# REPORTS

## On the proposed Short Line Railway between Montreal and Halifax.

By E. H. KEATING, C. E.

# Report on the proposed Short Line Railway, connecting the Canadian Pacific Railway at Montreal with the principal Atlantic Ports of the Dominion of Canada.

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CITY ENGINEER'S OFFICE,
Halifax, 12th June, 1885.

*To His Worship the Mayor, Chairman Short Line Railway Committee:*

SIR,—Having been requested to report upon the line which will best serve the requirements of the Maritime Provinces, looking specially at the interests of Nova Scotia, I beg to say that I have given the matter very careful consideration and have minutely examined the reports of the engineers who were engaged in making the explorations and surveys. After having made this investigation, I find that some of the surveys are not completed, and all of the engineers have not sent in their reports, or they have not yet been given to the public. On one important section a barometrical exploration only was made, and on others of equal importance the lines have been projected on paper without any minute examination of the country having been made so far as can be gathered from the reports. Sufficient information, however, appears to have been collected to establish the fact that

A VERY FAVORABLE LINE,

with easy curves and low gradients, can be obtained which will shorten the distance between Montreal and Halifax by about 140 miles as compared with the present route over the Intercolonial and Grand Trunk, while by utilizing the same line there would be a saving of distance between Montreal and St. John of about 270 miles. This proposed line will be found clearly shown on the accompanying map, which for the most

part is a reduced copy of the official map presented to Parliament by Mr. Schreiber, the chief engineer of the government railways. The various lines which have been surveyed, explored and projected will also be found traced out upon the map. From the best information which I can obtain, the distance from Quebec to Montreal via either the North Shore railway or the Grand Trunk is the same, viz: 172 miles. From Quebec to Halifax, via the Intercolonial railway, is 678 miles, and to St. John 579 miles, so that we have at present to traverse and to transport freight by rail:

From Halifax to Montreal.....850 miles.
" St. John " " .....751 "

THE OBJECT OF THE EXPLORATIONS

and surveys of the past season is generally supposed to have been to ascertain, by measurement, the most direct and favorable route for a railway "connecting Montreal with the harbors of St. John and Halifax," so as to avoid the long detour rendered necessary by traversing the whole length of the Intercolonial railway. This object cannot be said to have been attained in a perfectly satisfactory manner while some of the sections, or links, in the line remain only partially surveyed and others unexplored. In the parliamentary return requiring the engineers' reports to be submitted, no reference is made to St. Andrew's, or to any surveys having been ordered in that direction. Attention is called to this fact because in the official report greater prominence is given to certain lines to and by that port than to others that from engineering, commercial and patriotic standpoints appear to be less objectionable, and that would, while only slightly increasing the distance to St. Andrew's answer its requirements equally well

ONE OF THE PRINCIPAL DIFFICULTIES

at present in arriving at a perfectly clear and satisfactory understanding of the whole case, is that there appears to be a diversity of opinion between Mr. Schreiber, the engineer-in-chief of the Dominion railways, and Mr. Light, the chief engineer of government railways for the Province of Quebec, as to the distances and gradients which can be obtained over rival routes. Mr. Schreiber had the general oversight over all the surveys which have been made, while Mr. Light had the direct

charge of one of the surveying expeditions through the Province of Quebec and State of Maine, and from a life-long experience with the railway systems of the Lower Provinces and an intimate knowledge of the country traversed, should be in a position to speak positively, which he certainly does.

If, for the reasons I have given above, we leave St. Andrew's out of consideration,

THE CASE WILL BE GREATLY SIMPLIFIED.

This, moreover, ought to be done for other reasons, viz: In the official report to which I have alluded, the link to be constructed connecting Mattawamkeag with St. Andrew's is stated to be 58 miles in length. This line has never been surveyed, and the country is stated to be most unfavorable for railway construction, requiring excessive gradients and sharp curves. If, however, the official government map is reliable, the distance will be found to be more nearly 70 miles, providing ten per cent. is added for curvature, which has been the general rule followed in similar cases. It therefore appears to be improbable that this line will be built for many years to come, if at all, and the traffic to St. Andrew's will be forced round by way of the E. and N. A. railway, adding very materially to the distance. Practically the length of the line from Montreal to St. Andrew's will then become 450 miles, a great portion of which would be

OVER AN INFERIOR ROAD,

with seventy-four feet gradients, while another long section would be through a poor and rocky country which it appears desirable to avoid.

The official report refers to thirty different alternative lines, ten of which have been projected to Halifax, ten to St. John and ten to St. Andrew's. For the reasons stated above, the latter ten lines do not appear to require any special consideration, while twelve of those remaining are swept far northwardly out of the direct course and involve utilizing 113 miles of the New Brunswick railway, which is a road having eighty-five feet gradients and ten degree curves. These latter twelve projected lines are, therefore,—for commercial purposes—useless to the maritime provinces, and require no further reference, as the existing Intercolonial railway will answer our requirements quite as well and perhaps better. Halifax

has always contended for the "shortest and best" route that can be obtained. If by survey it were shown that a certain defined line is the "shortest" it then becomes necessary to ascertain if the various summits to be overcome, the gradients, curves, engineering features, and character of the country are such as to warrant its being pronounced "the best." In the present case

THE REPORT PRESENTED TO PARLIAMENT

shows line No. 6 to be the shortest and best to Halifax, or in the exact words of the report, "it takes the first place." This line after leaving Montreal crosses the St. Lawrence by the Victoria bridge and runs almost in a direct line to Chambly over the Montreal, Portland and Boston railway, a distance of twenty miles. From thence it follows the projected line marked on the accompanying plan to Lennoxville, eighty miles: thence over the International railway to Megantic, eighty-nine miles: thence by the projected line through the state of Maine to Mattawamkeag, one hundred and thirty six miles; thence by the E. and N. A. railway to McAdam Junction, sixty-two miles; thence by the St. John and Maine railway to Harvey, nineteen miles; thence by the projected unsurveyed line via Fredericton to Salisbury, a disputed distance stated in the report to be 113 miles; and from thence the line follows the Intercolonial railway into Halifax, 201 miles. The total estimated distance between Montreal and Halifax by this route will thus be seen to be 720 miles, while by adhering to the same lines as far as Harvey, and from thence following the St. John and Maine railway into St. John, the distance to the latter port from Montreal becomes by the above estimation 472 miles. It will be seen that in projecting this route, and in fact all the southern routes upon which reports have been made, that no reference has been made to the Lachine bridge, or to a line running into Montreal via Lachine. This would add about twenty miles to the distance referred to above, (vide Mr. Light's report), so that the actual length of the line would be:

From Montreal to Halifax.....740 miles
" " to St. John.....492 "

AN EXAMINATION

into the reports of the subordinate engineers engaged upon the

surveys, shows that the engineering difficulties to be encountered and objectionable features, are by no means insignificant; that very long and heavy gradients have to be overcome, and that a large portion of the country traversed is of little value. Mr. Davy, who had charge of the surveys from Chambly to Lennoxville, reports that "the eastern half of this survey passes through a difficult country for railway location." The International railway from Lennoxville to the international boundary is known to be a very crooked location, with gradients of 74 feet per mile. Mr. Spoffard, who had charge of the surveys from the international boundary to Mattawamkeag, reports that a large portion of the ground passed over consists of "a gravelly soil mixed with more or less rocks and boulders." On the existing railway from Mattawamkeag to Harvey, which it is proposed to utilize, the gradients and curvatures are not yet given, and the projected connecting link from Harvey to Salisbury on the Intercolonial railway has not been surveyed; the distance however, is stated to be 113 miles. This link is common to a large number of projected or proposed lines; it is stated to be through favorable country requiring neither steep gradients nor sharp curves, and it is of considerable importance to Halifax that it should be constructed, no matter which "short line" (exclusive of those running to the extreme north) may be selected. On the above described route the total mileage requiring to be built is given as 329 miles to reach Halifax and 216 to reach St. John, but if the extra distance to Lachine be added this mileage becomes about 354 and 241 respectively. If we now turn our attention to the surveys projected across the country from the vicinity of Quebec, it will be found, if any reliance is to be placed in the statements of the engineers who have examined the ground, that

A SHORTER, CHEAPER AND SUPERIOR LINE,

passing over much lower summits, with easy curves and moderate gradients, involving no engineering difficulties and free from most of the objectionable features of the more southern route, can easily be obtained. This line has been advocated by Mr. Light and is shown on the accompanying map by heavy dashes marked "Combination line." Although this route presents the strongest possible claims for favorable consideration, it is not shown upon the government map, nor is it referred to in the report. It passes through a country

which is said to need railway facilities and development, it does not involve the construction of as many miles of new railway as the southern route described and it can be much more cheaply built and operated. For the above reasons, in the interests of the port of Halifax and the Maritime Provinces and in the common interest of the Dominion, I would most strongly urge upon your committee, the government of the province, the city council and the chamber of commerce, to leave no stone unturned to procure, if it is possible to do so, the adoption of this route, and to spare no pains to prevent by all legitimate means the selection of a line which must inevitably have the effect of diverting to foreign ports the bulk of that traffic to and from the west which is ours by right and will deprive us of our last visible chance of regaining commercial prosperity. In describing the Combination line, which is recommended to your favorable consideration, I will first give the distance as measured and calculated by Mr. Light, and over those portions of the route which are common to other projected lines I will afterwards refer to any apparent discrepancies in measurement when compared with the distances given in the official report to the government.

THE "COMBINATION LINE"

is proposed to run from Montreal to Chaudiere Junction over the North Shore railway, 173 miles, crossing the St. Lawrence by the contemplated bridge at Cap Rouge, near Quebec. From Chaudiere Junction the line would traverse the valley of the Etchemin and Famine rivers, and thence would run in nearly a direct line to Lake Chesuncook, 105 miles. From Lake Chesuncook to Canterbury, 111 miles, the line follows the survey of Mr. Vernon Smith. From Canterbury to Salisbury, 121 miles, it would either go direct to Fredericton or by way of Harvey and Fredericton. From Salisbury to Halifax, 200 miles, the Intercolonial railway would be followed. The total distance between Montreal and Halifax by this route will thus be seen to be 710 miles, of which 337 miles require to be built, while to St. John the distance would be 481 miles, with 242 to build, or, in other words, there would be a saving over the southern route of thirty miles from Montreal to Halifax, and eleven miles between Montreal and St. John, while there would be

ABOUT SEVENTEEN MILES LESS

of new road requiring construction. By utilizing the Grand

Trunk railway instead of the North Shore line, the distance from Montreal to Halifax would be 703 miles, and to St. John 473 miles. On certain sections there are minor discrepancies between Mr. Light's figures and those given in the official report presented to the government, which are too insignificant to demand any special notice, as they do not exceed one mile in each instance. The greatest difference is in the distance between Canterbury and Moncton, Mr. Light giving it as 134 miles, whilst the report makes it 152. If the figures in official report are correct, this would add eighteen miles to the length of the "Combination line" to Halifax, but would not affect the distance to St. John nor the superiority of the line over the southern route. It is probable, however, that each set of figures is practically correct which will be more clearly understood by reference to the map, Mr. Light having most likely estimated the distance by the shortest possible line passing through Fredericton, while the line on the government map makes a detour round by Harvey. Mr. Light stakes his professional reputation upon the accuracy of his figures and assertions. He says: "I repeat that maximum grades of thirty-five to forty feet per mile and maximum curves of four degrees can be obtained all the way from Quebec to Moncton on the "combination line." This statement alone should be sufficient to weigh heavily against the best southern line that can be selected for comparison, even though it could be proved conclusively to be many miles shorter, as it is known that in following the latter, seventy-four feet gradients and at least six degree curves must be used. Mr. Vernon Smith, who conducted the survey over a large portion of the "Combination line," reports as follows: "On the whole the route proposed presents a very favorable line for the construction of an economical first-class railway * * * * By slightly increasing the earth works I believe that on a re-survey the

OBJECTIONABLE POINTS MAY BE GREATLY IMPROVED,

and the whole distance from Harvey to Chesuncook may be covered with gradients not exceeding thirty-five feet per mile, and with no curve exceeding three degrees or 1,910 feet radius." A great deal more might be said in favor of this line which I have advocated, but I feel that this report has already too great a length. I might, however, add that while it has been shown that a short and practicable line 710 miles in

length can be obtained which will connect Montreal and Halifax, the distance over which freight has to be transported to points further west can be reduced by thirty miles by the construction of a cheap line ten miles in length over a level country between St. Therese on the C. P. railway and Terrebonne on the North Shore railway. A further reduction of some fourteen or fifteen miles could also be effected at some future time, if the traffic should warrant it, by taking out the unsightly and unnecessary kinks in the Intercolonial railway in the vicinity of Dorchester, in New Brunswick, and Londonderry, in Nova Scotia.

Respectfully submitted,

E. H. KEATING,
*M. Inst. C. E.*

# Letter of E. H. Keating, City Engineer, to His Worship the Mayor, in reference to the Short Line Railway Question.

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CITY ENGINEER'S OFFICE, July 9th, 1885.

*To His Worship the Mayor, Chairman of Short Line Railway Committee:*

SIR,—As requested, I have looked through the various letters and reports on the "Short Line Railway" which have been published in our local papers during my absence from the city, and also the printed debates in the House of Commons on the same subject. A perusal of these documents tends to divert one's attention from the real question at issue, viz:—

WHICH IS THE "SHORTEST AND BEST LINE"

that can be obtained connecting the Canada Pacific Railway at or near Montreal with the harbors of St. John and Halifax? This is the vital question now agitating the minds of the people of the Maritime Provinces, and it is of the very first importance to the inhabitants of this and the neighboring Provinces, but more especially to the citizens of Halifax, that not only the 'shortest' practicable route, but the 'best' commercial line should be selected. By the best commercial line I mean the line which will, by the advantages it can offer in the way of low summits, easy curves and gradients and economical working, be most likely to be utilized as the main trunk line for carrying heavy freight, mails and passengers

between the sea board and the far west. We must not allow ourselves to be carried away by the various side issues which have been and are continually being raised, apparently for no other purpose than to cause bewilderment, nor should we allow our judgment to be prejudiced, either on the one side or the other, by the attacks which have been made upon the character, veracity and professional standing of the prominent engineers who have so ably advocated different rival routes. With

THE CONTROVERSY BETWEEN MR. SCHRIEBER AND MR. LIGHT

I do not concern myself. They may be allowed to settle their own differences. When I was directed to report upon 'the line which would best serve the requirements of the Maritime Provinces, looking specially at the interests of Nova Scotia,' I examined most carefully the maps and reports of each of those gentlemen and I stated in my report to you, dated 12th June, where I found the greatest difference between them to be. Not satisfied with that examination I delved into the reports of the subordinate engineers who had the direct charge of the surveying expeditions. The result of my labors has been given to you in my report. I cannot be accused of having any political or personal interest to serve; on the contrary I may expect much loss, as I have been and am still a supporter of the Government, but I consider that when the best interests and business prospects of my native Province and city are threatened with annihilation it is about time to lay aside party feeling, and that every man in the community who is worthy of the name should be patriotic enough to forget his politics for the time and work heartily and fearlessly with the view to obtaining for our country and city at least some share of the trade and commerce of the interior, which we have the undoubted right to expect. The Government have promised repeatedly that they would not adopt any but the 'shortest and best line' that could be found. This promise they are now asked by the people of this Province and city to fulfil.

THE QUESTION IS,

do the railway resolutions which have lately been introduced into Parliament, meet the case in the face of the fact that not one of the projected lines has been thoroughly surveyed?

I think any unprejudiced person will admit that they do not meet the case in a manner which can be considered satisfactory, especially when we reflect that there is a wide diversity of opinion among able, competent and prominent engineers as to which is really the 'shortest and best line.' Under these circumstances it seems to me that we have the right to demand that all proceedings be stayed until a thorough investigation has been held. I repudiate the idea that my report was drawn up, governed or moulded in any way under the influence or suggestion of any person. My opinions were formed after a careful study of the official maps and reports presented to the Government by their own officers, and I fail to comprehend how any consciencious man having the interests of his country at heart, can—after thoroughly investigating the reports of the Government surveyors—arrive at any other conclusion than that the line via Sherbrooke or Lennoxville and Mattawamkeag is

ONE OF THE WORST THAT COULD POSSIBLY BE SELECTED

in our behalf. Its many objectionable features are so great that it can never be made a first-class trunk line, heavy trains cannot be hauled over it nor light trains safely be run on it at a high rate of speed. The various high summits over which it has to pass, its many long and heavy gradients and its excessively crooked alignment are sufficient to condemn it without any further investigation, setting aside the fact that for long distances the country is barren and comparatively worthless. I have shown in my previous report that the statements made by the engineers in charge of the surveys on this line (Mr. Davy and Mr. Spoffard) are by no means favorable to its adoption. We have also the report of Mr. Moses Burpee, C. E., whose statements corroborate those made by Mr. Spoffard. He says that at one point he had to rise '740 feet in 67,600 feet, corresponding to an average rate of about 57 feet per mile' for nearly 13 miles. He, however, thinks it possible to reduce this rate to 55 feet per mile by increasing the length of the line, which of course would lengthen this heavy gradient, and as much of it must necessarily be on curvature more or less sharp, this feature is sufficient alone to condemn the whole route unless the remainder of the line should be exceptionably favorable, which unfortunately is not the case. The route has also been

CONDEMNED BY SIR CHARLES TUPPER,

our former minister of railways, who stated at a public meeting in this city that 'the people of St. John were standing in their own light by advocating its adoption,' and I have not yet heard one argument advanced in its favor which cannot be refuted by any person who will make himself familiar with the facts. The claim that it is the shortest line cannot be sustained, as I will presently show that other lines referred to in the official report to the government are shorter, even though they deflect further from the air line. It is an utter falacy to assume that a railway which keeps closest to an air line drawn between two points must necessarily be either the shortest or the best, especially where a very broken and rugged country has to be traversed. The official report gives the total distance to Halifax as 720 miles, to which however it is, I believe, admitted on all sides that 20 miles must be added to reach Montreal via the proposed Lachine bridge which it is intended to utilize, thus making the distance 740 independently of the additional mileage which will be required to overcome the summit referred to by Mr. Burpee, and the further additional length which may be necessary to get through the difficult country mentioned by Mr. Davy in his report. Now, if you refer to lines 17 and 18 as described by Mr. Schrieber you will find the total length of each to be 735 miles, showing a saving of at least 5 miles over the Mattawamkeag route. Each of these lines passes Chaudiere Junction, near Quebec, some 70 or 80 miles north of the air line. The absurdity therefore of assuming in this case that a route which is less remote from the air line is necessarily shorter, or of jumping at a hasty conclusion on a mere glance at a map will at once be apparent.

OUR REPRESENTATIVES IN PARLIAMENT

have assured us that it is useless to attempt to obtain a line via Richmond, or the central route, which is the one that was advocated by Senator Power, and which is claimed by some to be much the shortest line. The extreme northern or all Canadian route does not meet with general approval, and the southern or Mattawamkeag line has been shown to be most objectionable. It therefore became necessary to turn our attention to some intermediate or compromise route which

would be likely to meet the requirements of the case and to which no serious objections could be raised. If we now glance for a moment at the Combination line it will be found that it presents claims which cannot be lightly ignored. It is unfortunate that this route was not reported upon by Mr. Schrieber, because had he examined it, I believe he could not have failed to recommend its adoption. It is a mistake to call this Combination line Mr. Light's line, it is not his line as he did not survey it, but he has undoubtedly formed his opinions and advocated its selection after having studied the reports of the engineers who traversed and surveyed the greater portion of the route. It is also unfair to call it a 'mythical line which has no existence except in imagination.' It exists as really and substantially as any of the lines under consideration. From Quebec to Canterbury it has been surveyed and explored by engineers sent out by the Government, with the exception of a gap of about 30 miles or so to the west of Lake Chesuncook, connecting Mr. Vernon Smith's survey with Major Yule's line. For this short gap Mr. Light must be held responsible. He has examined the country and states in his official report that no serious difficulties will there be encountered, in fact it is stated that the line lies in such a low valley or depression that it would appear as being

'THE NATURAL DIRECT ROUTE

for a line of railway between the Province of Quebec and the Maritime Provinces.' If we now commence at Montreal and follow the Combination line, referring to official sources where doubts have been raised, I think the case will perhaps be better understood. I do not ask any person to be governed by my opinion, or by Mr. Light's, or by that of any other individual. It is only necessary to study the documents, but it is not sufficient to skim over them hurriedly and jump at conclusions. The Combination line from Montreal to Quebec, as has before been stated, follows the North Shore railway, which is a FIRST-CLASS ROAD, having no curve greater than 4 degrees, or 1,433 feet radius, and no gradient exceeding 50 feet per mile, with the exception of one short rise at the rate of 82 feet per mile (not 85) at Hochelaga, near Montreal, but over this the traffic to and from the west would not be required to pass. At any rate, if this short gradient is considered as fatal, why not apply the same remedy that has been put forward for the

long, steep grades on the International line, viz: improve it. The greatest rise and fall is 250 feet, while on the Intercolonial railway it is 1,405 feet. At Quebec we have the bridge to face, which, however, should not be considered an insurmountable obstacle, as we have the authority of Mr. Brunlees, the president of the institution of civil engineers of England, for stating that it can be built with a double track for $4,319,000. The cost is, however, placed at $5,000,000 to cover all contingencies, while $3,000,000 is considered sufficient if a single track only is to be accommodated. The people of

THE MARITIME PROVINCES ARE IN REALITY MORE INTERESTED

in the construction of this bridge than the people of Quebec, and it must be built sooner or later. A company, I am informed, are prepared to proceed with the work on a 4 per cent. government guarantee, which it is anticipated they would not, after a short time, be called on to pay, as there are good reasons for believing that the traffic over it would be large and the enterprise would prove remunerative. The building of the Lachine bridge will not prevent the bridge being constructed at Quebec, while, if both are built, there is the risk of unnecessarily increasing the burdens of the country. From Quebec the Combination line follows Major Yule's survey of 1837. This was the original line surveyed for the St. Andrew's railway and it certainly should not be called 'mythical.' Mr. Wickstead, C. E., has recently made a re-examination for the Government of the same or nearly the same route and he reports that no gradient need exceed 50 feet per mile, 'and that only for short stretches' and no curve is required of less radius than 1,200 or 1,300 feet, while the work would be light, We now come to the short gap examined by Mr. Light, which is represented as a low lying valley presenting no difficulties, and this brings us to the head of Lake Chesuncook from which point to Canterbury and Harvey the surveys were conducted by Mr. Vernon Smith. I gave in my previous report extracts from Mr. Smith's report to the Government, showing that 'the route presents a very favorable line for the construction of an economical first-class railway, with easy curves and gradients.' He estimates that the average cost per mile would be only $16,279, which is sufficient to show that the country traversed must be exceptionally favorable. From Harvey the Combination line merges into that known as 'Line No. 6,' which

has been recommended by Mr. Schrieber, so that no further description is needed. I would conclude by saying that if an appeal to the Government to suspend judgment until a proper investigation has been held into this matter should not meet with success, that it seems to me our proper course is to petition his Excellency, the Governor-General to withold his sanction to the measure and that nothing should be left undone to prevent the granting of public money to an enterprise that will be ruinous to the prospects and interests of the Maritime Provinces, but especially to this port.

I have the honor to be,

Your obt. servant,

E. H. KEATING,

*City Engineer.*