. Land should in consequence be reserved, not only for the public works necessary to surmount the Falls, but also for the site of a town.

North-West Angle of the Lake of the Woods.

This point has nothing very attractive about it, further than that being at the terminus of the navigation, and the commencement of the land roads, it must become a place of considerable resort and, therefore, a town plot should be laid off, and the lots sold or granted free, under condition of building and permanent residence.

Oak Point Settlement.

It would seem as if people sometimes gathered by instinct, to points which were destined to become of importance from causes of which they could have had no conception, and oak Point settlement is one of these. The first settlers could have had no idea that a line from the dreary swamps which lay between them and the Lake of the Woods, and of which they knew nothing, would emerge at that point. A few explorers attached to the Red River Expedition, following the best ground from the North-west Angle, came upon the settlement, and, as the track they laid out is to be a highway, there is every indication that it will become a place of importance. Forty families have already established themselves and a church has sprung up in their midst.

The land is of unsurpassed fertility, and being where the prairies and forest meet it has the advantages of a wooded and cleared country combined. Wood for fuel, building and fencing, on one side, and fields, for hay and pasture, bounded only by the dim horizon, on the other. A Town Plot should be laid off, and not a lot granted except to an actual settler.

* This is the country of which Sir George Simpson wrote as follows:—"nor are the banks less favourable to agriculture than the waters themselves to navigation, resembling in some measure those of the Thames near Richmond, &c., and proceeds, "It is too much for the eye of philanthropy to discern through the vista of futurity, this noble stream connecting as it does the fertile shores of two spacious lakes with crowded steamboats on its bosom and populous towns on its borders?"

Fort Garry,

Situated, as it is, on navigable waters, which have their sweep across half a continent, and with land of unequalled fertility surrounding it in every direction, must become a very important place. It is a point at which water lines, railroads, and telegraphs will converge. Hundreds of miles away to the South the valley in which it stands blends imperceptibly with that of the Mississippi, affording easy means of communication. In the opposite direction are vast tracts of navigable water, which afford ready access to the McKenzie River and the fur producing regions of the North. To the West, the broad Saskatchewan gives a route to the Rocky Mountains, with the gold fields of British Columbia just beyond, and to the East, lies the projected road to Canada which will yet bring its stream of traffic and immigration to the Prairies of the West.

Nearly sixty years have passed since Lord Selkirk planted his little colony of Scotch Highlanders at Fort Garry, and even then he must have seen the advantages of the situation in which he placed his countrymen, and the future which awaited their descendants, who are now among the lords of the soil, and must continue to grow in wealth as the country increases in prosperity.

The lands at Fort Garry are in private hands, so that no reserves can be made; but, as a general rule, Town Plots should be laid off and reserved wherever there is any likelihood of villages arising, and in such situations lots should be *sold, or granted free, only to actual settlers.*

THE INDIANS ON THE LINE OF ROUTE.

In my Report of last year, printed by order of the House of Commons, I referred to the Indians inhabiting the country about Rainy River and the Lake of the Woods, as being the only tribe with which the country would come in contact, in opening the communication between Lake Superior and the Red River Settlement.

These Indians occupy a peculiar and somewhat exceptional position. They are a community by themselves, and are essentially wood Indians, although going on hunting or fighting expeditions to the prairies. They are of the same tribe as the Indians at Red River, speak the same language, and regard them as their kindred; but they seldom see them, and have but little intercourse with them.

Although the principal line of traffic at one time passed through their territory they have for half a century had but little intercourse with the white man. Missionaries have made no impression upon them and, in many respects, they have shewn themselves to be less amenable to the influences of civilization, than Indians usually are. They, in fact, take pride in maintaining their distinctive Indian character, are deeply imbued with traditions of what they believe to be an honorable past history, and would look with disdain on any of the community becoming christian.

They have a sort of government, consider themselves great *braves*, and occasionally send war parties to fight the Sioux on the plains. The international boundary line passes through their territory, and some of them live on the United States side and some on the British. The permanent residents, however, are almost entirely on the British side, those from the United States making their appearance in considerable numbers only in summer, during the fishing season. The country on either side is in a state of nature, wild and unsettled.

They are sufficiently organized, numerous and warlike, to be dangerous if disposed to hostility; and, standing as they do in the gateway to the territories of the North West, it is of the highest importance to cultivate amicable relations with them.

One of the first necessary steps to be taken, will be to arrive at a distinct understanding as to right of way, and have the same embodied in a formal treaty. This treaty, if confined solely to that one point—right of way—as it should be without reference to lands for settlement, and other questions, which could be arranged after the communication was opened, would occasion no further outlay than would be involved in a few presents of blankets and such articles as they require, which an officer sent for the purpose might judiciously distribute, with the aid of the Agents of the Hudson's Bay Company.

On the opening of the communication, last year, the chiefs of the tribe sent one of their number, attended by a party of his followers, to Fort William, to ascertain what was being done, and to learn the intentions of the Government in regard to opening the communication. No information, on the subject of his enquiries, could at that time be given to him, but the fact of the tribe having sent such a messenger and for such a purpose, shews the deep interest which they take in the present movement. They would be keenly alive to any imagined slight in opening a highway, without regard to them, through a territory of which they believe themselves to be sole lords and masters, and to which, if a lengthened period of occupation can give a claim, they have unquestionably some title.

As stated in my report of last year, working parties must be kept as much as possible aloof from the Indians, and the officers in charge should always see that they are treated with proper respect. They are very different from the timid and cringing creatures who are now the sole representatives of the Indian Race in the back settlements of Canada, and the bearing I have sometimes seen adopted towards the latter would not be relished.

Never having come in contact, with what they believe to be a superior race, they are conscious of no inferiority; but, while this is manifest in their bearing, they are, at the same time, inoffensive and obliging.

The maintenance of order and amicable relations will be much facilitated by the utter and complete exclusion of intoxicating liquors. The penalty for the introduction of such on the American side is the States Prison. Pity that we have not so salutary a law on the British side.

For further notice of these Indians, see last year's report, page 26.

MANNER OF PROGRESSING WITH THE WORK.

As explained in my report of last year, the preliminary works proposed are of that nature which can be better performed by engaging good workmen and competent overseers, than by contract.

As many men as could be advantageously employed, should be at once placed on the land roads at either end of the route, so as to render the navigable waters of the interior sections accessible as speedily as possible.

The Lake Superior road can easily be supplied with workmen and material from Canada.

For the road between the north-west angle of the Lake of the Woods and Fort Garry, workmen can readily be engaged in the Red River Settlement, but the dearth now prevailing at that place, and which must continue to prevail until harvest, would render it necessary, in the early part of the season, to procure supplies in the northern settlements of Minnesota.

In regard to the Lake Region, timber can be prepared for the dams and floated, during summer, to the respective positions where it is required, and the work of excavation and construction could, in several instances, go on immediately and be continued during winter, when supplies can be sent in more cheaply by sleighs, than with canoes in summer.

When the road between Thunder Bay and Shebandowan Lake is completed, there will be no difficulty in conveying supplies to the works in the interior, and this is one of the reasons why it should be pushed through as rapidly as possible. Operations in such distant localities as Namenkan and Nequaqon, would be expensive and cannot well be undertaken until this road is completed.

SCHEME OF A RAILROAD TO RAINY LAKE.

In one of my preliminary reports, printed soon after the explorations had commenced in the North West Territories, occurs the following passage:—

“When the circumstances of the country would admit of the outlay, a continuous rail-road—195 miles in length—might be made between Lake Superior and Rainy Lake, and another of 91½ miles between Lac Plat and Fort Garry. If this were done, and two locks constructed at Fort Frances, the Red River Settlement would be within less than two days’ journey of Lake Superior, &c.” (Journal Reports of 1860, N. W. Territories, page 29.)

Since the report containing the above was written, there has been much additional exploration, and the result has been to show that a railroad of 40 miles, between Thunder Bay and the navigable waters of the interior section, combined with the lockage suggested, would be of greater advantage and vastly more economical, both in construction, in the first instance, and in working it afterwards, than a continuous line to Rainy Lake. The latter, although the distance, in an air line, is only one hundred and seventy miles, allowing for necessary curvature, in such a region, would run up to about two hundred miles, and there are certain very important conditions which it would not meet.

It could not be extended at a future period to the Red River Settlement, except through United States Territory, on account of the Lake of the Woods, which spreads its waters for a hundred miles directly across its course; and it could form no part of a line from Canada to Fort Garry, as it would be over sixty miles distant from such a line at its starting point, on Lake Superior, and about a hundred at its terminus on Rainy Lake.

It would only be a “Portage Railroad” available during the season of navigation, for connecting one tract of navigable waters with another. In this respect it would, no doubt, be highly useful, but the same object can be effected, in this case, by the shorter line of 40 miles now suggested, combined as it would be, with the lockage necessary to render the navigation continuous, between its terminus and the North-west angle of the Lake of the Woods.

The idea of a continuous line to Rainy Lake, was merely thrown out as a suggestion in a preliminary report, in which was discussed the various ways of reaching the Red River Settlement and their advantages, as compared to the longer route through the United States. It has, however, had a great deal of importance attached to it, and been adopted by many warm advocates of opening communication with the North West Territories, and I trust they will perceive that I am not now arguing so much against their views as explaining why a suggestion made by myself, before the explorations had proceeded far, might now be improved upon, by extending the navigable section and adopting a greatly shorter and less expensive railroad. The principle in both cases is the same,—a railroad from Thunder Bay to the navigable waters of the interior—only that, as now proposed, the navigation would be extended to within a shorter distance of Lake Superior.

FURTHER SURVEYS AND EXPLORATIONS.

Between Nipigon Bay and Fort Garry.

As already explained in projecting a line of railroad from Lake Superior to the Red River Settlement, Nipigon Bay, should be adopted as the starting point. Running from thence in the most direct course possible, the line would come upon Lac Seul—a large sheet of water tributary to the Winnipeg. From thence it is likely that practicable ground would be found by keeping in a course nearly direct to the north end of the Lake of the Woods. From the latter point to Fort Garry the country is better known, and no great difficulty need be apprehended except in the vicinity of Rat Portage, where a considerable area is occupied by low rocky hills. Should the ground prove to be of a very difficult character between Lac Seul and the North end of the Lake of the Woods, it is probable that a better line might be found by following the valley of the English River—the discharge of Lac Seul—to the Winnipeg, crossing the latter above the confluence of the two, and continuing along its valley to the Seven Portages, from which point a line could be carried to the Red River Settlement, in a distance of about forty miles, over a level but somewhat swampy country. By adopting the valley of the English River the distance would not be greatly lengthened, and according to the most reliable accounts a fair country would be thrown open for settlement. Fine crops are raised at the Hudson's Bay Company farm at Lac Seul, and, as limestone underlies a portion of the country, it is reasonable to suppose that where it prevails, the soil, as is generally the case, must be good, and the ground at the same time favourable for railways.

The principal difficulties will doubtless be found in this case, as elsewhere with lines starting from Lake Superior, in getting to the waters of the western slope.

A survey should be made of the entire route and, in carrying it out, the levels along the water courses, should be determined by actual measurement, with the spirit level, and the elevation of the adjoining country ascertained, approximately, by the barometer.

The region is intersected by rivers and lakes, navigable, to birch canoes, so that no great time need be occupied in making a cursory survey, such as would be necessary to ascertain the general character of the country.

This survey might be combined with operations at Fort William, so that no separate organisation would be required.

Between Thunder Bay and Rainy Lake.

Measurements require to be taken, on which to base estimates for the work required to render the navigation continuous between Shebandowan Lake and Fort Frances, and in view of the importance which must now attach to the country on the line of route, cursory surveys should be made of all the lakes and tributary streams for a considerable distance on either side thereof. These surveys might, without greatly increasing the outlay, be carried on in connection with the work on the projected roads and dams already reported on.

MR. RUSSELL'S WORK ON THE NORTH-WEST TERRITORIES.

In concluding this report I feel it incumbent upon me, in the interest of public information, on the subject of the North-west territories, to draw attention to a work by A. J. Russell, Esq., of this city, about to issue from the press of Geo. E. Desbarats, Esq., an advance copy, of which I have had the privilege of perusing. A lack of proper knowledge of these immense regions, so widely different in their climatic influences—though heretofore so generally referred to under the somewhat chilly name of *Hudson's Bay*, to which vast territories thus classed, bear not the slightest affinity—and the utter want of any available means of acquiring such knowledge, has heretofore precluded the possibility of any general practical discussion of the results to be attained by the development of the country. The information about to be laid before the public in Mr. Russell's work, will, therefore, be of the very greatest importance, drawing, as it does, from every source that patient investigation could render available such stores of knowledge as have yet accumulated, and presenting the whole, illustrated by maps, shewing the fertile and the barren, the genial clime which invites millions of settlers to till the virgin soil, and the hyperborean regions where the hunter and the fur trader will still have unmolested sway, in a manner that will enable every one to judge for himself of the future that awaits the Dominion that now presents so vast a field for enterprise and progress. Mr. Russell's work is deserving of a more extended notice than comes within the scope of this report.

THE GREAT NORTH WEST.

Although it may seem to be stepping aside a little from the direct matter of this report—properly confined to the subject of opening the communication—yet, inasmuch as I have, heretofore, under the orders of the Government, visited the great region farther to the west, to which the opening of this first link is but the unbarring of the gateway, I cannot close without congratulating the country and the honorable gentlemen themselves, on the success achieved by the deputation in settling a question that lays open to the enterprise of the Dominion a region which forms no inconsiderable portion of the American Continent, and which is probably unsurpassed, in the variety and extent of its natural resources, by any other area of equal dimensions on the earth's surface.

To those who believe that the North West country, including the Red River and Saskatchewan valleys, was properly a part of Canada, when they consider the formidable array which stood in the way of establishing our rights, and the vastness of the stake, the sum to be paid will appear insignificant; and when, in addition to all that could have been fairly claimed, we acquire an immense territory, rich in the products of the chase, in fisheries and probably in mines, to which the right of the Hudson's Bay Company was not even in dispute, and extinguish thereby the last vestige of a sway which, however mildly exercised, is not conformable to constitutional usage, over any part of British North America, a result has been accomplished of which the country at large and the delegates themselves may justly feel proud.

There is but one point in the transaction to which some seem disposed to take exception, and that is the appropriation to the Company of a small proportion of the land within the district known as the Fertile Belt, and which is not the only fertile belt in the wide regions of the North West. I would scarcely feel justified in touching on this subject did I not believe, from long personal intercourse with the resident members of the Company, that the arrangement will work well and conduce to the general advantage.

No one will dispute the wisdom and ability with which the Hudson's Bay Company have conducted their affairs, and if in the past they have sought to exclude settlement, as opposed to their interests, is it not reasonable to believe that the same ability will now be directed to its promotion, both because they will have other dealings with Canada, which will make it their interest to act in concert with her, and because their lands in the fertile belt will thereby increase in value?

Assuming this as the natural result, I can speak of the resident partners and officers of the Company as having it in their power to render the most important services, both in aid of settlement and in the control of the Indian element. They are wedded to the soil; they know every part of the country, and under the new *regime* they will feel that their interests are identical with its progress. Moreover, the influence of the partners in England—many of whom are in positions which will render their aid of the greatest importance—in directing emigration to the Prairies of the West, will probably be of more avail than any other effort likely to be made in the same direction.

To conclude, there is a beautiful and fertile land of vast proportions, inviting the husbandman to its virgin soil. If we, in turn, invite and interest all influences in the Dominion, the Hudson's Bay Company included, to unite in its development and in directing emigration and settlement to it, the day is not distant when a teeming population of millions will find there the means of prosperity and plenty; and it would be a fitting sequel to the work now being accomplished if, within a few short years from this date—which is quite possible—the delegates of last winter, Sir George E. Cartier, Bart., and Hon. Wm. McDougall, C. B., with the best appliances of modern travel, could visit the fertile belt and see its broad navigable rivers, cutting through great coal fields near their sources, to wind for many hundreds of miles through grassy prairies of unsurpassed fertility or, passing from this fertile belt, to view still another belt as vast,—farther to the north, but farther also to the West, and under the climatic influence of a lower level—where another navigable river, the great Unjiga, taking its rise in the plains of British Columbia, cuts through the Rocky Mountains, in its course of a thousand miles, and winds eastward through woodland and prairie, across ten degrees of longitude. This is the region which so impressed Sir Alexander McKenzie, the first civilized man who had ever beheld it. Early in May he saw the country green with exuberant verdure, its gently undulating hills and valleys covered, far as the eye could reach, with vast herds of Buffalo and Elk, with their young frisking about them. He speaks of its soft and beautiful scenery, its trees in full blossom, and indeed, to judge from his account, as well as from the narratives of other travellers, it would seem as if this remote country of the Unjiga with its winding streams, its clumps of trees, and beautiful green sward, and its herds of untamed cattle, rivals, if it does not surpass, in many places, all the groves, lawns and plantations with which genius and art seek to adorn the habitations of civilized life.

Respectfully submitted,

S. J. DAWSON.

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