SPAM 16539



# LETTER

TO THE

# SECRETARY OF STATE, CANADA,

IN REFERENCE TO THE REPORT OF THE

# CANADIAN PACIFIC RAILWAY ROYAL COMMISSION.

Y SANDFORD FLEMING,
Past Engineer-in-Chief.

*PRINTED BY ORDER OF PARLIAMENT.*

OTTAWA:
PRINTED BY MACLEAN, ROGER & CO., WELLINGTON STREET.
1882.

# LETTER

(48*cc*)

To the Secretary of State, Canada, in reference to the Report of the Canadian Pacific Railway Royal Commission, by Sandford Fleming, Past Engineer-in-Chief.

---

OTTAWA, 1st May, 1882.

The Honorable J. A. MOUSSEAU, Secretary of State.

SIR,—The Report of the Canadian Pacific Railway Commission, dated 8th April last, submittec recently to Parliament, has introduced my name in a form which renders it necessary that I should ask permission to address you.

I feel it due, not simply to myself, but to each of the three several administrations which I served as Engineer-in-Chief of the Pacific Railway, that I should point out that the criticisms of the Commission are not sustained by the facts of the case, and are even at variance with the evidence submitted.

I am not now an officer of the Government.* As a citizen of the Dominion, I know no more fitting course of vindicating myself and the Department with which I was connected, than officially addressing you on the subject, and requesting that this communication be submitted to Parliament and placed in the public records by the side of the accusations which have been published.

The Royal Commission consisted of three gentlemen, who were commissioned on the 16th June, 1880, "to make enquiry into and concerning all the facts connected with, and the conduct and prosecution of the Canadian Pacific Railway from its inception."

I fully recognize that the Commissioners undertook an onerous duty and assumed responsibilities of no light order. They were expected to make enquiries into every circumstance which arose throughout a period of nine years, in connection with a work unequalled in its peculiar character in the annals of the country. The dignity of their Commission demanded of them strict impartiality. They were called upon to throw aside all bias and foregone conclusions and to form a correct conception of the magnitude of the matter to be investigated, and of the difficulties which had to be surmounted by those whose conduct they were called upon to invesitgate. They were expected to manifest a generous appreciation of the efforts made to overcome difficulties and advance the work in hand. And generally it was their duty to be fair in their examinations and just in their conclusions.

It would be an ungracious task for any one to venture to suggest that the Royal Commission had failed in their duty. The task is rendered doubly unwelcome to me, from the fact that their report is, to a large extent, a Bill of indictment against the Engineer-in-Chief and the Department with which he was connected.

My duty, however, is plain if it be unpleasant. It seems to me that the Commission have, in their examination of witnesses, displayed a decided one-sidedness, and they have evinced an unmistakeable *animus* throughout their report. They have suppressed evidence of importance which I submitted, and they have brought against me grave charges on the testimony of hostile witnesses, without asking me a single question on the points raised against me, without affording me an opportunity of giving any explanation, and without the least knowledge on my part that such charges were made until I read them after the Report was laid before Parliament.

---

* See Appendix No. 11.

I am aware that in directing attention to these facts I am undertaking a duty which some may characterize as Quixotic, and that I shall incur the severe displeasure of partizans and of those whose influence caused the appointment of the Commission. Be that as it may, I must protest against injustice. I feel very strongly that the charges preferred against me, with all the weight and authority of a Royal Commission, are wholly unmerited. My personal character and professional reputation are both assailed, and I cannot remain under the burden of the obloquy cast upon me without an attempt, however feeble, to remove it.

I shall, in the first place, very briefly refer to some of the circumstances which led to the appointment of the Royal Commission:—

1. A large sum of money had been expended under three distinct Administrations:

(1) On the surveys, which began in 1871.
(2) On construction, which began in 1874.
(3) In the purchase of steel rails in 1874 and 1879.

2. Committees of the Commons and Senate had been appointed in the years 1875, 1876, 1878 and 1879 to enquire into various matters, among others: the expenditure of the Engineering Department, through Mr. William Wallace; expenditure on the Georgian Bay Branch; the route of the railway west of Keewatin; alleged irregularities in awarding contracts; expenditure on the Fort Frances Lock; on the purchase of steel rails; on the purchase of land at Fort William; expenditure on telegraph construction, and on other matters directly and indirectly connected with the railway.

3. The evidence taken at these several examinations was voluminous. By virtue of my office, I was generally in the position of principal witness, and not seldom had to pass through an ordeal of examination and cross-examination, by opposing politicians, who desired testimony that would serve party purposes. My invariable rule was to conceal nothing and to defend all proper acts of the Department to which my office was attached. This course did not give satisfaction to all. Partizans expected that when the Government changed, I should change too and join them in traducing the previous Administration. I declined to lend myself to party. It only concerned me to act for the best under all circumstances, and loyally uphold the acts of the Department. This course more than once led to serious difficulties; but it was the only course open to me with honor, and if in the same position again, I would follow no other course.

4. I may recall to mind the state of affairs for two years following the advent of Mr. Mackenzie's Administration when, day after day, during the sitting of the Committees, I gave evidence which was unacceptable to many of the Government supporters of that day, some of whom never fully forgave me. When the present party came into power the same experience was repeated; it was intensified by the fact that the previous Administration had the Pacific Railway under control for five years, while their predecessors had it for only two. It became my duty, as chief executive officer, to defend the acts of the Department under the Reform Administration. I was prepared to serve the new Administration as faithfully as the past, but I could not turn round and calumniate those I had previously served. Hence, a bitter feeling arose against me among some of the supporters of the present Government, which with concurrent circumstances of less importance, brought matters to a culmination.

5. Grave charges were made in the House of Commons; every one of which I fully disproved in a memorandum dated, 26th March, 1880, appended.* This was followed by a caucus, referred to at page 1697. At this caucus, the hostile pressure was great and the Government promised the appointment of a Royal Commission to investigate matters.

After the lapse of two years the Royal Commission has failed to substantiate the charges made against me in 1880. They re-affirm only one of them, viz:—that "I

* See Appendix No. 1.

unwisely advised the Government with respect to the bridging of Red River," an accusation which I will refer to presently. The Commission have dropped all the other charges, but they have raised new issues. There is scarcely one of the first 177 pages of their Report, which does not refer to me. A reader of the Report of the Commission, without a knowledge of the facts, could come only to one conclusion, viz: that three successive Administrations had employed a man to conduct the heaviest works ever undertaken by Canada, whose one aim and object was to do everything the way in which it should not be done.

It would take almost as many pages as the Commission have written, to meet in detail all the accusations they have made and the censures which they convey. The task would moreover be most distasteful, as in exonerating myself, I would in many instances be compelled to place blame on others. Those with whom I have been long associated, will attest that I have ever sought to avoid such a course; indeed, I have often borne blame and responsibility which should have been shared by others. I propose to depart as little as I possibly can from my usual practice, in the explanation and defence which I now submit, and I shall refer only to the most serious accusations with which I am specially arraigned by the Commission.

1. It is charged that I incurred unjustifiable expense in prosecuting the preliminary surveys, and that I should have conducted operations in some other way.

2. I am charged with neglect of duty with regard to what is known as the "Muskeg Question."

3. The charge is renewed that I unwisely advised the Government with respect to the bridging of Red River at Selkirk.

4. I am charged with ordering an unnecessary survey from Gardner Inlet to Lake Francois, in British Columbia, resulting in waste of time and money.

5. I am charged with recommending the purchase of 50,000 tons of steel rails in 1874, without any defined view as to the times at which they would be wanted.

I propose to take up these charges *seriatim*. Before doing so, I desire to refer to documentary evidence which the Commission have suppressed.

DOCUMENTS.

(A) Sandberg's diagram, showing the average price of iron and steel rails for 20 years, ending with 1874.

(B) Letter to the Secretary of Department of Secretary of Railways and Canals; in reference to certain evidence given by Mr. Horetzky, dated 22nd June, 1881.

(C) Order in Council in reference to saving in cost of construction of Sections 41 and 42, dated 18th June, 1880.

(D) Letter to the Minister of Railways and Canals in reference to saving to be effected in construction of sections 41 and 42, dated 14th June, 1880.

(E) Letter to W. T. Jennings, Engineer in charge of Section 42, in reference to saving in cost of sections 41 and 42, dated July 16th, 1879.

(F) Unofficial letter to Hon. Alex. Mackenzie, Minister of Public Works, enclosing memorandum on the construction of the Pacific Railway, and with reference to personal charges, dated 30th September, 1874.

(G) Memorandum in reference to the construction of the Canadian Pacific Railway and settlement of the North-West Territory, dated 29th September, 1874.

Copies of these seven documents are appended. They were sent under cover, on the 14th January last, to the Secretary of the Commission, with the request that they would be taken as part of my evidence. That they were received there can be no doubt, as the one marked G. is printed with the Report of the Commission. The remaining six have not been published, and, with one exception, have not even been noticed.

*Document A.*—This document is important in connection with charge No. 5 above. The Commission have published a document, at page 170, purporting to have been put in evidence by me, but it is not a copy of document A, and conveys quite a different impression.

*Document B.*—This should clearly have been published. After my examination was closed the Commission allowed a bitterly hostile witness to give abusive evidence against me at great length (pages 1700 to 1732.) I asked only the publication of this single communication to meet all the statements. The refusal of the Commission to publish this document or notice it is the more extraordinary, as it was also placed in their hands by the Secretary of the Department of Railways and Canals during his examination, nine months before the date of their report.

*Documents C, D* and *E* are in reference to Sections 41 and 42, and the steps taken to secure the completion of the work in a satisfactory manner within the estimated cost.

*Document F* is in reference to personal charges in connection with land speculations.

*Document G.*—This will be referred to when I come to consider charge No. 5 above.

### Charge No. 1.

*(Preliminary Surveys.)*

Whatever special pleading may urge to the contrary, the country of British Columbia and of the Hudson Bay Territory, when the railway was first proposed, was an unknown land, as far as its capabilities for a railway could be considered. Indeed what limited knowledge we then had was unfavorable, and doubts were freely expressed as to the possibility of establishing a line of railway north of Lakes Huron and Superior as well as through the Rocky Mountains to the Pacific. Ample proof could, if necessary, be adduced on this point. I need only refer to the Report of the Minister of Public Works for the fiscal year ended 30th June, 1873, an extract from which is appended.* As the Commission have either been unable to grasp the magnitude of the undertaking, or have endeavored to belittle the difficulties of the case, I have to direct special attention to the first two paragraphs of that Report.

When I was asked to assume the various duties intrusted to me by the Government, prompt and energetic action was demanded. In the terms of Union of British Columbia with the Dominion it was stipulated as follows:—

"The Government of the Dominion undertake to secure the commencement simultaneously, within two years from the date of Union, of the construction of a railway from the Pacific towards the Rocky Mountains, and from such point as may be selected east of the Rocky Mountains toward the Pacific, to connect the sea-board of British Columbia with the railway system of Canada, and further to secure the completion of such railway within ten years from the date of the Union."

This stipulation was referred to in the Speech from the Throne at the opening of the Session immediately following the Union. It was forcibly impressed upon Parliament by Sir George Cartier, in introducing the Pacific Railway Bill and on other occasions. He stated "the Government had no other alternative than to come before the House this Session, in order to carry out the covenant with British Columbia, and propose a scheme for the construction of the railway. The condition of Union with British Columbia was that the road should be commenced in two and completed in ten years. * * * He regarded it as not only possible, but as a certainty that the whole work would be completed in ten years from Fort Garry west to the Pacific and east to Lake Nipissing."—(*Hansard* page 735).

I did not seek the position of Engineer-in-Chief, and it is not surprising when Sir Hector Langevin, then Minister of Public Works, in a manner which I will not soon forget, induced me to accept it, that I hesitated. I could form some idea of the work I was asked to undertake, having, ten years previously, carefully considered the question of a Pacific Railway and given my views to the public in a *brochure*,† which has frequently been cited in Parliament by members on both sides; I had, therefore, some conception of the responsibility I was requested to undertake, and it was with great diffidence and anxiety that I was induced to accept the position offered me.

* See Appendix No. 9.

† *Vide* Sessional Papers, Province of Canada, 1863.

When I entered on my duties it was not for me to assume that the covenant with British Columbia, the words uttered by the Governor General from the Throne, the repeated expressions of the leaders of the Government, in Parliament and out of Parliament, were without meaning. I was bound to take them literally and do the best I could. As a public servant with an important trust thrown upon me, I felt it my imperative duty to leave nothing undone on my part to carry out the terms as they were setforth.

It is easy for men, sitting on a Commission ten years after the duty to solve the problem was thrown upon me, to say that the solution was easy, and to add that some other way than that taken would have been better and cheaper. They entirely overlook the fact that I was obliged to adapt myself to a state of things which I found existing at the period when the work was first conceived. Then but little positive information was available and every fact, in order to be correctly known, had to be sought out.

There were not a sufficient number of thoroughly efficient and practical men in the country to aid me in carrying out the work of preliminary explorations in what might be deemed the best way. There were not the same number of efficient assistants as now. The few capable men in the country could not be spared from the Intercolonial Railway and other public works then in progress. Ten years' experience has been gained, and many excellent young engineers have been trained or completed their training since the time in question.

I could only take the material available and make the best of it. I was called upon to do a work requiring a great number of highly skilled men when they could not be had, and, in consequence, I was obliged to adopt means to perform the service largely by partially skilled men. It was not a question of money, it was a question of men. The Government would not have thanked me to have informed them that it would be better to wait until a sufficient number of the proper kind of engineering assistants came to the country or were trained in the country. By so doing I would have been laughed at, and the proposition scouted had I urged that some saving might be effected by waiting. I was placed in the position of a general during an emergency who had no reserve of veterans to draw upon, and who, at short notice, had to raise a force for a campaign. Long after the battle is fought and won, wiseacres might argue that the battle cost too much; that it ought to have been fought by half the number of trained soldiers in another way altogether.

The whole of the judgment passed upon me by the Commission seems to turn upon the difference of cost between two kinds of surveys. My evidence and my instructions, which I read to them, establishes that I adopted both kinds of operations, separately and combined, wherever and whenever it was desirable and possible. It is perfectly true that my plans sometimes miscarried; I disclaim all pretensions to infallibility or any extraordinary degree of foresight, but I think I am justified in saying that failure was not always due to the plans laid down, it was sometimes due to the men placed under me, to carry them out, and frequently to causes beyond the control of any person. The question of this or that kind of survey was, at the time, one of expediency, and really was dictated by the circumstances of the hour. The Commission now view it by the light of all our present information, which the labor of years has furnished. Long after the work is done it is impossible to judge of the expediency of any particular survey, or to explain all the conditions by which we were governed. We were seeking to gain facts, we had a wilderness to operate upon, and for a time we were working in the dark. I do not pretend that, in that gigantic work, our labor was wholly free from miscalculation, but I can honestly say we acted with deliberation, and did our best under every circumstance.

### Charge No. 2.

### (*Muskeg Material.*)

The Commission mete out severe censure on the muskeg question, as the following extracts indicate:—

"The engineering of this period is marked by an unfortunate omission, for which we find no excuse."—p. 75.

"Enough has been said to make it manifest that the country has had but poor compensation for the money spent on excavation through muskegs. This, however, would not show that the loss is due to an oversight in the engineering."—p. 79.

The Commission proceed to blame me for not "learning before locating and contracting for the construction of the road-bed, the nature of the material which was likely to be met with in the prosecution of the work. The serious omission to which we have here called attention would not have occurred, had the Chief Engineer and his subordinates acted on the elementary principles of railway engineering."—p. 81.

The Commission appear to have made some researches in engineering literature in support of their accusation and they base their criticisms on the views expressed in a text book written by a professor in a college in Scotland.

They quote Professor Rankin and lay great stress upon the necessity of "Trial pits and borings," "in order to ascertain the strata of the ground, borings are the less costly in time, labor and damage to ground, &c." (Professor Rankin, page 81.)

Do the Commission mean that in equipping the various surveying parties with stores of food and clothing, with shelter, with axe men and axes to force a passage through the forest and with packmen to carry supplies for all, that I should still further have increased the impedimenta? In all seriousness do they mean that I should have added boring implements and gangs of men to work them, with the additional food and shelter which these extra men would need? Suppose I had so acted, would not the Commission have had some grounds for censuring me for absurdly wasting public money.

It is one thing to cite a sentence from a college text-book, to sustain a far fetched argument; it is another to know what is reasonably expedient, and to carry into execution what is really practicable.

The Commission, sitting in their room in Ottawa, must have been reminded of matters which attracted attention twenty years ago, and in which one of its members filled a prominent place. I refer to the enormous amount sunk in the foundations for the Parliament Buildings, by which the estimate and appropriation were so largely increased. On that occasion the principal officer of the Department of Public Works was censured for not having an examination made of the ground where the buildings were to be placed. The principal officer referred to is now one of my accusers, and he must know perfectly well that the cases are totally different. The examination of the ground for a massive building is an every day occurrence; that of the site at Ottawa might have been accomplished at any time in less than a fortnight. In the other case, such examinations are not common; they are not as a rule deemed necessary in this country, and in all probability had they been ordered it would have been necessary to delay construction for another year.

The Commission in one sentence pass censure because the surveying parties were unnecessarily expensive; in another they blame me for not making them more expensive still by adding more men, by dragging through forest and swamp, across rivers and lakes, the tools and machinery to make borings.

In a country like England, with good roads and good inns everywhere, and where land damages are an important factor, the practice may without difficulty be observed, but it certainly is not common in America.

At quite a different stage of the work, viz.: as construction advances, boring is sometimes resorted to, but the process is slow and tedious. A whole summer was spent in making the borings at one river crossing on the Intercolonial Railway.

I have yet to learn that the practice, which the Commission condemn me for not observing, is observed any where. I ask, is there at this moment any gang of men, with boring implements, "ascertaining the strata of the ground" on any of the new lines under survey in Ontario or Quebec?

I state, advisedly, that notwithstanding all the experience of the past there is not a single boring instrument in use to-day in the manner and for the purpose referred to by the Commission on any one of the surveys now being made by the Canadian Pacific Railway Company at any point between the Atlantic and the Pacific.

The first sections were hurriedly, possibly too hurriedly, placed under contract, but it will be remembered there was a great deal of pressure from members of Parliament to have a commencement made. Outside of Parliament the press and the public clamored for the prosecution of the work.

It became a political necessity that the work should be started, and however anxious I was to have the fullest information before commencing construction, it was imperative that the wishes of the Government should be met. Accordingly, I did what I could with this view and accepted all the information furnished by my assistants as the data for letting contracts.

At pages 78 and 79 the Commission describe a difficulty which presented itself some time after the contracts were let. It was discovered that a peculiar material, known as muskeg, was used, and to some extent its use was unavoidable in forming embankments; but there was no specific provision in the contracts for employing muskeg in work and paying for it as such. The existence of muskeg and the necessity for using this material in such large quantities in the formation of the railway, was not anticipated when the contracts were entered into.

In my evidence, questions 19,498 to 19,549, and questions 21,915 to 22,029 Appendix No. 10, I have fully explained my views on the muskeg question. It will be perfectly plain to the reader of the evidence, that I am in no way responsible for the difficulty which has arisen, or for any payment to the contractors on account of the use of this material. The difficulty arose during my absence from Canada.

I knew nothing of it until my return, and when the matter was brought under my notice, I at once instituted an enquiry and directed that certificates should be stopped, and, as a matter of fact, no farther certificates for muskeg were issued up to the day I ceased to be connected with the works.

I point out in my evidence, the course I would have followed, had I been acting as Chief Engineer, and at pages 1654 to 1658, I describe the action I did take when I returned to Canada in the fall of 1878, and resumed my duties.

A perusal of the evidence referred to will clearly establish that no blame is due to me, and that the censures of the Commission are entirely misdirected.

### Charge No. 3.

*(Bridging Red River.)*

In the performance of my duty, I recommended Selkirk as the point of crossing Red River, with the view of avoiding all contingency of interruption to traffic by inundation; and the possible cost of reconstruction of works swept away by floods and for other reasons set forth in my Report (1880).

Before advising the Government on this question, I had made myself acquainted with the facts of the case. My reasons are given at length in my Report, pages 264 to 265, and nothing has come to my knowledge since to lead me to change them.

The Commission do not endorse my opinion; they stigmatize the choice of Selkirk as an unfortunate one.

Current events are throwing some light on the subject since the Commissioners' Report was issued, two bridges across the Red River have been swept away: one at Winnipeg, another at Emerson.

The full force of the reasons I gave in favor of Selkirk, as a crossing point, may not be appreciated this year, but they will be understood in due time. I do not yield my opinion to that of the Commission. I venture to say that the public will have no difficulty in judging between us at no distant future.

### Charge No. 4.

*(Gardner Inlet Survey.)*

The Commissioners, in their Report, have accused me of directing an instrumental survey to be made from Gardner Inlet to Lake François, a distance of twenty-two miles, without any object.

They say, page 87:—"We think it ought to have been evident, before the expedition was started, that no result could be reached beyond showing that a railway on that line was not feasible, and that the consequence would be as it was, no better than a waste of time and money."

It might have been thought that before passing judgment, the Commission would have requested me to furnish some explanation on this point. Is it in accordance with the first principles of justice to condemn even a criminal without being heard in his own defence? The meanest subject has a right to claim a hearing, and surely a Royal Commission should have taken means to ascertain the facts before publishing to the world censures on the conduct of an officer in the position which I had occupied.

I might, as far as this particular charge is concerned, rest my defence on the fact that I was condemned unheard; but it may be thought desirable that I should briefly submit the explanations which I would have given the Commission had they favored me with an opportunity of doing so.

It was found at an early stage of the survey that a line available for a railway could be had through British Columbia to Burrard Inlet. This line was not attainable, however, without encountering obstacles of a formidable character requiring an enormous outlay. Such being the case, the Government did not feel justified in adopting that route until every effort had been made to secure a line which could be established to the Pacific sea-board at less cost. Year by year these efforts were continued, but without marked success. Line after line was examined across the Cascades to Howe Sound, to Bute Inlet, to Dean Inlet, and then to Gardner Inlet, and still later to Port Essington and Port Simpson.

From Gardner Inlet eastward for a breadth of over 200 miles, the map was a blank—nothing was known. In 1874, explorations were commenced and an impression was formed that a favorable line could be had to Gardner Inlet, except for a short distance on the extreme western end. Further explorations disclosed the fact that a favorable line with light gradients could be secured the whole way from Lake Superior to a point within 22 miles of Kemano Bay on Gardner Inlet. At this point the elevation of the ground was less than 3,000 feet above the level of tidewater. The difficulties being limited to a short section of 22 miles, it seemed to me possible that they might be surmounted by such works as are introduced to overcome similar natural obstacles elsewhere. I may instance the works on the Bhore Ghat, on the railway between Bombay and Madras, and the Thull Ghat between Bombay and Allahabad. I explained my views to the Minister of the Department; I showed him plans and profiles in my possession of the works in India referred to, which had for years been in successful operation. As the suggestion promised a possible saving of many millions of dollars, an instrumental examination was deemed expedient, and the survey which the Commission have so strongly condemned was authorized and directed to be carried out.

It is obvious that the circumstances justified the survey, and that it was undertaken with the knowledge and concurrence of the Minister, to whom I was responsible. The survey was clearly directed in the public interests, as any impartial man must admit.

These explanations I would willingly have given to the Commission, but they did not ask me a single question on the subject; they preferred resting the accusations set forth in their Report, on the testimony of a witness, who had threatened to levy blackmail, and they had evidence in their possession that he had so acted for months before their Report was issued. Moreover, they suppressed evidence which, in the eyes of all honest men, would have weakened the testimony upon which they founded their condemnation of my act. I refer to Document B, appended.

### Charge No. 5.

*(Steel Rails).*

The Commission, at page 177 of their Report, state as follows:—"That a large portion of the 50,000 tons, now under consideration, was purchased without any

defined view as to the times at which they would be wanted. * * * That the said purchase was urgently recommended by Mr. Fleming. * * * That if the foundation for Mr. Fleming's recommendation had been enquired into, he could not have shown any, sufficient to induce an ordinary business man to purchase on speculation at that time, steel rails at the price paid for them."

I have never attempted to conceal that I recommended the purchase of the rails, but I do not admit that I had no foundation for my recommendation; and the Commission had proof in their possession that I had a perfectly defined view as to the purpose for which the rails were to be employed as well as the probable dates at which they would be wanted. At page 63 of their Report, will be found a memorandum in reference to the construction of the Pacific Railway, to which I may refer. (See Appendix No. 8, Document G.) It is dated Sept. 29th, 1874, the same date as the first advertisement for tenders for steel rails, given at page 160.

In this memorandum, which I prepared for the information and guidance of the Minister before the rails were purchased, it will be found that I recommended, among other things, that the Government, through the Department of Public Works, should proceed during the two following years with as much energy as possible to construct the following works:—

| | | |
|---|---|---|
| 1. Railway from the River Kaministiquia to Lake Shebandowan, say | 50 | miles. |
| 2. Railway from Rat Portage to Red River, say | 112 | " |
| 3. Portages between Lake Shebandowan and Rat Portage, say | 7 | " |
| 4. Railway from Red River to Lake Manitoba, say | 130 | " |
| 5. Portage Railways on River Saskatchewan, say | 6 | " |
| 6. Pembina Branch, say | 85 | " |
| 7. Railway in British Columbia, say | 100 | " |
| Allowance for sidings, branches, &c., on above, say | 20 | " |
| Total | 510 | " |

Showing indisputably that in my mind there were, at that early period, perfectly well defined views with respect to the desirability of securing all the rails shortly afterwards purchased.

My share in the purchase of the steel rails may be thus described. I had, in the performance of my duty, and at the request of the then Premier, prepared a scheme of works which in my judgment should first be undertaken. That scheme showed that rails, for about 500 miles, should be secured. The price of rails was lower than it had been for some years, and I considered it in the public interest that the rails should be purchased.

With regard to the price of rails at the time of the purchase, it simply is disingenuous on the part of the Commission to present a diagram, at page 170, as the one put in evidence by me to illustrate the fluctuations in price previous to 1874. The diagram which they suppressed and which I now append (Document A), should have been published.

Circumstances over which I had no control, prevented the rails being used so soon as contemplated in September, 1874, and the price in after years went down; but whatever the Commission may now say, the universal opinion at the time was in favor of the purchase. There were no contemporary criticisms against it.

## Conclusion.

Having completely disproved these definite charges, I may rest without taxing your patience with a refutation of the minor and less direct accusations; nor need I allude at any great length to the various insinuations and to the distortion of the meaning of the evidence. I may, however, give one instance, out of many, as an illustration. First, it will be necessary to allude to the manner in which evidence was taken. In

order that I might refresh my memory by reference to documents, I asked the Commission to furnish me with a list of the questions they were going to put to me, as I appeared before them day by day; no such list was furnished, and searching and difficult questions were often sprung upon me, with the view evidently of confusing and bringing out hasty replies, which could be twisted to a meaning other than that intended.

On one occasion I stated, in reply to a question, that "it was necessary to ascertain whether a line from end to end of the country was practicable or not, before a blow was struck." The meaning of this expression was plainly that, in the extremely difficult sections alluded to in previous replies, there should be no doubt of the feasibility of the whole line. The Commission, at page 50 of their Report, give a non-natural meaning to this statement. They coin for me an opinion by turning the expression I used to a meaning quite different from that intended. They say they understood me to mean "that a continuous line should be accurately described from instrumental data before a decision could be arrived at on the vital question—could a railway be built." Had they any doubt as to my meaning they should have placed it beyond doubt by asking another question.

I might proceed *ad infinitum* to point out the unfairness of the course taken throughout by the Commission and the *animus* which pervades their Report; but it is not possible, within the limits of a letter, to enter into the innumerable criticisms of an unfavorable character which are met in the 500 pages they have published. The Commission seem to have had one view constantly before them. They must ferret out some wrong—some dishonest proceeding; and if they cannot do more they must at least defame. In harmony with this view, they sat day after day hearing the most abusive statements from a witness avowedly hostile; they encouraged him to continue his vituperation while they knew that the hostility of the witness was due to unworthy motives. They, moreover, have founded grave accusations on the testimony of this witness, while they conceal from Parliament and the public facts in their possession which would have shown his evidence to be valueless.

The Commissioners have spent two years in investigating the early proceedings of the Pacific Railway, but they have not been able to discover one single act of mine during the whole nine years I filled the office of Engineer-in-Chief which they can commend. They do not pretend there has been fraud; they find no trace of dishonesty, but they certainly do not hesitate to cast blame in every page. Nothing was properly done, according to their finding, not even by chance or accident. Is it not therefore clear that they have been strongly biassed and unfair? Is it not perfectly evident that my condemnation was a foregone conclusion?

While I protest indignantly against the course they have followed, and their verdict as being unjust, I am willing to stand or fall by the decision of impartial men.

The Commissioners condemn the Engineer-in-Chief, but in doing so they simply condemn the Government whose servant he was. They condemn three Administrations whose wishes he consulted, and whose instructions he carried out. They pay no regard to the state of things which existed ten years ago, nor to the political circumstances which dictated operations at that period and every subsequent year.

It is obvious, from the few facts which I submit, that the three gentlemen appointed on the 16th June, 1880, have not properly, and with becoming dignity, performed the duties of a Royal Commission.

I have the honor to be, Sir,
Your obedient servant,

SANDFORD FLEMING.

APPENDICES.

No. 1.—Memorandum addressed to the Minister of Railways and Canals by the Engineer-in-Chief, 26th March, 1880.
No. 2.—Document A, suppressed by the Commissioners.
No. 3.—Document B, do do do
No. 4.—Document C, do do do
No. 5.—Document D, do do do
No. 6.—Document E, do do do
No. 7.—Document F, do do do
No. 8.—Document G, furnished the Commissioners, 14th January, 1882.
No. 9.—Extracts from the General Report of the Minister of Public Works, for the fiscal year ending 30th June, 1873.
No. 10.—*The Muskeg Question.*—Extracts from the evidence given on the examination of Mr. Sandford Fleming, 19th April and 7th May, 1881.
No. 11.—Documents relating to the retirement of Mr. Sandford Fleming from the office of Engineer-in-Chief.

## APPENDIX No. 1.

MEMORANDUM ADDRESSED TO THE HONORABLE THE MINISTER OF RAILWAYS AND CANALS BY THE ENGINEER-IN CHIEF OF THE CANADIAN PACIFIC RAILWAY.

CANADIAN PACIFIC RAILWAY, OFFICE OF THE ENGINEER-IN-CHIEF,
OTTAWA, 26th March, 1880.

(*Memorandum.*)

On the 3rd March, grave charges were made in the House of Commons, against the writer, as Chief Engineer of the Canadian Pacific Railway, which have since been published throughout the Dominion. These charges seriously affect his personal character and his professional reputation.

A member of the House of Commons has certainly the right to investigate the conduct of any public servant, if he deems it proper to do so. Equally the party assailed, if wrongly accused, may claim to be heard in his justification.

An Engineer is an executive officer of the Government, to whom the public interest is confided according to his rank and *status.* No charge can be more painful than that he has neglected his duties, or that he has failed honestly, and with ability, to consult the interests he has undertaken to protect.

It is obvious that, if called upon to vindicate his character from what he holds to be an unjust accusation, the only course open to an Engineer, in the employ of the Government, so long as he holds his position, is to address his remonstrance to the Minister at the head of the Department.

He cannot with propriety avail himself of the columns of the newspapers or of a magazine, neither can he publish a pamphlet in his vindication. To the mind of the writer it is still more objectionable to have recourse to a borrowed pen, and to get published anonymously what he holds inexpedient to state above his signature.

The writer, therefore, respectfully asks leave to address the Minister on the subject of the charges made against him in Parliament.

They may be formulated :—That the writer has recommended an ill-judged and unwarranted site for the bridge-crossing of Red River; that he was long absent in England from his duties, during which time the railway work was unconsidered, and his responsibilities neglected; that the original estimates given for the work under contract have been greatly exceeded; that he has caused needless expenditure at Cross Lake on an improper location, and that he has permitted large sums of money to be carelessly wasted.

The writer has submitted, at length, the reasons which have led him to recommend the location of the Red River Bridge. They are set forth in his Report to the Government, of 8th December, 1879, to be laid before Parliament. Subsequent enquiry having confirmed the facts he cannot change or modify his opinions. He respectfully submits that, if the question be examined, and the facts and the circumstances be fully weighed, it will be found that his view of the case will be sustained and his recommendation justified. It is known that the location recommended by him is not looked upon with favour in quarters and localities adversely interested; but his own convictions remain unchanged, and he holds it incumbent on him, in the general interest of the public, to adhere to the selection he has submitted, and to ask that the considerations which dictated it be fully examined.

On this point of the censure directed against him, he begs leave respectfully to refer to his report to the Government, and to ask for it impartial consideration.

He turns to the other issues which have been raised. The charge is unusually grave, that of having neglected his duty and allowed large sums of money to be squandered. An engineer is in no way responsible for the policy adopted by the Government in making contracts; but once a contract is entered into and placed in his hands, he is responsible to the Government, through the Minister of the Department, that it be honestly fulfilled. It is his duty to carry out and enforce its conditions, to see that the work is properly performed and full value given for the money paid. It is equally his duty to do justice to the contractor as to the public; indeed, to act as a judge between parties whose views of right are not always identical. It is, moreover, his duty to submit to the Minister any changes, in construction or otherwise, he may hold to be desirable, and, on obtaining the Minister's authority, to have them carried out.

Between 1863 and 1871, the writer was Chief Engineer of the Intercolonial Railway. From 1871 to 1876, he filled the position of Engineer-in-Chief of both the Intercolonial and Canadian Pacific Railways. In the latter year the Intercolonial was opened for traffic, and the writer ceased to act as Chief Engineer. At this date most of the difficulties connected with the Canadian Pacific location had been solved. Two sections, easy of construction, had been placed under contract; No. 13, the first section west of Fort William, Lake Superior, 33 miles; No. 14, the first section east of Selkirk, Red River, 77 miles.

The writer's health had been much affected by his labors; his medical advisers counselled rest. He himself felt that abstinence from work was indispensable. He applied, accordingly, for twelve months' leave of absence. So much a matter of necessity did this rest appear to himself, that he had determined, should the leave of absence not be granted, to resign his position, a fact perfectly capable of being established.

Before leaving, it was arranged that the Senior Assistant, on the Pacific Railway Staff, in the writer's absence, should assume his duties. Full confidence was felt in the ability, experience and reliability of that officer, and, on the writer's recommendation, the then Minister of the Department consented to the arrangement. That gentleman was placed in charge, and he entered on his duties with the title of Acting Chief Engineer.

The writer left for England. At that time Sections 13 and 14 only were under construction. The work then performed was valued at--

| | |
|---|---|
| Section No. 13 | $127,353 |
| do 14 | 102,140 |

Section No. 25 had been placed under contract as the writer was leaving, but no work had been executed. Six months afterwards the contract was signed for Section No. 15.

During his absence the writer was relieved from active direction of work, superintendence of details, and all the incidental duties appertaining to his office. Matters, however, connected with the railway were frequently brought to his notice, and formed the subject of correspondence.

Twice he was recalled by the Government. His leave was thus temporarily set aside, and in consequence renewed and extended. Before six months had passed he was peremptorily summoned by the Minister to Ottawa. Leaving England in December, 1876, he remained in Canada until May following. In this period, independently of the other duties which engaged most of his time, the writer completed the voluminous Report of 1877, which he had commenced in England.

The leave of the writer was renewed, and he again left for England. He was again recalled, and so urgent was the summons that he started on a few days' notice. The consequence was that he was forced to neglect important private affairs, the arrangement of which necessitated his return to England.

In October, 1878, he returned to Canada and resumed his duties. The Acting Chief Engineer had, from July, 1876, held the position of principal executive officer of the Government to supervise the works under contract, to give directions to the engineering staff, to control the expenditure, and to issue proper certificates for work performed by the contractors.

From July, 1876, to October, 1878, no charge was taken by the writer of details of work under construction, beyond replying to the points submitted to him and receiving the reports forwarded from time to time. The latter in no way presaged the difficulties which now attract public attention.

On the return of the writer to his duties in the autumn of 1878, his attention was directed to the difference between the original quantities and the work returned as executed on Sections Nos. 14, 15 and 25.

Whatever the cause, it was plain that the original quantities had been greatly increased. No report of any such contingency had been made to him. The fact fell upon him as startling, from being unexpected, as it was alarming and unaccountable.

He had never supposed that a result of this character was possible. Had he been in the country his duty would have led him to take means to keep down the expenditure, to amend the line where change was advantageous and possible, and if through any cause the quantities of work executed showed a tendency to over-run the estimate, his attention would have been at once directed to the subject, as progress sections and the monthly returns conveyed the unwelcome information. No time would have been lost in endeavoring to ascertain the cause of the difficulty, and steps would have been taken to rectify it.

The original bills of quantities were made up without the exact data necessary for forming estimates with accuracy. They were prepared, from the best information, by engineers who had charge of each particular survey. As there was great pressure to have the work placed under contract, and definite quantities were indispensable, the results were, to a certain extent, assumed.

Much of the line passes through muskegs and marshes. The surveys were mostly made in winter when the ground was frozen. This circumstance doubtless, in some cases, deceived the surveyors as to its character, and led them to mistake marsh and muskeg for firm earth. One thing is certain, the quantities published before tenders were invited made no claim to exactness. Their *primâ facie* character establishes this fact beyond dispute. The amounts are almost invariably in round figures, such as 100,000 lineal feet or 1,000,000 cubic yards. At the same time, although estimated, or rather assumed, specially to admit of a comparison of tenders by having the different prices applied to them and the total amounts thus worked out, it was also supposed that if not approximately correct, they would at least not be greatly at variance with the actual results.

It was, therefore, incomprehensible to the writer that the actual quantities should in nearly every case be so much greater than those originally assumed and printed. Making every allowance for imperfect data, misleading those who had made up the bills of quantities, for the frozen marshes having been considered to be solid ground and for other contingencies, in the writer's mind there was no satisfactory explanation for the extraordinary differences.

When the discrepancy came under the writer's notice, he at once gave it his serious attention, and the difficulty with all the circumstances connected with it was frequently and earnestly discussed with the Minister.

It was not possible for the writer to accept the returns of the work executed and the certificates which had been issued. Accordingly he declined to grant any certificates whatever, for what had been done during his absence, until the quantities were properly accounted for and irrefragably established as correct. He caused an investigation to be made into each case separately. He sent for those who had been engaged in the work to learn the course taken in carrying on operations, and the principle adopted in making measurements, and fully to satisfy himself as to the accuracy with which the quantities had been computed; but he failed to obtain any satisfactory information with regard to the excess of quantities.

A remeasurement of the work on each section was, therefore, recommended by him; a course approved by the Minister.

The value of the work certified as having been executed when the writer took the matter up, was as follows:—

| | | | |
|---|---|---|---|
| On Section 13 | Gross amount certified | ..... | $331,978 00 |
| " 14 | " | ..... | 583,742 00 |
| " 15 | " | ..... | 1,151,975 57 |
| " 25 | " | ..... | 1,180,800 00 |

In the winter of 1876-77, during the writer's stay in Canada, he was called upon as senior officer, *pro forma*, to put his name to certificates which had been prepared and laid before him. Their accuracy was not investigated by him, as he had the fullest confidence in the returns submitted. These are the only certificates for which the writer is in any way responsible up to the time he resumed his duties. According to the certificates which he finds in the office, work to the value of $2,539,181 has been executed in the interval, on the four sections in question.

In the case of Section 13, the writer was not called upon to take any action, as the work had been completed, the contract closed, and the money paid before he returned to Canada.

A re-measurement of Sections 14 and 25 has been made, but it does not verify and substantiate the previous returns. In consequence, the writer has been unable to confirm the certificates issued during his absence for work reported as executed.

Section 15, and the circumstances connected with it, have formed the subject of a special report. The facts have been laid before the Minister. Errors in the system of measurement and classification of work have been rectified. Explicit rules have been laid down for future guidance. A verification survey to check measurements has been commenced. The whole contract has been placed on a new basis under an Order in Council, dated 20th May, 1879, under which the work has since been carried on and payments made. No certificates have been issued by the writer since his return, except in accordance with its provisions.

These four sections only had been under construction when the writer re-assumed his duties as Engineer-in-Chief; since then, seven additional sections, some of them very heavy, have been placed under contract. He has taken every means to prevent a repetition of similar difficulties. The precautions adopted may, in part, be understood by reference to the letters of instructions to the Resident Engineers, one of which is appended.

From October, 1878, the whole time of the writer, and his best efforts, have been given to the discharge of his duty. From that date every point of detail, more or less, has come under his personal cognizance, and for the results he holds himself answerable.

This remark cannot, with justice, be applied to the period when he was on leave of absence, and he should not be identified with operations, over which he exercised no supervision, carried on during the time when, with the approval of the Government, he was absent from the Dominion.

The question has been raised that the writer caused needless expenditure by an ill-judged location of the line on Section 15, in the neighborhood of Cross Lake.

There are points between the terminus on Lake Superior and the Prairie Region which govern the whole location. The geographical position of the Lake of the

Woods on the International Boundary, defines Keewatin, at the outlet of the lake, to be one of these points. Selkirk, in the writer's view, is clearly another. The problem was to connect these points by the shortest, best and cheapest route. With the exception of a limited area of prairie or thinly-wooded country near Selkirk, the whole distance is forest. A great extent of the surface is rocky, broken and rugged, with many long, narrow lakes, some of which it is impossible to avoid. Cross Lake, met some thirty-six miles west of Keewatin, is of this class.

The country here, and for a long distance, is exceedingly rough, and when the surveys commenced it was a wilderness, well nigh impenetrable. It was necessary, however, to find a railway line through it, not simply a line over which trains could be taken, whatever the cost of working them, but a railway which could be operated cheaply and which would admit of the conveyance of farm produce to the eastern markets at the lowest rates, a result only to be attained by limiting the gradients.

This view has governed the writer from the earliest inception of the undertaking. In his published report of January, 1874, he set forth the paramount importance of finding a location with the easiest possible gradients running easterly. He directed attention to it again in his report of 1877, and again in 1879.

Extracts from these reports are appended. This principle has been constantly kept in prominence, and its importance has been generally admitted. It has been frequently brought forward during the last six years. The writer does not know any instance of a public man having protested against it, or of any newspaper having taken exception to it

Although a great extent of the country between Lake Superior and the Red River is very rugged, the general level over long distances is not diversified. There are no great elevations or depressions to control the location and enforce the introduction of heavy gradients. Cross Lake is probably the only place on the whole 410 miles where any saving worthy of consideration could have been effected by a departure from the principle of light gradients, which it was found possible to apply generally.

In the neighborhood of Cross Lake a number of lines were surveyed. Ultimately the choice was narrowed to two lines, connecting common points, east and west of Cross Lake, about six miles apart. No. 1 crossed the lake at a high level and gave the desired easy gradients, none of which exceeded a rise of 26 feet per mile, and the longest being for about one mile. No. 2 crossed the lake at another place on a lower level, but it involved a continuous ascent of 2¾ miles, on sharp curves, with a rise of 44 feet per mile. The lake at the crossing of No. 1 is 600 feet wide; at that of No. 2 fully 900 feet; for five miles east of the lake the work is heavier on No. 2 than on No. 1, while at the lake, and for one mile west of it, the work is considerably the heaviest on No. 1. Although No. 2 would, upon the whole, cost less in the first place, No. 1 would undoubtedly, in the end, prove by far the most economical. After full consideration, Line No. 1 was selected, and it is on this line the construction is now being carried on.

The writer respectfully submits, that the line which conforms with the policy of successive Ministers, and with the prevailing faith of the public mind, that on the railway between Manitoba and Lake Superior all gradients ascending eastward should be kept within the established limit, was the only one for selection.

It was according to this principle that the location was first made, and the writer respectfully submits that there is no act of his connection with the Canadian Pacific Railway which should claim higher appreciation than his advocacy of the principle, and his constant efforts from first to last to secure to the country a line with the lightest possible gradients between Red River and Lake Superior.

It was six months after he left for England that the contract for Section 15 was signed. As a matter of course, before the heavy work at Cross Lake was commenced nothing should have been left undone to reduce its magnitude by revising and perfecting the location, and by every possible means. When the writer resumed his duties the work was in progress, and it was too late to make any change at this point, even if a change at an earlier stage had been desirable or possible.

The writer believes that he has established that the censures which have been directed against him are not warranted by the facts, and he respectfully submits:—

1. That he has not unwisely advised the Government with respect to the bridging of Red River.

2. That he has not absented himself from his duties without authority and without cause.

3. That he has not neglected his responsibilities, or subjected to injury the interests entrusted to him.

4. That he is in no way to blame for the original quantities being exceeded and the cost of the work increased on the sections in question.

5. That he has not caused needless expenditure at Cross Lake on an improper location.

6. That he has not allowed public money to be carelessly wasted; but that by every means in his power, he has endeavored to control the expenditure on the work, and that he has earnestly endeavored in all respects faithfully to discharge the duties of his position.

The writer trusts that the urgency of the circumstances which have called for this memorandum, will be held by the Minister of Railways and Canals sufficient justification for submitting in this form the facts which it sets forth.

SANDFORD FLEMING, Engineer-in-Chief.

---

EXTRACTS FROM THE REPORTS OF THE ENGINEER-IN-CHIEF IN REFERENCE TO THE ADOPTION OF LIGHT GRADIENTS IN CONNECTION WITH THE QUESTION OF CHEAP TRANSPORTATION FROM THE PRAIRIE REGION OF LAKE SUPERIOR.

*From the Report of January*, 1874.

"One of the questions which will undoubtedly force itself on public attention when the Prairie Region begins to raise a surplus for exportation, will be the cheap transportation of products to the east. Looking to this view of the question, the importance of a location which will secure the lightest gradients in an easterly direction is manifest.

"The gradients and alignments of a railway have much to do with its capacity for business, and the cost of working it. It is well known that by attention to these features, in locating a line, it is quite possible, in some cases, to double the transporting capacity of a railway, and very largely reduce the cost of conveying freight over it.

"That portion of the Canadian Pacific Railway between Red River and the navigable waters of Lake Superior, is precisely one of those cases where the utmost attention should be paid to its engineering features. The reduction of the cost of transportation on this section to the lowest figure is a question which affects the future of the country, as upon it, to a large extent, depends the settlement of the western prairies.

"The more this portion of the railway can be made to convey cheaply the products of the soil to the navigation of the St. Lawrence, the more will the field be extended within which farming operations can be carried on with profit on the fertile plains.

"The information obtained suggests that it will be possible to secure maximum easterly ascending gradients between Manitoba and Lake Superior, within the limit of 26 feet to the mile, a maximum not half so great as that which obtains on the majority of the railways on the continent.

"I think the line should be located so as to have the best possible alignment, with no heavier gradients than the maximum referred to. But the importance of securing the benefits of an unbroken steam communication at the earliest moment are so great that I consider that it would be advisable, in the first instance, to con-

struct the cheapest possible line. While adhering to the permanent location in the main, I would, with a view of accomplishing the desired object, recommend the construction of a cheap temporary line, avoiding for the present all costly permanent works that would retard its completion. In order to gain access to the country as speedily and cheaply as possible, it might indeed become necessary to overcome special difficulties by adopting temporarily, for short distances, deviation from the true location with heavy undulating gradients and sharp curvature. I have no reason, however, to think that this expedient would frequently be required. I am satisfied that for the greater part of the distance between Lake Superior and Manitoba, the permanent location may be substantially adhered to." (Pages 32, 33.)

*From the Report of February,* 1877.

"It has been held from the first that the successful occupation of the Prairie Region and the extent to which it may become thickly populated will, in a great measure, be governed by the capability of the line to Lake Superior to carry cheaply the products of the soil. The success of the railway itself must be determined by the number of inhabitants which can be established in the country, and the degree of prosperity of the population will be influenced in no narrow limit by the character of the outlet for the products of their industry. The more, therefore, that the eastern section of the railway can be rendered available for cheap transportation, the more rapidly will the Prairie Region become populated and the more speedily will the line become self-sustaining.

"I have felt it my duty to regard those views as of paramount importance in the location of a line between the Prairie Region and Lake Superior. Accordingly, every effort has been made to discover the shortest line, with the lightest possible gradients and easiest curvature, especially in the direction which heavy traffic will take, towards the Atlantic seaboard.

"On the sections placed under contract from Red River to Keewatin, 114 miles, and from English River to Fort William, 113 miles, the maximum gradients are as follows:—

*Ascending East.*

| | | | | | Per 100. | Per Mile. | |
|---|---|---|---|---|---|---|---|
| "On tangents and | $1\frac{1}{2}°$ | curves, equal to | 3,820 | feet radius. | 0·50 | 26·40 | feet. |
| On | 2° | do | 2,865 | do | 0·45 | 23·76 | do |
| On | 3° | do | 1,910 | do | 0·40 | 21·12 | do |
| On | 4° | do | 1,433 | do | 0·35 | 18·48 | do |

*Ascending West.*

| | | | | | Per 100. | Per Mile. | |
|---|---|---|---|---|---|---|---|
| "On tangents and | $1\frac{1}{2}°$ | curves, equal to | 3,820 | feet radius. | 1·00 | 52·80 | feet. |
| On | 2° | do | 2,865 | do | 0·90 | 47·52 | do |
| On | 3° | do | 1,910 | do | 0·80 | 42·24 | do |
| On | 4° | do | 1,433 | do | 0·70 | 36·96 | do |

"On the remaining distance to be placed under contract, between Keewatin and English River, 183 miles, equally easy gradients have not been as yet, at every point, secured. At the few exceptional points, the location will however be revised, and I have confident expectations that all the gradients will be reduced to the same standard, without materially increasing the cost of the works.

"Thus, there will be no impediment to the Pacific Railway carrying products from the heart of the continent to Lake Superior, at a lower rate per mile than those now obtaining on the leading railways already in operation." (Pages 81, 82.)

* * * * * * *

"I have described the efforts that have been made to obtain a line, with the easiest possible gradients, from the Prairie Region to the navigable waters of the St. Lawrence, and the paramount importance of this feature."

* * * * * * *

"Cheapness of transportation is thus to a certain extent assured—an important element in facilitating the prosperous settlement of the fertile territory in the interior." (Pages 85, 86.)

---

*From the Report of April,* 1879.

"I have always attached great importance to the endeavor to secure the best location attainable for the railway. I have elsewhere described the efforts which have been made from the commencement of the survey to obtain a line favorable for cheap transportation."

* * * * * * *

"The whole of the railway between Fort William and Selkirk, in length 410 miles' is now under contract. It is with no little satisfaction that I am enabled to point to a table of the gradients which have been definitely established in this length. Under the contracts which have been entered into, these favorable gradients are to be carried into execution without having recourse to the temporary expedients which I thought necessary to suggest five years ago.

*Summary of Gradients, Fort William to Selkirk.*

| Ascending Easterly. | Feet per Mile. | No. of Miles. | |
|---|---|---|---|
| Rise ·10 to ·20 per cent.....about | 5 to 10 | 38·52 | |
| do ·20 to ·30 do ..... | 10 to 16 | 17·11 | |
| do ·30 to ·40 do ..... | 16 to 21 | 42·97 | |
| do ·40 to ·50 do ..... | 21 to 26·4 | 80·11 | 178·71 |
| Level..... | | 108·06 | 108·06 |

| Ascending Westerly. | Feet per Mile. | No. of Miles. | |
|---|---|---|---|
| Rise ·10 to ·20 per cent.....about | 5 to 10 | 28·51 | |
| do ·20 to ·30 do ..... | 10 to 16 | 10·91 | |
| do ·30 to ·40 do ..... | 16 to 21 | 9·74 | |
| do ·40 to ·50 do ..... | 21 to 26 | 12·83 | |
| do ·50 to ·60 do ..... | 26 to 32 | 6·82 | |
| do ·60 to ·70 do ..... | 32 to 37 | 10·65 | |
| do ·70 to ·80 do ..... | 37 to 42 | 12·76 | |
| do ·80 to 1·00 do ..... | 42 to 52·8 | 31·01 | 123·23 |
| Total miles..... | | 410·00 | 410·00 |

"In determining the gradients the rule has been laid down to equate them with the curvature, so that when sharp curves were called for by the physical features of the country, the inclinations of the line would in those cases be proportionately reduced.

"The practical effect of a sharp curve on a maximum gradient is to make the gradient heavier by reducing the effective power of a locomotive making the ascent, thus preventing the passage of full loaded trains over the line. The object has been, whatever the curvature, to secure a degree of inclination which in no case would exceed, on tangents, 26·4 feet per mile ascending easterly, or in the direction of heavy traffic. The contract profiles of the line over the 410 miles from Fort William to Selkirk establishes that this object has been substantially secured. Only at one point (eighteen miles out of Fort William) has the locating engineer neglected to enforce this rule. I greatly regret that such is the case, as it will involve an expenditure to remedy the defect greater than would have been called for in the first place, when the cost would have been comparatively trifling.

"With the exception referred to corrected, the portion of the Pacific Railway between Lake Superior and Manitoba is thus finally established with extremely favorable engineering features, and it may be claimed that when completed under existing contracts, it will be available for conveying the products of the soil from the Prairie Region to Lake Superior, at the cheapest possible rates.

"As this portion of the Pacific Railway must, for a long time to come, form the great outlet of much of the Prairie Region, the favorable character for cheap transportation which has been secured for it cannot be over-rated. Indeed, upon this important condition very largely depends the successful settlement of the vast fertile plains and the permanent advantage of the future settlers." (Pages 18-21.)

---

MEMORANDUM OF INSTRUCTIONS TO MR. W. T. JENNINGS, RESIDENT ENGINEER IN CHARGE OF SECTION 42, EXTENDING FROM EAGLE RIVER TO THE EASTERN END OF SECTION 15, NEAR RAT PORTAGE (KEEWATIN).

CANADIAN PACIFIC RAILWAY, OFFICE OF THE ENGINEER-IN-CHIEF,
OTTAWA, 3rd June, 1879.

*Memorandum.*

The Hon. the Minister has appointed Mr. Jennings to the charge of Contract No. 42, embracing all the works of construction required to complete the railway between Eagle River and the eastern end of Section 15, near Rat Portage.

1. A copy of the contract entered into with Messrs. Fraser, Manning & Co., has been furnished Mr. Jennings. He has also been supplied with copies of the plans and profiles and all the documents relating to the work to be executed.

2. The undersigned has verbally communicated to Mr. Jennings his views with regard to the work and the manner it should be carried out. He has explained to Mr. Jennings the points where changes may be made, and has indicated on the profile some alterations that suggest themselves in the grade line. These changes are suggested with the view of reducing and expediting the work, the contractors being limited to time.

3. Mr. Jennings is desired at the earliest possible period to direct his attention to any possible change that may be made in the alignment whereby the work will be decreased without increasing the curvature or gradients.

The undersigned directs the attention of Mr. Jennings to the importance of, in no case, exceeding the rates of gradients and curvature, as follows:—

*Ascending East.*

| | | | | | | |
|---|---|---|---|---|---|---|
| On tangents and | $1\frac{1}{2}°$ | curves, | gradients not to | exceed | ·50 | per 100. |
| do | 2° | do | do | do | ·45 | do |
| do | 3° | do | do | do | ·40 | do |
| do | 4° | do | do | do | ·35 | do |

*Ascending Westerly.*

| | | | | | | |
|---|---|---|---|---|---|---|
| On tangents and | $1\frac{1}{2}°$ | curves, | gradients not to | exceed | 1·00 | per 100. |
| do | 2° | do | do | do | ·90 | do |
| do | 3° | do | do | do | ·80 | do |
| do | 4° | do | do | do | ·70 | do |

While insisting that in no case these gradients shall be exceeded, the Chief Engineer directs the earnest attention of Mr. Jennings to the very great importance of keeping down the cost of the work, and he trusts that wherever it be possible, without lowering the character of the engineering features of the line, Mr. Jennings will studiously avoid incurring any expenditure beyond that absolutely required.

4. The undersigned recognizes the peculiar difficulties which will be met by the contractors in this section; not the least serious being the inaccessibility of the

country through which the line is to be constructed, and he foresees the great importance to them of having the rail track extended as far as possible easterly from Rat Portage, the moment the rails are laid throughout Section 15. From 2 to 5 miles east of Rat Portage, the profile shows some of the heaviest work on the whole section, after which for several miles the work is comparatively light.

Fortunately the difficult portion could easily be got over by adopting, temporarily, a steep grade, as indicated in the accompanying profile. Mr. Jennings is authorized to make this suggestion to the contractors, with the understanding that the undersigned will concur in its adoption, should the contractors desire it in their own interest. The line must, thereafter, be constructed with the permanent gradient before the completion of the contract, and the contractors will be paid for all now or hereafter executed, which forms any part of the permanent work. The cost of temporary track-laying, and the small amount of excavation of parts A,B,C,D, etc., or any work of a merely temporary character, not necessary in the permanent works, will have to be borne by themselves.

5. For the guidance of Mr. Jennings, it may be mentioned that on some of the sections which have been under construction the contractors have found it convenient, with the modern explosives, to blast out rock-cuttings considerably beyond the slope lines, as defined on the specifications. The Engineer-in-Chief directs that only the excavation within the slope lines be returned as rock. The material beyond the slope lines, if placed in embankments, may be returned and paid for as earth; but, if wasted, it must not be returned as excavation under any class.

6. It may be further mentioned, for the information of Mr. Jennings, that on some sections under construction, when muskegs prevail and the embankments have been formed from side borrowing pits and ditches, serious difficulties have arisen. The material so borrowed is reported to be, in many cases, vegetable matter of a spongy nature, holding much water, and when dry and compressed by a superincumbent weight, to have little solidity; it is, consequently, unfit to be used in the formation of earth embankment. The undersigned accordingly disapproves of its use.

7. There is always more or less difficulty in forming embankments across muskegs or marshes. In some cases where a proper out-fall is available, so that ditches would have the effect of draining and consolidating the ground, it is advisable to form them parallel to the line of railway. But when the ditches, after being formed, would simply remain full of stagnant water, their formation is of doubtful expediency, and under such circumstances, ditches are of little value. Indeed, in some special localities, they may be a positive injury, and in all such cases it is advisable not to form them, but rather resort to a judicious use of logging and brushing provided for under the contract.

This being done, a thin covering of earth to form a foundation and bed for the ties may be added. Track may then be laid and thus allow material to be brought from any convenient distance by train. But if this expedient be resorted to, it will be necessary to bed the track sufficiently even and solid to prevent the rails from being bent or injured in any way.

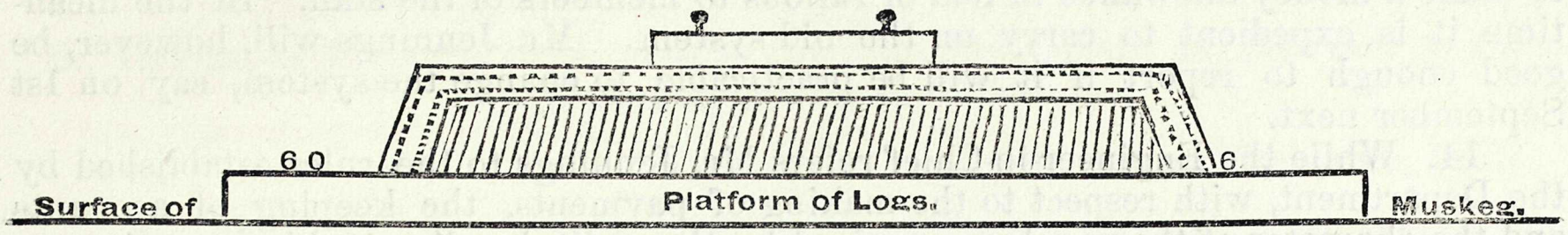
8. These several points are brought to the attention of Mr. Jennings, but he will himself determine the best course to be pursued when he has specially examined each locality, and become acquainted with the depth of the muskeg, and all the circumstances. In arriving at a decision, Mr. Jennings will take into consideration the question of haul, for which a price is provided, and he will see that in no case the price of earth and haul together (when material is brought by train) shall exceed the price of ballast, as in such cases ballast would probably be the best and cheapest material with which to form the embankment.

9. There may be some exceptional cases where it may not be impossible for the contractors to procure suitable material for the road bed, and where it would be a very great advantage to them and expedite their operations, if they were permitted to use in part the spongy material found in muskegs. This shall only be allowed sparingly, and in all cases when used, the solid contents of the spongy matter only is to be paid for. A log platform (clause 12) must invariably be laid on the surface

before any of the muskeg material is deposited, and arrangements must be made to measure the solid cubic contents in the embankment after the water has had time to drain out of it. On these conditions, as to measurement and payment, and on these only, will the undersigned approve of the use in any form, of this peculiar material.

Mr. Jennings will be good enough to inform the contractors accordingly, and obtain their written acceptance of these conditions, when the material is placed in embankments. Wherever it be deemed expedient to allow the use of muskeg material, the whole must be covered over with good earth; in no case should the coating of sand, clay or gravel be less than 12 inches under formation level.

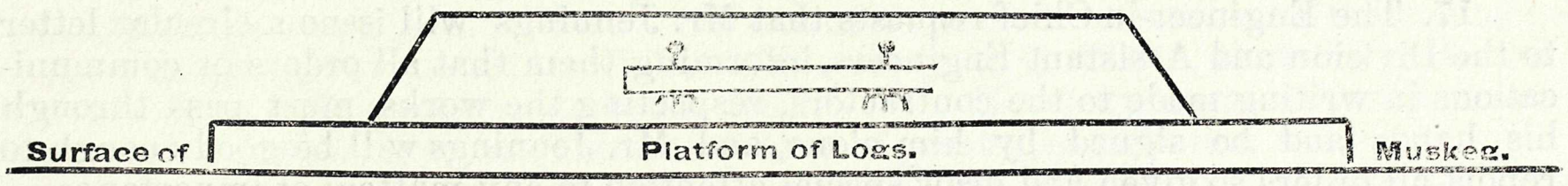
(Sketch A.)




As a rule the surface of the muskeg should not be broken by ditches or borrowing pits within 50 feet of the centre line.

10. When it becomes expedient to form the embankments by train, good-sized poles, or small trees "spotted" on the side, to average say six inches thick, should invariably be laid longitudinally under the ties. These poles should break joint, and every means taken to render the track reasonably solid and secure to prevent injury to rails. See Sketch B.

(Sketch B.)




10½. The undersigned has given careful consideration to the question of rock borrowing, referred to in the specification, and he has arrived at the conclusion that it will not be expedient to resort to the process of excavating rock for forming any portions of embankments, except so far as the embankments may be formed by material from "rock line cuttings."

The contractors will, accordingly, be relieved of this expensive and troublesome class of work referred to in clause 98 of the specification.

11. Mr. Jennings is probably aware that on section 15, where the railway is carried across lakes and ponds, the material from rock line cuttings has been deposited in two parallel lines along the toe of the slopes. This was done subsequent to the date of the contract with a special purpose in view, but it involves a good deal of extra trouble and expense to the contractors, without corresponding advantages, and as the undersigned recognizes the peculiar difficulties, these contractors have to overcome, and the importance in the public interest of assisting them in every legitimate way, and of avoiding unnecessary outlay, he does not insist upon the same plan of construction being followed on this contract.

The contractors may be allowed to finish the embankments in the usual way, allowing the material of whatever kind to find its proper natural slope, and in the case of the slopes being formed of soft material, in ponds or lakes, they will be protected by rip-rap, a few feet above and below water level. The rip-rap must be provided after the embankment has to some extent consolidated.

12. Attention should at once be given to the volume of all streams crossed by the railway; the necessity for the structures proposed to be erected, and their sufficiency and character.

Mr. Jennings will report, from time to time, such improvements or suggestions in the mode of construction as may appear advisable.

13. The Engineer-in-Chief encloses printed general instructions, 1 to 5, for the information of Mr. Jennings on the general guidance of the staff under him. These are in force as far as applicable. Special attention is directed to these general instructions.

The object in view is considered of great importance. Not the least important is to procure a complete historical record of the progress of the work under the contract, with details of every event noticed as it transpires. The purveyor branch, referred to in Instructions No. 2, is, however, abolished, and Mr. Jennings will himself be held responsible for procuring supplies and the proper account of all expenditure. It is the intention of the undersigned to apply for the authority of the Minister to make a money allowance in lieu of rations to members of the staff. In the meantime it is expedient to carry on the old system. Mr. Jennings will, however, be good enough to report if it will be practicable to change the system, say on 1st September next.

14. While the Engineer-in-Chief refers Mr. Jennings to the rules established by the Department, with respect to the making of payments, the keeping of accounts and the character of the vouchers required by the audit, he directs his attention to the exercise of proper economy in all matters of expenditure. Any food supplies obtained must be good and sufficient, and procured at reasonable prices.

15. While exercising prudence and forethought as to the wants of the staff, and the supply of good and sufficient provisions, all extravagance and waste and all unnecessary expense must be avoided.

16. The following staff has been selected to assist Mr. Jennings in carrying out these instructions:—

* * * * * * *

17. The Engineer-in-Chief requests that Mr. Jennings will issue a circular letter to the Division and Assistant Engineers, informing them that all orders or communications in writing made to the contractors, respecting the works, must pass through his hands and be signed by him alone, and Mr. Jennings will be good enough to report all orders so given and draw special attention to any matters of importance.

18. As far as can be foreseen, ample allowance has been made in the bill of works for every description of work required under the contract. Should it become expedient, as operations proceed, to execute any class of work for which no provision is made, Mr. Jennings' attention is directed to the 5th clause of the contract, which stipulates that no additional work shall be performed unless the price to be paid for the same shall have been previously fixed by the Minister in writing.

The necessity for any additional work must therefore be reported to the Engineer-in-Chief, and, if approved, permission obtained as above for its performance.

19. Mr. Jennings will arrange that the monthly measurements shall be completed on or before the last day of each month, so that he may be able to make up and transmit the estimates to this office as early thereafter as practicable. All monthly estimates are to be signed by Mr. Jennings, and forwarded in triplicate.

20. In addition to the weekly progress reports a short report should accompany the monthly estimates, referring to any special features of the work done during the month, the progress being made, the length of grading done or track laid, etc.

21. The Engineer-in-Chief impresses upon Mr. Jennings the necessity of holding the division engineers, as well as their assistants, personally responsible for the accuracy of returns of work done. It will not always be practicable for the division engineers in person to examine the whole work every month, but they should personally go over a portion of their division each month; the sub-division engineers sending their figures to them by telegraph or otherwise. The succeeding month the division engineers will be able to measure the remaining portion, and by this means they will test the accuracy of the whole, as the work goes on and become familiar with all details, with respect to which they are responsible.

22. Mr. Jennings is furnished with a copy of the contract and every plan, profile and document relating to the works under his charge. The undersigned looks to Mr.

Jennings with confidence, believing that he will spare no efforts to have these instructions, and the works to which they refer, satisfactorily carried out, and that he will earnestly endeavor to have everything done with strict regard to economy.

SANDFORD FLEMING, Engineer-in-Chief.

## APPENDIX NO. 3.

### DOCUMENT B. SUPPRESSED BY THE COMMISSIONERS.

B., LETTER *to Secretary Department of Railways and Canals, in Reference to Certain Evidence given by Mr. Horetzky.*

OTTAWA, 22nd June, 1881.

SIR,—The character of the evidence given by Mr. Horetzky, before the Royal Commission on the Pacific Railway, impels me reluctantly to address you with regard to it.

I have already given my testimony before the Commission on every point on which enquiry has been made. I do not consider it necessary to re-open my examination, in order to make the explanations which this letter contains, but I do conceive it due to the Department, which I served as one of its chief officers, to place the facts on record, so that they may be available for any purpose in the future. It occurs to me that I am called upon specially to notice three points:—

1. Mr. Horetzky takes exception to part of my evidence before the Commission, in which his name is alluded to. The examination had reference to the commencement of the survey, in 1871, and I stated in reply to Q. 22,613, that "Mr. Horetzky went out as a photographer to begin with." Mr. Horetzky says, this statement is untrue, and it seems to have been the cause of great dissatisfaction to him.

The facts connected with Mr. Horetzky's first engagement on the Canadian Pacific Railway staff, are these:—Application was made by Sir Charles Tupper on his behalf, in the spring of 1871. Sir Hector Langevin was then Minister of the Department.

Sir Charles was not at that time in the Government. He took a warm interest in Mr. Horetzky, whose name I had never previously heard. The application was frequently renewed, and Sir Charles expressed a strong desire to see him employed. It was, however, difficult to give him any position as he had no experience on surveys or explorations, or in engineering. I was informed that he had been a clerk in the Hudson Bay Company's service, and there was no opening on the survey for mere clerks. Sir Charles Tupper in his desire to have Mr. Horetzky employed, mentioned that he could take photographs well, and specimens of his photographic work were produced.

From our want of knowledge of the country, his services could be rendered useful as a photographer, and he was accordingly engaged and attached as a supernumerary to an exploring party, "for the purpose of taking photographic views of objects of interest, illustrative of the physical features of the country, more especially to the west of the Forks of the Saskatchewan." The quotation is from my instructions to the engineer in charge of the party, dated 20th June, 1871.

The service was creditably performed by Mr. Horetzky. The following winter he returned with a portfolio of photographs of natural scenery from the Saskatchewan westward to Jasper House in the Rocky Mountains.

Mr. Horetzky being naturally quick, observant and intelligent, obtained some knowledge of the duties of an explorer, and became of use in observing the general features of the country he passed through. Some fifteen months after his first engagement, I sent him, associated with Professor Macoun, to obtain information respecting the Peace River country, as set forth in my Report of 1874 (page 45).

One of the objects I had in view was to obtain photographs so as to gain as correct an idea as possible respecting the physical features of the country. Mr. Horetzky performed his part of the service with credit, and brought back some excellent photographs of different localities to which I attached considerable value.

Although in subsequent years, Mr. Horetzky made some useful explorations, yet he undoubtedly went out as a photographer in the first instance, precisely as I have described. In 1875, I think, his work was confined entirely to photographing.

2. Mr. Horetzky states that I suppressed portions of his report of great public interest and value.

There can be no doubt as Engineer-in-Chief, subject to the Minister's approval, I was the proper person to judge whether or not it was expedient to publish the whole or any portion of a report sent to me by a subordinate. In this particular case, being much engaged at the time, I asked my Chief Assistant, Mr. Marcus Smith, to read Mr. Horetzky's report carefully, and give me his opinion as to the propriety of publishing the whole or portions of it, with the appendices to my own report.

Mr. Smith gave his views in the letter which follows. This letter may serve to explain why portions of Mr. Horetzky's report were not printed. On examination I entirely concurred in Mr. Smith's suggestions, and I took the trouble to send for Mr. Horetzky and explained to him that it was expedient to reduce the length of his report:—

OTTAWA, March 24th, 1875.

DEAR SIR,—I have carefully looked over Mr. Horetzky's report, which is very good so far as he confines it to a description of what he saw, and gives heights and distances (approximately) such as are usually ascertained on track surveys, by aneroid, compass or other portable instruments. But at several places he gives engineering opinions and descriptions of grades, tunnels and other engineering works, for which there is no reliable data and for which he is not qualified, as he has no engineering knowledge whatever—does not even know how to use a level.

It has been observed as a rule in all the reports of myself and staff, that no engineering opinions or descriptions of engineering works, are given on mere track surveys. These are confined to lines of which a complete instrumental survey has been made, and even then the descriptions are not given by the assistants or even the Division Engineer, who only make the plans and profiles and put all the information they possess on these, from which the descriptions are made by myself and submitted for your approval.

You will have to explain this to Mr. Horetzky, for he is such a crazy, conceited fellow, he will think (and publish) that his genius is being repressed, if he has not his say, although, I may inform you that, except his photograpls, his work is altogether worthless and cannot be laid down on the general map. He says it is Vancouver who is wrong; that in his chart the relative positions of Dean and Gardner Channels are wrong, over 20 miles out of true position.

To save you time I have marked in pencil on the margin those portions of the report which I think should be omitted, viz.:—

Page 6 (1). No data for engineering descriptions and (2) opinions, nor any use describing portions of a route otherwise impracticable.

Page 7 (1). No data for engineering opinions or descriptions.
(2) Mere heresay, but harmless.

Page 11 (1). No data for engineering descriptions, &c.
(2). Only an Indian mountain trail; if left in it might mislead.
(3). Doubtful.

Page 12. No data for engineering opinions, &c.

Page 14 (1). Opinion all wrong, as we know by actual inspection.
(2 and 3). No data for engineering opinions.

Pages 15, 16, 17 and 18. No data for engineering opinions; nor any use describing an impracticable route.

Page 21 (1). All wrong as we know by inspection.

Page 22*. Report should end here, except in
Page 24 (1). Might be left in.
Page 26 (1). Might be left in.
Page 27.—Might be left in, conclusion.
Pages 22 to 25.—All described in my report for which I made this voyage especially.
Page 25 (1).—All conjecture.
Page 26—(2). Might go in.
Page 27—(1). All incorrect and conjecture.
(2). To go in.

I hope the above will assist you and save time.

Yours most truly,

M. SMITH.

SANDFORD FLEMING, Esq., Chief Engineer, C.P.R.

3. Mr. Horetzky charges me with having prevented him receiving proper compensation for his services.

I would be doing Mr. Horetzky an injustice if I do not admit that I formed a more favorable impression of the value of his services than did any of the Engineers on the staff who came more directly in contact with him. I spoke to each successive Minister, at the head of the Department, in terms of approbation respecting the aptitude which he had displayed for exploring in a rough country.

I recommended that his pay should be increased from time to time and at the termination of his services he received the very highest rate payable to explorers as such. Subsequently, however, he conceived that he should be paid at a still higher rate; that he should receive back salary equal to that of the highest grade of engineering assistant; of men who had devoted their whole life to engineering and "whose experience, high character and attainments, qualified them to take charge of the heaviest and most important engineering works."

I had no authority to fix the rate of salaries; this power rested with the Minister and the Government, and I may state that I never held that my Assistants, as a rule, were too highly remunerated. I had no objection to Mr. Horetzky receiving all that the Government would grant him. I felt, however, that if his pay was increased, every man on the staff would be entitled to claim an increase, and that each would feel an injustice was done him, if his compensation was not increased in like proportion.

Mr. Horetzky continued to importune me to certify that an additional sum was due him even after I ceased to be Chief Engineer. Being absent from Ottawa, correspondence was carried on, until in August and September, I received three extraordinary letters in which he volunteered to pledge me his lasting friendship, provided I would assist in getting him the money he demanded from the Government, at the same time vowing vengeance if I failed to recommend its immediate payment.

The character of these letters was such that it was impossible for me even to acknowledge their receipt.

I have the honor to be, Sir,
Your obedient servant,
SANDFORD FLEMING.

F. BRAUN, Esq., Secretary, Department of Railways and Canals.

## APPENDIX No. 4.

DOCUMENT C, SUPPRESSED BY THE COMMISSIONERS.

*Order in Council in reference to saving in cost of construction Sections* 41 *and* 42.

COPY *of a Report of a Committee of the Honorable the Privy Council, approved by His Excellency the Governor General in Council, on the* 18*th June*, 1880.

On a Memorandum, dated 15th June, 1880, from the Hon. the Minister of Railways and Canals, submitting a report received from Mr. Sandford Fleming, late Engineer-in-Chief of the Canadian Pacific Railway, relative to a certain engagement entered into by him in July last, with Messrs. Jennings and Caddy, engineers in charge of Sections Nos. 41 and 42 of that railway, whereby for every five per cent. of reduction on the then estimated total cost of these sections, one year's extra salary should be paid to them, and so on in proportion as the amount of reduction might be increased.

The Minister states that the arrangement being made on Mr. Fleming's own authority alone, he desires that the liability having been incurred in the interests of the railway, it may now be assumed by the Government, which the Minister recommends for favorable consideration.

The Committee submit the above recommendation for Your Excellency's approval.

Certified,

J. O. COTÉ, C.P.C.

## APPENDIX No. 5.

DOCUMENT D. SUPPRESSED BY THE COMMISSION.

*Letter to the Minister of Railways and Canals in reference to saving in cost of construction Sections* 41 *and* 42.

OFFICE OF THE ENGINEER-IN-CHIEF, CANADIAN PACIFIC RAILWAY.
OTTAWA, 14th June, 1880.

SIR,—The Order in Council which has recently been sent to me respecting my position on the Canadian Pacific Railway, suggests to me the duty of reporting to you an engagement entered into with the engineers in charge of sections 41 and 42 Messrs. Jennings and Caddy.

The circumstances under which the engagement was made are:—It was my intention last summer to have given my personal attention and as much of my time as could be spared from other duties to the supervision of these two sections. They are marked by unusually heavy works, and I hoped to be able considerably to reduce the expenditure involved. The contracts were purposely so framed as to admit of a reduction. On the opening of spring, however, I was directed to proceed to England to assist yourself and the other delegates (the Premier and the Finance Minister), in important matters.

I was thus compelled to be absent from the work. I said that it would not be possible for me to visit them until late in the fall, when the season would be practically over. I considered it the more necessary therefore to invite the resident engineers to exercise the greatest care and economy possible, and to make extraordinary efforts to reduce the work wherever it was practicable to do so, so as to bring it within the lowest practicable cost. I deemed it expedient in the interests of economy to enter into a personal engagement with these officers, making myself liable to a considerable although indefinite amount. I cannot better explain the nature of the engagement than to enclose to you a copy of a letter which I felt

it my duty to write on ship-board, on my way to England, and which I posted at Queenston.

I need scarcely say that before and after Messrs. Jennings and Caddy took charge, I carefully instructed them verbally and in writing, in accordance with my views and determination, to keep the expenditure down to a minimum. My confidence in these gentlemen was very great, but when I had last communicated with them I had led them to understand that I would pay them an early visit and carefully consider with them every point along the 185 miles which these works covered. Obliged, however, to follow the delegation of Ministers to England, this course was impossible, and having time to reflect while on shipboard, and considering it expedient to leave nothing undone to enlist the engineers in charge of these important works to the most active, zealous and continuous exertions in the study of the location, so that the results, with the established limit of gradient, could be made at a minimum cost by shortening and improving the line where feasible and by reducing the amount of work to be executed.

The accompanying copy of a letter to Mr. Jennings, dated at sea, 16th July, last year, will show you that I undertook that for every five per cent. reduction on the then estimated total cost of sections 41 and 42, one year's extra salary should be paid to each resident engineer, and so on in proportion as the amount of reduction was increased.

I have not until now mentioned this arrangement to you. I have had no object in concealing it, but a proper opportunity for reporting it has not before arisen. I have felt from the first that it would be quite time enough to bring the matter under your notice when reductions were effected and the exact amounts known. This could only be established on the closing of the contracts, on which occasion I would have no fear of the Government favorably viewing the course I took and assuming the liability entered into by me to the full extent of the saving effected. For my own part I have always considered that the liability, be the sum much or little, should stand as a first charge against my own salary until assumed by the Government.

As I now leave the office of Engineer-in-Chief I respectfully submit that I am justified in asking the Government to assume an obligation which I am in honor bound to see carried out, and which I deemed it expedient to enter into in the interests of the public.

I have, &c.,

SANDFORD FLEMING.

Sir CHARLES TUPPER, K.C.M.G., Minister of Railways and Canals.

---

## APPENDIX No. 6.

---

### DOCUMENT E, SUPPRESSED BY THE COMMISSIONERS.

*Letter to W. J. Jennings in reference to saving in cost of construction, Sections* 41 *and* 42.

CANADIAN PACIFIC RAILWAY, OFFICE OF THE ENGINEER-IN-CHIEF.
ON BOARD OF THE "CASPIAN" AT SEA, JULY 16TH, 1879.

MY DEAR MR. JENNINGS,—Before you left Ottawa to take charge of Section 42, I mentioned to you verbally my great anxiety to have the works placed under your immediate charge conducted in such a way as to have the whole completed in the most satisfactory manner within the estimate.

Since you left we have had some correspondence about various things, and among others the erection of engineer's houses; in this it seemed to me you had not quite caught my ideas. On the other sections, too much money has been spent in erecting prematurely houses of a permanent character. It costs a great deal to take in materials to a new section, where the roads are bad, or where there are no roads at all. Sometimes the building when finished thus, at great cost, is destroyed by fire,

and it is always in danger of being burned at the commencement of operations before the clearing is completed.

All my staff know that I am desirous of seeing them well paid for their services and made as comfortable as possible, but at the commencement of operations in an entirely unsettled district it is not practicable to secure all the comforts of civilization, and to attempt to get them in any considerable degree can only be done at a great cost, or at such a cost as the circumstances will scarcely warrant. I think we should endeavor to be satisfied with what is easiest within reach, and in spending the public money invariably to do so as if it were our own.

In this view, what would a farmer do in settling down in a new and next to inaccessible country? He would not attempt to erect a dwelling which required material which the locality did not provide, he would put up a plain log-house, he would shift for a time with a small quantity of home-made furniture and such articles as the necessity of the case required, and when winter brought a passable road he would supplement them. Could not our people be contented with the same? A log-house can be made as warm and comfortable as any other, and the supply of many things can be postponed for a while.

It was my intention to have started to go over all the work between Lake Superior and Selkirk directly after all the parties were despatched, and business at Ottawa placed in such a state as would admit of my leaving. I have been obliged, however, to proceed to England, and it will not be in my power to see you until late in the season. I have, however, fully discussed every matter with Mr. Smellie, and explained to him my views. He will speedily pay you a visit, and I trust you and he will get the above matter placed on a satisfactory footing.

Touching the contract itself, I wish you to do everything in your power in a perfectly legitimate way to assist the contractors. They have serious difficulties to overcome, and while seeing and insisting that they do their work as it should be done, I would rather adopt the policy of giving and taking than being too punctilious about matters of no great moment.

It is of primary importance that the line should be built throughout with the easy gradients and favorable engineering features which, from the first, I have aimed at, and it will be your first duty to see that these are not in any way departed from. You will, however, see that no expenditure whatever is incurred that is not absolutely necessary to secure these advantages.

The bill of works is a liberal one. The contract is different from all others, it is what may be termed a maximum contract, and the total sum mentioned in the contract may be decreased, but it cannot be increased. The bill of works is so liberal that I think it is possible to finish all the work *largely within the contract sum.* I would wish you to make every effort to have this done, much depends upon you, and if you earnestly bend your mind to it, I feel sure you will succeed. While acting justly to the contractors, even liberally to them, in seeing them paid in full for all the work they do, and the contract be completed considerably within the contract sum, it will be a feather in your cap to assist thus in saving the public money, and it will establish no small claim to consideration if not to a material reward.

The latter I have no authority whatever to offer you on the part of the Government, but I cannot help feeling it is in the public interests that some substantial acknowledgment should be made to you in the event of your success, and I think further that my own claims on the Government for past services are such as to justify me in saying that if the contract be finished to my satisfaction for five per cent. less than the contract sum, you will be entitled to receive one year's extra salary, and so on for any further reduction. I look upon this as a mere acknowledgment of valuable services and, as I said before, although I have no authority from the Government or the Minister to do so, I pledge you this in the public interest, entirely on my own responsibility and on my own authority as Engineer-in-Chief.

I intended writing Mr. Caddy to the same effect, but the motion of the ship is ceaseless and conveniences for writing are not the best. I shall be obliged to you if you will convey to him my views, perhaps send him a copy of this letter. I would

have written him precisely in the same spirit and said the same with regard to an acknowledgment for services in the event of the contract sum being reduced on the completion of the work. Contract 41 is the same as Contract 42, and they are the only two of the kind yet entered into. Please let me know when this reaches you and address as on the other side. I have no copy, I would therefore be glad if you would kindly send me a press copy when you write Mr. Caddy.

Wishing you all success and hoping to see you early in October.

Believe me very sincerely yours,

SANDFORD FLEMING.

W. J. JENNINGS, Esq., Section 42, C.P.R.

London address: Canadian Agency, 31 Queen Victoria street, London, E.C.

---

## APPENDIX No. 7.

### DOCUMENT F SUPPRESSED BY THE COMMISSIONERS.

LETTER *to the Hon. A. Mackenzie, enclosing a Memorandum on the construction of the Canadian Pacific Railway, and with reference to personal charges.*

*Unofficial.* OTTAWA, 30th September, 1874.

MY DEAR SIR,—I have considered the question of beginning the construction of the Canadian Pacific Railway as you requested me, and I have thought it best to put the views I have formed in the form of a memorandum which I now enclose.

As you did not intimate to me in any way your own views, and I have not consulted with any one, and have not had the benefit of your opinion or that of others, I, therefore, may be wrong in the judgment I have arrived at. Be that as it may, I have submitted freely and frankly my views on the subject.

I wish to mention one thing to you which has surprised me a good deal. I have learned that a charge is made against me in Toronto and elsewhere, that I am deeply interested in property at Nipigon. I do not care so much what outsiders may say as I know some people will stick at nothing to serve their own ends, but I would like you to be rightly informed lest any such stories may have reached you.

I am not directly or indirectly interested, personally or otherwise, in a single inch of any kind of property at Nipigon, Thunder Bay, or any other point north or west of Lake Superior. I have never at any time owned or been interested in any real property north or west of Collingwood except some fifty acres of land at Sault Ste. Marie, which land I have owned for some twelve years and still own. I cannot be charged, however, with having advocated carrying the Pacific Railway to Sault Ste. Marie, all my reports point the other way.

I have paid no attention whatever to the ownership of property north of Lake Superior, other than studiously keeping clear of it, and as to Nipigon, I do not even know a single individual who is interested in a foot of land there. I am not even aware that the Government has granted any land in that quarter, or so much that any one has actually applied for a grant.

I could have mentioned all this to you verbally, but I might not have an early opportunity, and it is natural that I should wish to give the charge an emphatic denial.

The only point in the enclosed Report requiring immediate attention is referred to in the last paragraph.

Yours truly,

SANDFORD FLEMING.

HON. ALEX. MACKENZIE.

---

## APPENDIX No. 8.

DOCUMENT G. FURNISHED THE COMMISSION, 14th JANUARY, 1882.

*Memorandum in reference to the construction of the Canadian Pacific Railway and settlement of the North-West Territory.*

OFFICE OF THE ENGINEER-IN-CHIEF, CANADIAN PACIFIC RAILWAY,
OTTAWA, 29th September, 1874.

SIR,—In accordance with your wishes, I have given some consideration to the question of constructing the Canadian Pacific Railway, and the best mode of proceeding, under the Statute, passed last Session. I now submit the general views I have formed on the subject.

You are already aware that I have always considered and advocated the construction of a line of telegraph, in advance of the railway, as a necessary and most important preliminary work.

The construction of the telegraph from the Pacific coast as far easterly as Lake Superior, is now placed under contract, may be considered secured. For reasons which will herafter be presented, I think that there should be no delay in inaugurating the construction of the telegraph from Lake Superior along the route of the railway, to the south side of Lake Nipissing, at some point where it would connect with the telegraph system of Ontario and Quebec.

I have the highest possible opinion of the producing capabilities of much of the country extending for a thousand miles west from the Lake of the Woods. I believe this vast territory is destined to support a very large population, and I think that a judicious expenditure on the part of the Government, in opening up lines of communication, together with a well devised scheme of immigration, will very soon have the effect of settling the country.

Under favorable circumstances, I believe that in a few years the population will be counted by millions, and the day is not far distant when the census will show a greater number of Canadian subjects to the west of the Lake of the Woods than it now shows to the east of it. Ontario and Quebec will then be classed with the Eastern Provinces of the Dominion.

If such a population existed on the central plains at the present time, who for a moment would doubt the gigantic proportions of the traffic between the millions east and the millions west of Lake Superior. A traffic which would not only find a channel through the magnificent system of lakes and rivers during the season of navigation to the Lower St. Lawrence, but would absolutely demand for its service throughout the whole year, the shortest possible *all-rail* route that can be made.

The traffic indicated would without any doubt whatever fully occupy every line of communication now thought of. Freight would naturally seek the water channels during the season of navigation, while passengers and the light kinds of traffic would, as a general rule, go at all seasons of the year by rail. Looking to the future, therefore it is of the utmost importance that the railway should be projected and constructed on the shortest possible route that can be found.

It is a mistake that many people have fallen into to suppose that the shortest route would run south of Lake Superior. The best information yet obtained goes to show that a line south of Lake Superior would be from 59 to 94 miles longer than a line touching at Thunder Bay, and from 123 to 153 miles longer than a line touching at Nipigon Bay.

Entirely apart, therefore, from the question of passing through a foreign country, it is quite clear that all idea of spending Canadian money towards constructing a line south of Lake Superior should be abandoned, and every effort should be directed to establish a more direct line to the north.

Of the two lines north of Lake Superior, the one touching at Nipigon appears to be the shortest by about 64 miles, that route therefore, is the one which, in my opin-

ion, should be adopted, if one still shorter cannot be found. It would, looking to the not distant future and vitally important objects to be gained by having the shortest possible "through" line, be most unwise to twist the main trunk railway a single mile out of the direct course. The very shortest line that can possibly be secured will be longer, all will admit, than we would desire. If therefore, no line can be found shorter than the one referred to by Nipigon, that, undoubtedly is the true route for the line of railway.

To carry the trunk line round by Thunder Bay would practically be placing the eastern and western provinces of the Dominion, sixty-four miles further apart and imposing an unnecessary tax of nearly two dollars per head on every passenger using the railway for all future time.

I must not be understood to advocate that the construction of a continuous all-rail route north of Lake Superior should take precedence over everything else. I simply recommend that it should, from the first, be kept prominently in view and form part of the general design, and that when the proper time arrives it should be carried into execution. There are other sections and other works more immediately necessary.

Existing canals and railways in connection with the great lakes, being the steam communication of this country, from the Atlantic Ocean to Thunder Bay. Thunder Bay is the natural and proper outlet for the mixed land and water route; thence to Manitoba, popularly known as the Dawson Route. This line of communication should, I think, at once be rendered as efficient as possible for present purposes and for permanent use during the seasons of navigation as a freight route. The Dawson Route will never be of much service until it is operated by steam throughout; the 50 miles east of Lake Shebandowan and the 100 miles west of Lake of the Woods should immediately be railwayed, the portages intervening that cannot be canalled should at once be tramwayed and provided with the best mechanical contrivances for transferring and handling freight with ease and speed.

The outlet of the Lake of the Woods at Rat Portage is an objective point on the Pacific Railway, and may be made a common point on the Dawson Route; from thence to Red River. The railway should be made common to both lines of communication.

East of Rat Portage, I think that it would be advisable to establish the Dawson Route as an entirely independent line of traffic.

I am perfectly well satisfied that at no distant day the traffic between Lake Superior and Red River will fully engage both lines of communication, and that the part of the Pacific Railway which will first demand a double track will be that portion between Rat Portage and Red River.

I feel convinced that the Dawson Route improved and employed to the fullest capacity will be utterly inadequate for the freight traffic that will be, and hence the importance I attach to the construction of that portion of the Pacific Railway between Red River and Lake Superior, of such a character as will specially adapt it for the heavy traffic which will soon seek this channel.—*Vide* Pacific Railway Report, 1873, page 33.

The Pembina Branch will, of course, be useful for a short time, in giving access to Manitoba until the other and more direct lines are established through Canadian territory.

The Canadian Pacific Railway from Manitoba eastward cannot stop short at Lake Superior, there terminating it would only be employed during the summer months. The Pembina Branch would continue to be the only inlet and outlet during the winter season, but when the country becomes populous the people on the plains will never be satisfied to make a journey through the United States of 1,589 miles to Toronto, when it might be reached by travelling only 1,173 miles, nor would they submit to be thrown 1,925 miles away from Montreal, when the completion of the link east of Lake Superior would shorten the distance 637 miles.

With regard to the country west of Red River, the question of the day is really its settlement. The lakes and rivers can undoubtedly be used in promoting this

work to a great extent, but owing to the climatic fact that the water channels cannot be employed at all for a considerable portion of the year, something more than the navigation of the lakes and rivers is required to render the settlement of the country speedy and successful.

We must look to the establishment of railways, not simply a trunk line, but a complete railway system, as the only satisfactory means of maintaining communication between the several sections of this vast territory.

A trunk line is probably the first railway that should be undertaken, branches to it will follow in due time, and they will ramify in every direction where profitable traffic is found possible.

Everything so far points to the Yellow Head Pass as the proper gateway through the Rocky Mountains to the Pacific coast. Whatever explorations now being made and yet to be made may bring to light, I assume for the present that the trunk line will pass through the Yellow Head Pass, and I have laid down on the accompanying map its possible approximate position from Red River westerly.

From the trunk line I have indicated where some leading branches may be judiciously established. It will be seen that one branch is projected from the main line at the Red River crossing, nearly due west, by the valley of the Assiniboine. This branch would serve the fertile country in that direction, and extended to the coal deposits recently discovered by the boundary survey, would supply the inhabitants of the Province of Manitoba with fuel. Other branches are shown from the main line, southerly and northerly from a point in the neighborhood of Edmonton. One of these would run through a beautiful and extensive country on the eastern flank of the Rocky Mountains, extending from the North Saskatchewan towards the boundary of the United States, while another would tap the Peace River region, and both would be of immense service in developing the mineral and agricultural resources of these regions.

Many other branches will be formed as circumstances may require; those I have alluded to are simply leading ones that suggest themselves at the present time.

With regard to the country on the western side of the Rocky Mountains and the railway route through it to the Pacific coast, it will be necessary to wait until the surveys are further advanced before much more can be said than has already been presented in my last general Report. All that can now be done is to reserve a sum for proposed expenditure on which ever route may be found most eligible.

Having submitted these general remarks, I will now proceed to state the view I have formed with regard to the carrying into execution the important works referred to.

It would undoubtedly be advantageous in many ways to construct the Pacific Railway through the instrumentality of a large Company instead of directly by the Public Works Department.

I feel satisfied, however, after giving the matter careful consideration, that it would be best during the next two years or so to carry on initiatory and desirable works directly by the Department of Public Works. This would give time to obtain full information respecting every portion of the country, to locate the railway route, to erect the telegraph and do all the works embraced in the telegraph contracts, such as clearing, making roads, etc. It would enable the Government, as well as parties who may propose entering into contracts, to form a more intelligent idea of the undertaking proposed to be carried out than can possibly be formed at the present time.

Before the expiration of a period of say two years, the Government could publicly invite and receive proposals from capitalists who might be prepared to form one or more strong financial companies to carry out the undertaking, and such proposals as may be made could embrace the assumption by the contracting company or companies of such portions of the whole scheme as the Government may execute in the meantime and as may be stipulated.

In the meantime, I would recommend that the Government, through the Department of Public Works, proceed during the next two years, with as much

energy as possible, in carrying out certain preliminary and necessary works as follows:—

1st.—Telegraph line, including clearing two chains wide along the route of the railway, through forest and packtrail or roads.

| | | |
|---|---|---|
| 1. British Columbia to Edmonton | $300,000 | |
| 2. Edmonton to Fort Pelly | 117,250 | |
| 3. Fort Pelly to Fort Garry | 56,250 | |
| 4. Fort Garry to Lake Superior | 189,120 | |
| 5. Lake Superior to Lake Nipissing | 250,000 | |
| | $912,620 | |
| Total, say | | $1,000,000 |

2nd.—Land and water communication from Lake Superior to Red Red River (Dawson Route).

| | Approximate expenditure. | |
|---|---|---|
| 1. Railway from River Kaministiquia to Lake Shebandowan | $1,000,000 | |
| 2. Railway from Rat Portage to Red River. | 2,000,000 | |
| 3. Portages and equipment between Lake Shebandowan and Rat Portage | 250,000 | |
| Total expenditure on the Dawson route, of which $2,000,000 would be common to the trunk line of the Pacific Railway | | $3,250,000 |

3rd.—Land and water communication, Red River to the North Saskatchewan.

| | | |
|---|---|---|
| 1. Railway from Red River to Lake Manitoba | $1,500,000 | |
| 2. Portage, railways, improvement of navigation of Saskatchewan, steamboats, &c | 250,000 | |
| Total expenditure in connection with the Saskatchewan navigation, of which $1,500,000 would be on account of the main line of the Pacific Railway | | $1,750,000 |

| | |
|---|---|
| 4th.—Pembina Branch | $1,000,000 |
| 5th.—On account of construction of Pacific Railway in British Columbia and between Rat Portage and Nepigon | $3,000,000 |

RECAPITULATION.

| | |
|---|---|
| 1. Pacific Railway Telegraph Line | $1,000,000 |
| 2. Railway and water communication from Thunder Bay to Red River | 3,250,000 |
| 3. Railway and water communication from Red River to Edmonton | 1,750,000 |
| 4. Pembina Branch Railway | 1,000,000 |
| 5. Pacific Railway in British Columbia | 3,000,000 |
| Total | $10,000,000 |

The expenditure above suggested would initiate construction generally throughout the whole line, and it would probably be quite as much as could judiciously be made within the period referred to.

It would secure a telegraph line along the route of the railway from Ottawa to British Columbia, it would clear the forest land to a width of two chains, it would establish a road passable for horses along the entire route, and thus give access to the country for contractors, explorers and settlers who would follow and render the establishment of regular postal communication possible and easy at a very early day.

The expenditure proposed would also develop and so far perfect the Dawson Route as a line of steam communication as would make it really serviceable for all kinds of traffic, until the completion of the Railway between Lake Superior and Red River. On the completion of the railway a classification of the traffic would naturally follow. The Dawson Route would continue to be of value as a means of transporting way freight, while passenger and other traffic would find their way by rail.

The expenditure proposed would also connect Red River by rail with Lake Manitoba, place railways on the Portages lying between Lakes Manitoba, Winnipegoosis, and the Saskatchewan River, improve the rapids of the Saskatchewan, place steamboats on the whole route, and thus practically extend the means of steam communication from tide water at Quebec by both branches of the Saskatchewan to the foot hills of the Rocky Mountains.

It will be seen, too, that the expenditure contemplated will be strictly confined to those portions of the great lines of communication essential to the opening up of the country, and which would in the highest degree assist in the economical construction of that which at the end of two years would remain to be done.

In the estimate presented I have placed $3,000,000 for expenditure in British Columbia and on the line between Rat Portage and Nepigon. I have not attempted to separate the sum, as the amount which may be expended in British Columbia depends so much on circumstances. With regard to the estimates, I may state that although roughly approximate it may be considered a liberal one, and with regard to the period of two years I should not be understood to mean strictly two working seasons, I should rather have used the general expression two or three years, as, owing to the peculiar circumstances which obtain, I doubt if it would be possible to carry out all that is contemplated or expend the estimated amounts judiciously and economically within the shorter period. There would be nothing, however, to prevent the Government entertaining any proposals that may be made by financial companies for the construction of the whole line of railway before the completion of those portions herein referred to, the amount actually expended could then be considered as so much paid the company on account, or dealt with as may then be agreed.

My present object (at your request) is to point out which plan of procedure would, in my judgment, be the best. I feel well convinced that whether or not it may be considered advisable to place the whole undertaking bye-and-bye in the hands of one large company, it would in the meantime be in the public interests to initiate construction in some such manner as herein indicated. I am satisfied that with the preliminary works alluded to well advanced, every section of the country made accessible and its speedy settlement assured, it would be possible to make terms with capitalists far more favorable to Canada than can possibly be expected at the present time.

Should you entertain favorably the suggestion herein contained, I have further recommend that public notice be at once given that the grading of the railway from Thunder Bay to Shebandowan, from Red River to Rat Portage, and from Red River to Lake Manitoba will be ready for contract before next meeting of Parliament, and that tenders will be invited so soon as the surveys now in course of completion be ready, and the plans, profiles and specifications prepared; the object being to afford intending contractors an opportunity before winter comes on, of personally examining into the character of the excavations which will require to be made on the several sections referred to.

I am, &c.,

SANDFORD FLEMING.

To the Hon. ALEX. MACKENZIE, Minister of Public Works, &c., &c., &c.

# APPENDIX No. 9.

EXTRACTS FROM THE GENERAL REPORT OF THE MINISTER OF PUBLIC WORKS FOR THE FISCAL YEAR ENDING 30TH JUNE 1873.

## *PACIFIC RAILWAY SURVEY.*

"Your Excellency will doubtless bear in mind, that the operations for the survey were commenced in June, 1871. These examinations have since been continued with much vigour, and although nothing definite has been officially brought to public notice, in which controverted points have been decided, the labour of examination has been unremitting. It is no exaggeration to speak of the extent of territory to be explored as immense. The false impressions which have existed with regard to it are a matter of history. It is but ten years since that Captain Palliser, in his report to the Imperial Government, declared the utter impossibility of finding any communication through Canadian Territory.

"This officer thus summed up the result of his investigations,—

"'The connection therefore of the Saskatchewan Plains, east of the Rocky Mountains, with a known route through British Columbia, has been effected by the expedition under my command, without our having been under the necessity of passing through any portion of United States Territory. Still, the knowledge of the country on the whole, would never lead me to advocate a line of communication from Canada across the continent to the Pacific exclusively through British Territory. The time has now forever gone by for effecting such an object; and the unfortunate choice of an astronomical boundary line has completely isolated the Central American possessions of Great Britain from Canada in the east, and also almost debarred them from any eligible access from the Pacific Coast on the west.'*

"This deliberate and forcibly expressed opinion, the result of four years' labour in the field, of a man of eminence, aided by assistants of equal culture, ability and energy, may with propriety be quoted to show the formidable difficulties to be overcome in the Pacific Railway Line. Difficulties, which, until the last three years, have been held to be insuperable, and the solution of which calls for unremitting labour and thought.

"The immense area to be considered can only be dealt with in a corresponding space of time. The descent of the western slopes of the Rocky Mountains may be described as offering no natural choice of ground. Consequently, the line can be finally traced only after elaborate examinations, and by a comparison of the extra heavy work which, in some cases, cannot be thrown out. By these means this form of expense may be reduced to its minimum. The surveys, to enable such comparisons to be made, are still in progress. It is only when the location is sustained by a perfect knowledge of the geography, and the physical facts which dictate it, and when all hope of improvement is seen to be futile, that it can be definitely recommended.

"One of the principles early assumed in this examination is, that the main line shall turn in its course to the navigable waters of Lake Superior at a point most accessible to Manitoba. Difficulties have, however, been found immediately on the north shore of Lake Superior to the south-east of Lake Nepigon, so serious as apparently to force the line to the north of that body of water.

"Explorations were accordingly made north of the lake, and it was necessary to connect them, with the previous year's work, at River Moose. A portion of the line between the River Nepigon and the Lake of the Woods being unsatisfactory, likewise the country to the south not appearing more favourable, a line was explored further north to connect with the Northern Nepigon Line.

"At the same time a survey has been made from this northern line for a connection with Lake Superior, in accordance with the principle which has affirmed its necessity.

* Parliamentary Report. London, 1863. (*Vide Ante.*)

"The starting point of the railway has been established by Legislation (Cap. LXXI., 35 Vict.) as 'some point on or near Lake Nipissing, and on the south shore thereof.' It was not far from this locality that the examination took its commencement.

"The whole distance from Lake Nipissing to the Red River has now been surveyed and a route has been traced out through its extent. In order to avoid the rugged country on the coast line of Lake Superior, the location has been thrown back of Lake Nepigon. Consequently a connection is called for from the main line with Lake Superior. A branch to Thunder Bay will be about 150 miles and to Nepigon Bay probably about 110 miles. These lines are now also being examined and traced out.

"The Chief Engineer of the line reports that the distance from the eastern terminus to the Red River is about 980 miles. The waters of Lake Superior will, however, be reached in about 440 miles from Red River.

"A comparison of distances to the principal cities of the Dominion with other routes to the great West gives the following results:—According to the report of Mr. Fleming, the Engineer-in-Chief of the Railway, Manitoba is about 300 miles nearer Toronto by the Canadian Pacific Route than by the most direct existing railway, that by St. Paul, Chicago and Detroit.

"It is 100 miles less by the Canadian route from Red River to Toronto than by Duluth, and the shortest line that could be constructed along the south side of Lake Superior, Sault Ste. Marie, and the north-east side of the Georgian Bay.

"Red River is 550 miles nearer Ottawa and Montreal by the Canadian Pacific Line than by the most direct existing railway route, that by St. Paul, Chicago, and Detroit; and is nearly 200 miles nearer Ottawa and Montreal by the Canadian route than by the existing line of railway to Duluth; and the shortest line that can be constructed from that point, by the south side of Lake Superior and the north side of the Georgian Bay to connect with the Eastern Railways. The proximate distance of the new railway line required to be constructed from Duluth to complete the connexion is about 1,020 miles, half of which would run through United States' territory, while the total distance by the Canadian Pacific, between Red River and Pembroke on the Ottawa, is only about 1,080 miles. The distance from Red River to Lake Superior by the Canadian line will probably not exceed 430 miles, while to Duluth it is 477 miles; Duluth being situated also 200 miles further west on Lake Superior than Prince Arthur's Landing.

"The western section of the work has been vigorously prosecuted during the past year.

"A surveying party, fully equipped for this particular service, is now engaged exploring the county from Yellow Head Pass to the east, towards Edmonton on the North Saskatchewan. This country is densely wooded, and difficult to penetrate; much of its extent being entirely unknown, with scarcely a trail through it when the survey was commenced. In many parts it is rolling, rough and rugged, and its physical features can only be established by patient examination. Very great interest is felt with regard to the result of this survey.

"Two lines which may be pronounced practicable, but which must exact a large expenditure, have been traced across the mountains to the coast. Some sections show very heavy work, but, as has been previously submitted, more exhaustive surveys are in progress to determine if a better line can be had.

"Such surveys are now in operation from Howe's Sound to the North Thompson, and from Moose Lake to Tête Jaune Cache and the River Thompson, on the opposite side of the valley to that where the first survey was made. At the same time an exploration is being pushed on from Tête Jaune Cache to Quesnel Lake, with a view of determining the possibility of obtaining a more direct line to Bute Inlet than by the valley of the Thompson to Kamloops, and from thence across the Chilicoten Plains and the River Homatho.

"Operations are likewise projected in Vancouver's Island to verify the reconnaissance already made between Seymour Inlet and Esquimaux Harbor.

"Reference has been made to the difficulties which present themselves on the Lake Superior coast, which threaten to drive the location north of Nepigon Lake. Further efforts are being made to avoid that route, and an exhaustive examination is now going on in the hope of finding a suitable line running to the south of Lake Nepigon. Necessarily any location must to some extent pass through the unfavorable ground which is the characteristic of this rugged district; but it is to be hoped that heavy work will not be extreme, and that it will be possible to give a direction to the railway, so that the branch to Lake Superior will be but of moderate length.

"Other operations are now being carried on between Red River and Lake Superior to connect lines already surveyed, and to improve and reduce the length of the proposed location where possible.

"In order to obtain as much knowledge as possible of the country, the Engineer-in-Chief, Mr. Fleming, in the season of 1872, made a reconnaissance of the whole distance to the Pacific, including Vancouver's Island, detaching a small party from the main expedition to Peace River, to reach the Pacific at some point on the northern coast of British Columbia. The reconnaissance was satisfactorily accomplished."

---

## APPENDIX No. 10.

EXTRACTS FROM THE EVIDENCE GIVEN ON THE EXAMINATION BY MR. SANDFORD FLEMING BEFORE THE COMMISSIONERS, 19TH APRIL AND 17TH MAY 1881.

*The Muskeg Question.*

"19498. How do you mean that that system of measurement has led to this disappointment: is it that a larger quantity was allowed for in the measurement than was actually executed?—According to the system of measurement adopted in paying the contractor, a larger quantity of material was allowed than is actually represented in the work.

"19499. How was that?—It was owing to the excessive shrinkage it may be called, of the material itself. It has been found that the muskeg material employed in making many of the embankments is very porous, was filled with water like a sponge, and after a time the water passed away in the embankment, leaving very much smaller cubic contents than was measured up and paid for.

"19500. Did this system of measurement accord with your views on the subject?—It did not.

"19501. In your opinion, what would have been the correct system of measurement?—I felt that the spirit of the contract was to pay for the work actually executed, and in cases where such material had to be used I would have adopted a different system of measurement.

"19502. Had you not the control of the system of measurement at this time?—Not at this time.

"19503. At what time do you consider you are now speaking of, when you say you had not the control?—The contract was let in June, 1876; I left early in July, 1876, and no work was then returned, so that I actually certified to no work done on that contract. It was done by others during my absence.

"19504. When did you resume the control of the work so as to be answerable for the system of measurement after that?—When I resumed my duties in October, 1878, I found that the original estimate had been very much overrun, and I declined to certify, and have not certified as to the quantities of work done.

"19505. I understand your objections to this system of measurement to be in effect this: that the contractor ought not to be paid for the full cubic measurement of the material which he has moved, but only for the quantity as it finally remained in the embankment: is that the meaning of your objection to the system?—My idea is that the contractor should be paid for every solid yard of earth work executed by him, or rock work, as the case may be.

"19506. That does not quite inform me of your meaning, because you make use of the word executed: now he has executed the removal of it as well as placing it in the embankment, and I want to know whether your idea is that he should be paid for the quantity he removed, or only for the quantity finally left after compression in the embankment?—In cases where the work consists in making a cutting to admit of the railway passing through it, the contractor should be paid by the yard for all the material taken out of that cutting. In cases where he had to form an embankment he should be paid for the solid contents of the embankment and nothing more.

"19507. Is that the ordinary rule of measuring to contractors?—That is the spirit of the contract, as I understand.

"19508. I am not speaking at present of the meaning of the contract, which would probably be a legal question, I am asking you whether it is the usual custom of measuring to contractors in practice, not in law: is that the usual custom?—The usual custom in other parts of the country, is to pay for measurement in excavation; but then the nature of excavation is very different in these parts of the country which I speak of.

"19509. Then the system which you speak of would be exceptional, would it not?—Yes; and there is provision made in the contract for the exception, if I am not wrong.

"19510. For the present, I am not asking you to construe the contract, I am asking you of matters in your experience: am I right in understanding you to say that the system which you suggest would be an exceptional system, and would be owing to the peculiar character of this part of the country?—Yes, it would.

"19511. Then, in this locality do you think that the quantity to be measured to the contractor would be the quantity left in the embankment finally?—The solid contents of the embankment in this case.

"19512. I understand that the difficulty in this particular locality, not only regarding section 25, but some of the others in that neighbourhood, was that the soil as removed contained a large proportion of water which was afterwards not available in forming the embankment?—It turned out that the material employed, which was termed muskeg, was very much like a sponge and contained a great deal of water—more than 50 per cent. in some cases—so that it took from two yards to two yards and a-half of this muskeg material to form one yard of solid material in the embankment. The contractor was paid for the two and a-half yards; I hold that he is only entitled to be paid for the one. The whole discrepancy between the original estimates and the quantities returned and paid for, arose in that way. The original estimates were not so far astray. They were sufficiently near for the purpose they were designed to serve.

"19513. Then, I understand you to say this in effect: that in order to make the embankments, it became necessary that a very much larger amount of material had to be excavated in order to finish that embankment than was expected?—No; it was not done. I do not say it was a *sine qua non*. Possibly not in all instances, but in some instances it might be had in some other way.

"19514. But as to the material that was used, was it not necessary to remove a much larger quantity than was originally expected to be removed, because it did not make the same quantity in the embankment that it did *in situ*?—It was necessary to remove with the solid material a large quantity of water. The water was incorporated with the material itself. In some places it was like thick vegetable soup, and when this water drained out, the two yards and a-half were reduced to one yard.

"19515. But at the time of estimating the quantities for the purpose of receiving tenders, I understand you to say it was assumed that the quantity to be removed would supply the same proportion in the embankment that excavation generally supplies?—I do not know that the matter was thought of at that time. The estimate of quantities necessary to lay before intending contractors, was ascertained in the usual way, by computing the quantities from the profiles.

"19516. Was it not then assumed, as far as you know, that this excavation would supply the usual proportion of embankment?—I have already said we were

not familiar with this material, that we had had no experience—at least only to a very limited extent—of that material in other parts of the country.

"19517. I ask was it not assumed that this excavation would supply the usual proportion of embankment?—It was assumed there would be no marked difference in the excavation in that section from excavations in other parts of the country.

"19518. Then the disappointment which finally happened arose really for want of knowledge of the material at the beginning?—To some extent.

"19519. I understand all this explanation to mean that the disappointment arose because the nature of the material was not known, and because it had to be assumed that the ordinary proportion would be found in the excavations for the embankment that is generally found?—May I ask what disappointment you refer to?

"19520. That caused by the great discrepancy between the quantities executed and estimated?—No; it arose from the system of measuring.

"19521. Did it not arise because a great deal more material had to be excavated in order to supply the required quantity in the embankment?—It arose from the measuring of the water in the material, as well as the solid material itself.

"19522. Is it not your understanding that it became necessary to take out either in water and earth, or some kind of material, a much larger quantity of material than would afterwards be found in the embankment?—I am not prepared to say it was necessary, because the material could have been taken in another way. It could have been obtained from borrowing-pits of a more suitable character in some instances at all events.

"19523. Do you know whether a large portion of the embankment, as executed in any of these instances, was made from the muskeg instead of from borrowing-pits in localities where it could have been got from borrowing-pits?—It was borrowed from the adjoining muskeg in many instances, and this unstable material was used in that way. It was more convenient to the embankment.

"19524. Do I understand you to suggest that it might have been obtained of a better quality, and more suitable material, from some borrowing-pits, in that neighbourhood?—In another way.

"19525. Do you remember any marked instances where that happened, where the embankment was made from muskeg, and where it might have been made from borrowing-pits?—I cannot point to any particular instance at present. I know perfectly well the material could have been taken forward by train from suitable borrowing-pits.

"19526. Have you investigated that part of the question—I mean practically to ascertain that there were borrowing-pits which would have supplied this material in the instances you complain of?—I have investigated the matter and found in some cases there were, but I cannot tell the precise places at present. However, I took every means in my power to prevent a repetition of the difficulty, and instructed the engineers in charge of the several sections up there, as soon as the matter came to my knowledge, to adopt another course, and you will find my instructions in a letter addressed in this instance to Mr. Jennings, in charge of section 42. Similar instructions were sent to other engineers. You will find it in Exhibit No. 293, pages 15, 16 and 17.

"19527. You alluded a short time ago to a discretion which you thought the engineer had over the measurement of this kind of material, and by which the contractor would only be paid for what was found in the embankment. I understand that to be the substance of what you believe to be the power the engineer had over the matter: would you say what clause of the specification leads you to think so?—I think he had control under clause 30, and under clause 31, and under clause 20, but more especially under clause 30, in which these words are used:

"The measurement of quantities shall invariably be made in excavation, unless in special cases, if any, where this may be found impossible. In such cases the engineer shall determine the quantities in embankment, after making all proper allowances, of which he shall be the judge."

"19528. I understand you to say that at the time these specifications were prepared to be submitted to persons who were invited to tender, there was no knowledge

of the kind of material which would be excavated, as for instance muskeg, so as to provide specially for it any further than is provided in this clause?—There was no precise information with regard to the material to be excavated, but the specifications were intended to cover every kind of material and every contingency.

"19529. Could you say whether it was known at the time that these specifications were prepared that, in many instances, the material would be of the spongy character you describe, so as to make it less available than if it were more solid, and so that the quantity excavated would not be represented fully by the contents of the embankment?—I do not know as to that; but I can say that the spirit of it was given, and the intention of the contract was to pay for solid work, not for water or air.

"19530. That is hardly an answer to my question, because it is possible that some court might say these documents do not contain the spirit that you think they contain. I am asking you now about the information that the Department had on this subject, and I ask again whether, at the time that these specifications were prepared, the Department or the engineering branch of it had the information that a large quantity of this material was of that character which would make it impossible to get beyond perhaps two-fifths of its equivalent in the embankment after removal?—I can only speak with regard to myself and my own knowledge. I prepared the specifications, and it never was my intention that anything further than solid material should be paid for.

"19531. You are still speaking of the intention of the document?—Yes.

"19532. What I was asking about was the information that the Department possessed?—I have already said all that I can say about that.

"19533. At the time that these specifications were prepared, had the engineering branch of the Department of Public Works any knowledge that the material which might be largely used in making this embankment, was of the spongy character that you describe, and contained so little solid matter that no more than two-fifths of it would be finally represented in the embankment?—We had a knowledge of the country through which the line would pass, but we had no precise knowledge of the character of the material you speak of; and I, for one, certainly had no idea that this material would be used to the extent which it has been used.

"19534. Had you any idea that in that neighbourhood there was much of that material which, after being moved, would not represent more than two-fifths, or thereabouts, of its original solid contents?—I could not say that I knew what proportion of the material would be solid. I could not say at that time what has been the result of experience since obtained. I knew that the country was a very rugged one, I knew there were a great many swamps and flat grounds, and that swamps generally contained soft material; but I had no idea then that there was so much soft material—that has since been proved.

"19535. Had you the information that there was likely to be a considerable portion of the material there of the quality you describe, that is to say, that no more than two-fifths, or one-half, or somewhere thereabout, would be finally represented in the solid embankment?—No information of that sort.

"19536. If you had no information of that sort at that time it would not be likely that you would draw up specifications to prepare specially for it?—My impression is that that material has been much more largely used than is called for.

"19537. If you were not aware that there was this material in large quantities likely to be used, do you think it probable that you would have provided specially for that kind of material in your specification?—Had I information that there was any possibility of using this material to the same extent that it has been used, I would certainly have made provision that it should not be used to that extent.

"19538. But irrespective of the extent to which it has been used, I understand you say that you had no information about the character of this material which was likely to be used to some considerable extent—I do not mean to the great extent it has been used, but to any considerable extent—and I am asking you if you had not that knowledge whether it is likely you drew your specifications so as to provide

particularly against the loss which will be occasioned by the use of such material?—It is very likely if I had had information such as I have now, I would have made special provision against the use of this material, or with regard to its proper measurement.

"19539. I understand you to say that the contractors have been paid for excavation to a much greater extent than they have performed the work, according to your reading of the contract?—They have not been paid more for the work; they have been paid for what is not represented in the work. They have been paid for moving some sort of substance that is not in the work at all—they have been paid for moving water.

"19540. Then they have been paid on certificates for much larger quantities than they were entitled to?—There is nothing to represent on the ground in the railway much that has been paid for at this moment.

"19541. I understand that to be the result; but I am asking now for this information: whether they have received certificates for a larger quantity of work than, according to your own reading, they ought to have received under this contract?—Clearly, clearly. I might mention to you that the twelfth clause of the specification also bears on the question. It reads:

"The material to be placed in the embankment must be approved by the engineer, and any places where the natural surface of the ground upon which the embankment is to rest is covered with vegetable matter, which cannot be burnt off in the clearing, and which would, in the opinion of the engineer, impair the work, the same must be removed to his entire satisfaction."

That goes to show, with the other clauses that I have referred to, that the whole matter, as far as material to be used is concerned, was in the hands of the engineer.

"19542. I understand that you made a formal report upon the subject of the difference between the measurement by Mr. McLennan, and by the gentleman who was afterwards appointed to revise it, Mr. Bell: have you anything to say upon that subject beyond what your report contains?—It is simply a statement of facts. I simply report the re-measurement of Mr. Bell's, and give the general result, but I do not go very much into the question. I just simply sent it in to close up my office work. I had ceased to be Engineer-in-Chief immediately after this report was written—the following day, in fact.

"19543. Returning to the question of measurement in the embankment as against the excavation, is it usual to allow contractors something more than the earth actually found in the embankment, assuming that you had no means of measuring the excavation, and were judging entirely upon the basis of what is found in the embankment?—It has not been usual in my own case, and this contract provides for nothing of the kind. I shall read you another clause which bears on the question—clause 89:

"The contractor will be paid for the work actually executed by him under the engineer's directions and to his satisfaction, at the prices stipulated in the contract; but he shall not be entitled to any additional allowance by reason of any changes or alterations."

Then again, in clause 90:

"But any work, material or thing of any description whatsoever that may be omitted from the specification or contract which, in the opinion of the engineer, is necessary or expedient to be executed, the contractor shall, notwithstanding such omission, upon receiving written directions from the engineer, perform the same, and the payment therefor shall be at the price for such work given in the schedule of prices."

"19544. In clause 89 you read that he will not be entitled to any additional allowance by reason of any changes or alterations; the words referred to are in the section?—Yes; they are used.

"19545. Do they not define the particular alterations therein alluded to?—I did not deem it necessary to use these words, because I had not read the previous part of the clause, but I shall be glad to read the whole. It points to the fact that the engineer will be at liberty to make alterations which he may deem expedient in the grades, the line of location, the width of cuttings, the fillings, the dimensions and

character of structures, or any other thing connected with the works, whether or not such changes increase or diminish the quantities of work to be done.

"19546. And the clause applies, therefore, to those particular alterations?—Certainly. Then in clause 91, in fact almost every clause in the contract points to the fact that the contractor is to be paid for what he does and not for what he does not do.

"19547. That would hardly settle the question whether, when he removes spongy material, he does not do something?—It refers to what he does under the engineer's directions, and not what he does for his own convenience.

"19548. It is not necessary to discuss a question of law; I suppose the point is, whether the contract promises to pay him for moving this kind of material by the yard?—I have no hesitation in saying that had I been present he would not have moved very much of it, or if he had it would not have been measured up in the way it was.

"19549. It is quite possible that the engineer may control his movements so that he might not have so large a claim for this material under the contract; but that is a matter about which, as you were not present, I do not wish to ask you, and I understand that you do not consider yourself responsible for it?—I took active steps to put an end to it the first time it came to my knowledge.

* * * * * * * * *

"21975. Do you wish to add anything to your evidence touching the measurement of the muskeg excavations, or any other matter connected with the subject?—In reading over my evidence on the muskeg material, I find it terminates rather abruptly. After question 19,548, I think it would have been well had it been followed up by some other questions, or if I had volunteered then to give some explanations which I wish now to give.

"21976. Please proceed with them?—I will give you my views with regard to the muskeg question. There are certain leading principles by which I hold an engineer ought to be governed in dealing with public works under the Government. First, the engineer is not a contracting party, he is simply an executive officer appointed to see a contract properly carried out, and justice done alike to the public and to the contractor in the matter of measurement or other things. His judgment should be guided in the contract and the specifications, and in such contracts as those under consideration, every kind of work is intended to be embraced in the schedule of rates and prices attached to the contract. If there be any exceptional or special work necessary to be done, which may not have been foreseen when the contract was originally entered into, and no price fixed for it, the engineer, not being a party to the contract, should not fix it; it should be established by the principal parties to the contract. Assuming that muskeg is an exceptional description of work, it is quite clear to my mind that the engineer should not have the power of fixing the value by increasing the quantity of useful work which that material will produce. If a solid yard of embankment formed of muskeg, is worth twice as much as a yard of common earth in an embankment, in that event the contractor should receive double price, but the Government is the only party that should fix the additional price for the use of that material where it is necessary to be used. I shall endeavour to illustrate my views by taking a case in which the solid contents of material in the formation of a section of railway is 1,000,000 yards, and the price of earthwork is fixed at 33 cts. per yard. If this section be completed with earth it would cost $330,000, but if earth cannot be had, and it becomes necessary to employ more expensive material for which no price has been fixed, the engineer should not fix it. It should not be in his power to fix it or to allow the contractor compensation for the use of the new and more costly material by any process whatever. If the new material is worth twice as much as earth, I hold that the Government should fix the price, and that the engineer should not be called upon to certify that there are 2,000,000 yards of earth in the formation of a railway section while there is only 1,000,000. If it be right and proper to pay the contractor $660,000 for the work, that is reckoned at 66 cts. per yard when executed with muskeg material, then the price should be made as I

have stated, 66 cts., and the certificate of the engineer would stand thus: 1,000,000 yards of muskeg material at 66 cts., total $660,000; and it should not stand in this way: 2,000,000 cubic yards of earth at 33 cts., giving it the same total, $660,000. Of course, in the case as it is put, the compensation to the contractor would be the same, but the responsibility would rest upon the proper shoulders; the Government, being the principal party to the contractor, would fix the price, and the engineer would not be called upon to certify that a piece of work contains 2,000,000 cubic yards while it only actually contains 1,000,000. It has been stated, in evidence before this Court, that it would be impossible to measure muskeg in the embankment. I am not of that opinion. My experience has taught me that where there is a will there is always a way, and I hold that there would even be less difficulty and much greater certainty in arriving at accurate measurements of the solid material of an embankment than in measuring muskeg in the way in which it has been done.

"21977. You suggest that it has been stated, by way of evidence before us, that it would be impossible to measure the quantities in the embankment: is that what you say?—Yes.

"21978. I do not remember that suggestion, but I remember that it has been said it would not be fair to measure the quantity in the embankment, and that the quantity excavated should be the criterion established for the quantities in the certificates. The argument has been that although the quantity was less after the compression in the embankment, there was no difficulty in ascertaining what there was there, but that it formed no information on which to show what had been excavated: is not that a correct statement of the argument as you understand it?—I do not know that it is. I understood that it was stated here that it would be impossible to measure it in the embankment. Of course, if it was impossible to ascertain the quantity of an embankment, there would be no need of attempting to settle with the contractor in that way; but it is not impossible, it is perfectly practicable. I do not say that the contractor would be fairly paid or fully paid if no change was made in the price. I think every contractor ought to be fairly dealt with, but the system of measuring two yards for one is a bad one, or calling one material another kind of material.

"21979. You are evidently under the opinion now that there has been some difficulty suggested, because of the impossibility of measuring the actual quantities as they remain finally in the embankment. That is a new idea: it has not occurred to us, and it has not been advanced by anybody?—It is certainly given in the published evidence.

"21980. Well, it is not correct. At all events, the difficulty as I understand it is this, that, although the quantities could be ascertained in the embankment, they did not show how much had been excavated and the contractors contended that they were to be paid for the amount excavated and not the amount remaining finally in the embankment, not because of the difficulty of measuring this, but because of the impropriety and injustice of taking that as decisive as to the quantity which had been excavated?—I found that some of the engineers were disposed to attach prices for work done, which work there was no price for in the schedule of prices. For instance, a fire might break out in the woods and the contractor would be put to some expense in saving the timber of a bridge or of a building. I found in the returns the expense reduced to yards of earth—so many yards of earth equivalent to so much money. Of course, I put down my foot at once, and I said: "This principle is wrong." The return should show exactly what the expenditure is for, and I hold that muskeg should be treated in precisely the same way. If there was no price in the contract for muskeg, then it was for the Government, and for the Government alone, to fix the price for it. In all those other cases that I refer to where expenditures have been returned to me for exceptional work, such as putting out fires and this, that and the other thing, I always insisted on them being called by their right names and left the Minister to fix the price for them.

"21981. In order to make plain what I understand to have been the difficulties suggested as to the measurement, I will state now my view of what has been said.

You, in giving evidence upon a former occasion, said that the specification permitted an engineer to estimate this muskeg material upon a different basis from ordinary material, because one clause in the specification provided that where it was impossible to measure the material that then an unusual rule might be applied, intimating, as I understand it, that it was impossible to measure the material from the place from which it had first been taken. That was the difficulty which I understood had been suggested by you, and which led to the application of this particular clause in the specifications—that was one difficulty; the other was not the measuring in the embankment, but that upon the re-measurement in the muskeg locality the ditches and other places from which material had been taken would be so changed in their shape that they would not afford information to enable an engineer to find out the quantities first excavated?—Possibly not; but there ought to be no difficulty in measuring an embankment at any day.

"21982. I have not yet seen that any person has suggested any difficulties in measuring the embankments?—My invariable custom has been, in connection with these works and other works, to face the difficulty at once, and I am not reflecting on any one when I say this, for not taking the course I did; but I think it is a mistake in principle to allow this to go on until the end. I think when it was first discovered that an exceptional kind of material was to be used in the work, that was the time to take the bull by the horns and bring the matter before the Government, and throw the responsibility on the Government as one of the contracting parties to deal with it. Remember, I am not in favour of paying the contractor less than what it cost him. I think the contractor ought to have a fair price for his work—a liberal price for his work for that matter—but at the same time the prices ought to be fixed in a regular way. I do not think the engineer, or any one of the engineers, or any one of his assistants, should have the power of fixing the price directly or indirectly.

"21983. That is beside the question. I do not think that in any part of this investigation it has become a matter for serious consideration whether an engineer might make a new contract for the Government, and I do not understand that is a point in the dispute. I have understood you to say that it would not be proper to certify that there were 2,000,000 yards in an embankment, when in fact there was only 1,000,000: now, do you remember any certificate at any time given by any engineer in which he certifies to the quantity in an embankment?—He certifies to the quantity in the work.

"21984. What is the work?—It is the railway.

"21985. But do you remember, at any time in your experience, an engineer certifying to quantities in an embankment?—I have done it myself.

"21986. Under what circumstances?—Under circumstances not unlike these?

"21987. And did the certificate purport to state the quantities in the embankment?—The certificate stated exactly on the face of it what it meant, and every certificate ought to do the same.

"21988. But as I did not see it, I cannot tell what was in it: what did it say?—So many yards of earth in the embankment.

"21989. Did the contract provide, in the case to which you allude, that the quantities might be measured in the embankment?—The case to which I refer was simply a contract of this kind: the contractor was to receive payments for so much earth excavation or earth work—earth excavation means earth work.

"21990. Do you mean that when you contract for earth excavation at so much per yard that the quantity remaining in the work is a fair criterion?—Not always.

"21991. But is it the case?—There are exceptions to ordinary rules, and if this is not an exception it ought to be one.

"21992. We are getting away from the matter under investigation: you mean, perhaps, that it ought to be provided in the specification to be exceptional?—It ought to be made exceptional the moment the difficulty arose.

"21993. Do you say that under this contract, and under this specification, you conceive it to have been a right course for the engineers to certify the quantities in

any embankment?—The right course to pursue is exactly the one I have pointed out, in my judgment.

"21994. Are you aware that these specifications provides as to how this material shall be estimated, and how it shall be classed?—The word muskeg is not found in the specification.

"21995. Are you aware that there is a clause which covers exactly this case?—No; I am not aware.

"21996. Are you aware that in sub-section 3 of clause 17, these words are used:

"All excavations of whatever kind, with the exception of off-take ditches, found in clause 13 shall be deemed earth excavation?"—

Allow me to refer to another clause with respect to earth excavation.

"21997. But you have not yet answered my question?—Yes; that would go to show that this muskeg material might be called earth.

"21998. Under the specification?—Under this particular specification, but this does not make the matter any better. The difficulty is with regard to the measurement of this peculiar kind of earth. I hold that we ought to pay for the useful effect produced by the work itself. The same in a bridge or building; we would not measure the stone in the quarry, we would measure the solid wall in the bridge or building.

"21999. That would depend on the contract, would it not?—Some quarries would produce a very small proportion of building stone and a great deal of debris, while others would produce a very large proportion of building stone.

"22000. Don't you see that to make that at all an analogous case the contract would have to recite that the man was to be paid for the building by what was measured in the quarry—it is not usual to make contracts for building on such a basis: in this case the work was to be paid for by the amount excavated?—I admit the specification does not cover the amount sufficiently well, and hence there is the more necessity for bringing it before the Government at an early stage, and throwing the responsibility on the Government.

"22001. You assume, as I understand it, that although the quantity excavated could be ascertained, the quantity excavated ought not to be paid for, unless it was subsequently effective in the work?—The quantity of useful material excavated could only be ascertained in the embankment. You could not ascertain the solid contents of a space filled with solid material and liquid material until the one is separated from the other.

"22002. Is this your contention: that although the quantity excavated could be ascertained, the material being such as it was the knowledge of the quantity excavated was not sufficient to justify an engineer in giving a certificate upon it?—Not in this case, from the peculiar material.

"22003. Now, is it not the case in all earth material, that the amount excavated does not yield the full amount subsequently?—It yields more sometimes.

"22004. What is the rule about it; in other words, whether more or less would make no difference, is it not the case that the quantity of ordinary earth excavated is not the same as is found in the embankment when compressed?—It depends very much on the material, and to set all doubt at rest it has been common to specify all ordinary material shall be measured in excavations, but I hold this is not ordinary material. This is exceptional material, and it is necessary to measure this in some other way, and that other way is provided by the specifications.

"22005. Is the amount excavated of ordinary earth material the basis for the certificates of the work, or is it the quantity in the embankment, or do these quantities differ as a rule?—The quantity of material in the work is, without any question, the quantity that should be paid for under the certificate.

"22006. Do these quantities differ, as a rule, when ordinary earth is used?—They differ slightly when ordinary earth is used, but not to any great extent.

"22007. About what extent?—I cannot tell at this moment. It varies.

"22008. Well, the average?—There are different opinions about that. Some hold there is more, others less. It depends on what stand point you view it from. The contractor who is paid one way will argue one way; the contractor who is paid another way will argue another way.

"22009. I am asking your experience as to the relative proportion; whether the earth excavated gives any criterion as to the amount in the embankment?—It does.

"22010. What criterion?—As to the proportion of one to the other, I cannot tell you at this moment.

"29011. Could you not say near it?—The one is not very much different from the other.

"22012. Is it somewhere about four-fifths: is there not a difference of between eighty and 100?—It depends on whether it is sand, or clay, or gravel.

"22013. That is not answering the question?—I am not prepared to give it to you now.

"22014. Would you say this: whether, in any of those cases: earth, sand, or gravel, the certificate is based on the amount found in the embankment or on the amount excavated?—The certificate is based on the amount excavated in those cases, for the reason it is easier to measure in the pit than in the embankment in those cases.

"22015. Then, according to that, the amount in the work ought to be paid for, but because it is easier to ascertain the amount excavated, that is paid for: is that what you say is done in ordinary cases?—In those cases; yes.

"22016. If the legal effect of the contract in this case is that this material shall be called and dealt with as ordinary earth, then your theory would hold, I suppose; you understand that your argument is really one upon the legal effect of this contract?—Well, with regard to the measurement, it would remain the same.

"22017. For instance, if the contractor is entitled to call this earth under the terms of his contract and the specifications connected with it, then this theory of yours about the different material would fall to the ground?—No; I do not think so. I think the responsibility is thrown on the engineer to ascertain the quantity, and he should take the right way of getting it.

"22018. If the contract should also say, first, that this is earth, to be dealt with as earth and should be termed earth, and next that earth shall be measured in excavation, would you still be of the same opinion?—Still, because I would have applied clause No. 30 of the specification to ascertain the quantity.

"22019. I think I understood you, upon a previous occasion, to say that you had never considered it necessary, notwithstanding these disputes on the subject, to make the specifications for contracts let subsequently to such disputes any more positive or less doubtful than the previous specifications, as to the mode of measuring muskeg material?—I can give you the reason. The reason is this: I was not aware myself until the other specifications were made. This matter was concealed from me—I do not say concealed purposely, but it was not known to me until the specifications for the other contracts were made and printed.

"22020. Then, I understand you to say that you had not the opportunity to correct those specifications so as to save future difficulties upon the same subject?—I was not aware of the difficulty until the specifications were prepared.

"22021. But they might be altered at any time before the contract was signed?—The system adopted was to print the specifications and to print the contract too, so that the contractor or contractors would know exactly before tendering what contract they would have to execute, and these cases—these latter cases particularly, if not in every case in the Pacific Railway—the contracts were printed and exhibited to contractors before putting in tenders.

"22022. The dispute between the contractors and the Government or at all events the difficulty of measuring this muskeg material on some proper basis, came to your knowledge while you were Chief Engineer of the Pacific Railway?—I explained to you, in some previous evidence, unfortunately I was not in the country.

As soon as I returned to the country and discovered there was a difficulty, I gave orders that no further certificates should be issued in the contractor's favour until we ascertained what the nature of the difficulty was.

"22023. Could you say about what time you first knew of it?—Yes, by referring to a letter which I wrote. It was about the end of 1878. I have sent for the letter.

"22024. You have spoken of the system of measuring the quantities left in the work instead of those actually excavated; it is generally understood, I believe, that rock makes a larger quantity in the embankment than its cubic contents before it is excavated?—It does.

"22025. What is the rule about rock: is that usually measured in excavation?—Yes; that is always measured in excavation—always.

"22026. Why is it that it is not measured in the embankment?—Because it can be very readily measured in excavation. The muskeg material, I hold, cannot be accurately measured in excavation—it cannot be measured at all.

"22027. Then, do I understand your objection to measuring it in excavation to rest on the impossibility of measuring the quantity excavated?—Yes; my objection to measuring muskeg excavation or to measuring anything else.

"22028. Do I understand you to say that when this first came to your knowledge, I mean the difficulty of measuring muskeg material, that you instructed the engineers under you no longer to permit it to be measured in that way?—I at once took steps to ascertain the precise nature of the difficulty, and gave positive instructions that no certificate thereafter should be issued in the contractor's favour.

"22029. You mean based on the quantity of muskeg taken out?—Yes."

## APPENDIX No. 11.

### DOCUMENTS RELATING TO THE RETIREMENT OF MR. SANDFORD FLEMING FROM THE OFFICE OF ENGINEER-IN-CHIEF.

LETTER *from the Secretary of the Department of Railways and Canals, enclosing an Order in Council appointing Mr. Sandford Fleming to a position combining the Offices of Consulting Engineer for the Canadian Pacific Railway and Chief Engineer of the Intercolonial Railway.*

DEPARTMENT OF RAILWAYS AND CANALS, CANADA.
OTTAWA, 3rd June, 1880.

SIR,—I am directed to enclose, for your information, a copy of an Order in Council, dated the 22nd ultimo, appointing you Consulting Engineer for the Canadian Pacific Railway and Chief Engineer of the Intercolonial.

I am, Sir, your obedient servant,
F. BRAUN, *Secretary.*

SANDFORD FLEMING Esq.

COPY *of a Report of a Committee of the Honorable the Privy Council, approved by His Excellency the Governor General in Council, on the 22nd May,* 1880.

On a Memorandum, dated 11th May, 1880, from the Honorable the Minister of Railways and Canals, having reference to the Intercolonial Railway, stating that a considerable number of suits brought against the Government by the contractors have been left undecided; that it would be a very difficult matter for any one except the Engineer who was connected with the work from its inception to satisfactorily perform the service of finally adjusting and settling such claims, and recommending that Mr. Sandford Fleming, formerly Chief Engineer on said railway, be relieved

from the duties and responsibilities connected with the office of Engineer-in-Chief of the Pacific Railway, and be re-appointed Chief Engineer of the Intercolonial Railway, to investigate the unsettled claims which have arisen in connection with that undertaking upon which no judicial decision has been given, and report on each case to the Department of Railways and Canals;

The Minister considers it important that he should continue to have the benefit of Mr. Fleming's professional skill and judgment in important matters connected with the construction of the Pacific Railway; he therefore recommends that that gentleman be retained as Consulting Engineer for that work, for the purpose of affording advice and assistance in that capacity to the Minister and officers of the Department.

The Minister further recommends that Mr. Fleming be paid a salary of six thousand dollars per annum, while discharging the combined duties of Consulting Engineer of the Canadian Pacific Railway and Chief Engineer of the Intercolonial Railway.

The Committee submit the above recommendations for Your Excellency's approval.

Certified. J. O. COTÉ, *C.P.C.*

---

LETTER *to the Honorable the Minister of Railways and Canals from Mr. Sandford Fleming submitting reasons for declining the new position assigned to him.*

OTTAWA, 7th June, 1880.

SIR,—The Order in Council of the 22nd May, has been communicated to me by the Secretary in a letter dated the 3rd instant.

By it I am relieved of the active duties and responsibilities of Engineer-in-Chief of the Pacific Railway, and appointed Consulting Engineer. I am named Chief Engineer of the Intercolonial Railway to investigate the unsettled claims that have arisen during construction.

In the nine years I have acted as Engineer-in-Chief of the Pacific Railway, I have given my best efforts to carry out the instructions and wishes of the Government; my labors have frequently been harassing, but I have exerted myself to the utmost of my power to advance the work, and I have done all I could to promote the general interests of the Dominion in connection therewith.

At this stage in the progress of the undertaking I may recount what has been accomplished. The question of practicability with the difficult problem of route has been successfully solved. The most exacting labor imposed upon the Chief Engineer has been performed. Generally speaking, the whole design of the Railway and its multitudinous works have been considered; difficulties overcome; details arranged; plans prepared; specifications made; contracts framed; modes of procedure established; operations for carrying on the work systematized, and instructions to the various executive officers issued and put in force. So much having been designed and organized, the duty remaining consists chiefly in general supervision and carrying out what has been arranged and determined. I can, therefore, relinquish the position I have so long held with a feeling of confidence for the future, and although difficulties which no foresight can guard against may present themselves, I am justified in saying that every contingency that may be anticipated has been considered, and, as far as practicable, provided for.

Having from its inception been so actively engaged in connection with the undertaking, and in forming and maturing the organization for carrying it to completion, I shall never cease to take a deep interest in the great work, and I will always be willing and ready to give my advice and render all the service in my power towards the establishment of the railway system to the Pacific.

But my nomination to investigate the unsettled claims which have arisen in the construction of the Intercolonial Railway places me in a position as embarrassing as it is unwelcome. The service is not strictly of an engineering character, and it could

scarcely be possible to select a duty more distasteful for me to perform, or one for which, with my antecedents in the matter of these claims, I appear less fitted to act.

The difficulties now to be investigated and settled are due mainly to the adoption of a policy entirely at variance with the views I held, and the recommendations made by me when Chief Engineer of the Intercolonial Railway some years ago. They have arisen through the disregard of the earnest and repeated warnings which I gave in letters, official and unofficial, addressed to the Head of the Government during the early stages of construction. I respectfully submit, therefore, that I am not the person to make the investigation. Whatever decision I might give, or whatever report I might make, the party to whom it would be adverse would be in the position to challenge it as the result of prejudice or feeling, and to insist that it was adopted to fit in with opinions previously expressed.

The service proposed to be assigned is so full of complications that I can foresee it will be one utterly impossible for me to perform with any hope of giving satisfaction in any quarter; however just my decision, I will be exposed to the charge in Parliament, and in the press, that it has been my aim and object to sustain my previously expressed theories and opinions.

The Government likewise cannot fail to recognize that in a matter of such importance, involving the settlement of claims amounting to several millions of dollars, all ground for hostile criticism should be avoided.

My sense of duty has always led me to serve the Government as best I could in every position in which I have been placed. In this instance, I feel it a duty to point out that no good result can be attained from deputing me to attempt the settlement of the Intercolonial Railway claims, and that it does not appear to me expedient that I should enter upon the investigation.

In declining this duty, I am aware that I will be terminating my connection with the great railway works of the Dominion, to which I have given the best seventeen years of my life in the responsible position of Chief Engineer.

It will especially be painful for me to separate myself from the Pacific Railway in its present condition, but the terms of the Order in Council leave me no alternative.

Accordingly for the reasons set forth I have respectfully to ask the Government to allow me to decline the new position assigned to me.

I have the honor to be, Sir, your obedient servant,

SANDFORD FLEMING.

The Honorable Sir CHARLES TUPPER, K.C.M.G.,
Minister of Railways and Canals, Ottawa.

---

LETTER *from the Honorable the Minister of Railways and Canals acknowledging the receipt of letter from Mr. Sandford Fleming declining to accept the position of Consulting Engineer of the Canadian Pacific Railway aud Chief Engineer of the Intercolonial Railway.*

OFFICE OF THE MINISTER OF RAILWAYS AND CANALS, CANADA,
OTTAWA, 10th June, 1880.

MY DEAR SIR,—I have to acknowledge the receipt of your letter of the 7th inst. declining, for reasons therein stated, to accept the office of Consulting Engineer of the Canadian Pacific Railway and Chief Engineer of the Intercolonial Railway which will be duly communicated to my colleagues. Entertaining as I do the highest estimate of your ability and integrity, I cannot but express my great regret that you have not felt it consistent with your duty to accept the position to which you had been appointed.

Wishing you every success and happiness in the future.

I remain yours faithfully.

CHARLES TUPPER.

SANDFORD FLEMING, Esq., C.E., C.M.G.

CANADIAN PACIFIC RAILWAY, OTTAWA, 1st July, 1880.

You will learn from the documents appended, published by permission, that I am no longer in the Government service.

For the past seventeen years I have served under successive Administrations as Engineer-in-Chief of important public works: first, the Intercolonial Railway and, more recently, the Pacific Railway. I cannot cease to act as I have hitherto done without thinking of my past relationship with the many who have aided me, and I cannot retire from the position I have so long held without bidding farewell to those with whom I have been associated.

In undertakings so gigantic, involving questions so complicated, it is not possible to avoid differences of opinion and such difficulties as are incident thereto. But these difficulties have been exceptionally few, and they have been far more than compensated by the exceedingly agreeable relations which have generally prevailed; by the genuine satisfaction which has arisen from the performance of duty; and by the engrossing character of the work itself.

As the head of the Engineering Staff to whom the Government has looked for opinions and reports on all questions; as the officer held responsible for the direction of every operation and the organization of every detail from the first explorations to the present time, it is with peculiar regret that I break my connection with the Pacific Railway at this particular stage. I cannot conceal from the members of the Staff that I would have perferred to have remained with them to help forward the more complete fruition of our joint labors. But circumstances have exacted that it shall be otherwise, and the time has come when my professional connection with the great undertaking into which I have thrown my best energies must close.

On the other hand, I conceive that I may, with legitimate satisfaction, look back on the progress which has been made. The vast territory in which our investigations have been made is no longer a *terra incognita*. Our labors have successfully pierced the formidable barriers imposed by nature, and every problem of practicability has been solved. Construction is being proceeded with at different points, within a range of nearly 2,000 miles, and in a little more than another year the completion of at least 600 miles of the railway is assured. In that short period a line of communication will be open within Canadian territory for the influx of settlers to our great fertile wilderness, destined to be the home of millions.

In retiring from the office of Engineer-in-Chief of the Pacific Railway, I entertain the kindliest feelings to each and to all. I shall always retain a warm recollection of friendships formed during my official career. I shall delight in hearing of the prosperity of my old associates, and I shall watch with deep, may I say with patriotic interest, the development of a national work which it has been my high privilege to assist in bringing to its present condition.

Again, with cordial good feeling and best wishes to all—Farewell!

SANDFORD FLEMING.

To the Members of the Engineering Staff and Other Officers.

PURCHASED 6th May 1930

FROM R. Douglas

PLACE OF PURCHASE Ottawa

PRICE 1.00

LATER CATALOGUED PRICES