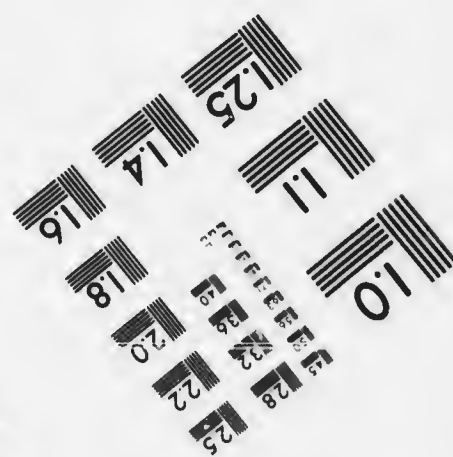
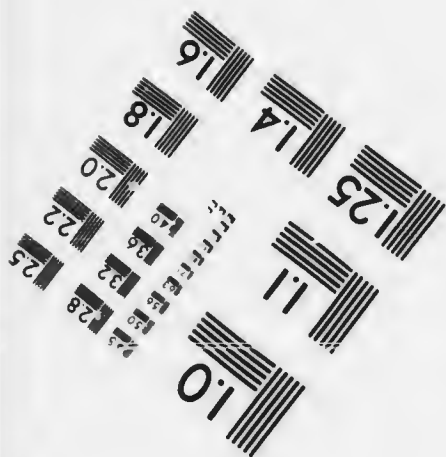
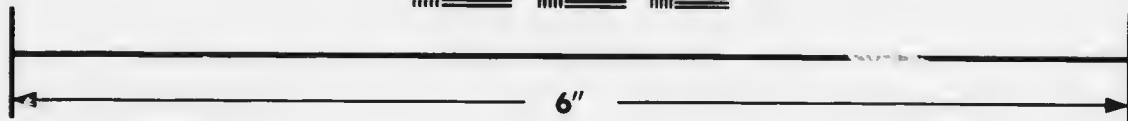
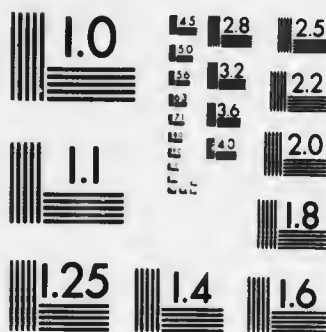


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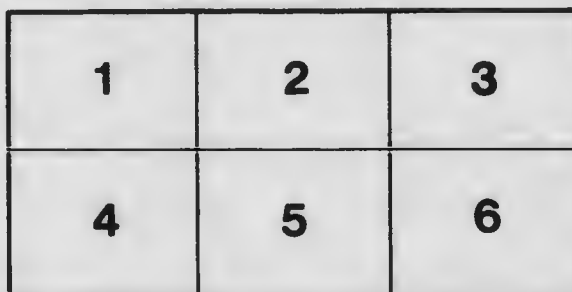
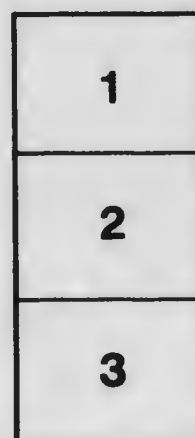
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REPORT

OF THE

COMMISSIONERS

OF THE

INTERCOLONIAL RAILWAY.

The Commissioners appointed under authority of an Act of the Parliament of Canada, 31st Victoria, cap. 13, intituled, "An Act respecting the construction of the Intercolonial Railway," beg leave to report progress since the date of their appointment, 11th December, 1868.

The Commissioners held their first meeting on the 17th December, 1868, and appointed the following Staff for their Office at Ottawa, viz. :—

- Mr. C. S. Ross, SecretarySalary \$2,000
- Mr. T. C. Duplessis, Assistant Secretary " 1,600
(Mr. D. is conversant with the French language).
- Mr. W. Wallace, Accountant.....Salary 1,600

These gentlemen have performed their respective duties in a very satisfactory manner.

The Commissioners also appointed W. Curran, messenger, at a salary of \$300.

Under the terms of the Act, the appointment of all officers, except the Chief Engineer, was left to the Commissioners.

By the 4th clause of the Act, the Government appointed Mr. Sandford Fleming, C.E., Chief Engineer.

The selection of the route of the line by Matapedia and the Bay of Chaleurs had been determined by the Government on 3rd July, 1868. Since that date Mr. Fleming had been actively employed in surveying and location of the line so selected by the Government.

INSPECTION OF THE LINE.

The Commissioners, deeming it to be of the first importance that they should have personal knowledge of, and acquaintance with, the general character of the country over which the Railway is to be constructed, proceeded (in company with the Chief Engineer) to drive over the whole line, from Truro to Rivière du Loup; making special inspection

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of the more important points, such as the crossing of the rivers Miramichi, Nipissiquit, Restigouche and Metis, and visiting the more important towns, such as Chatham, Newcastle, Bathurst and Dalhousie, where differences of opinion existed as to the proper location. The information thus obtained has been of the utmost possible value in deciding and reporting upon important questions which have arisen from time to time.

ENGINEER STAFF.

The engineer staff in existence at the time the Commissioners were appointed, was continued without interference on their part, until the first contracts were let, when, as it was desirable that the final location of the line should be proceeded with, the Chief Engineer was requested to indicate the number and strength of the parties necessary to cover the whole extent of the Railway, as well upon construction as upon surveys. The system adopted was to divide the line into four districts, the St. Lawrence, Restigouche, Miramichi, and Nova Scotia districts.

Mr. S. Hazlewood was appointed Division Engineer of the St. Lawrence district, covering 129½ miles.

Mr. M. Smith was appointed to the Restigouche district, covering a length of 127½ miles.

Mr. Abbight was appointed to the Miramichi district, extending over 114½ miles.

Mr. W. H. Tremaine was appointed to the Nova Scotia district extending over 117½ miles.

These four Division engineers receive each a salary of \$2,600, with an allowance of \$600 for travelling expenses.

For each section a resident engineer was appointed, with two assistant engineers, two rodmen and two chainmen.

This staff is necessary to stake out the work, make the plans of structures, see that the work is properly performed by the contractors, and make the measurement of the work as it progresses.

The salaries paid to these persons are as follows, and include all their expenses (and board) :—

Resident Engineers	\$1,800 and \$200.
Assistant Engineers	1,100.
Rodmen.....	600.
Chainmen	500.

The remainder of the engineering staff was divided into parties to complete the surveys and plans of the rest of the line, and work out the necessary detailed information. As the parties were moved from place to place, and had generally to live in tents, it was necessary to keep up a small commissariat staff to supply them with food ; and the cost of this had to be paid by the commissioners. Under these circumstances, the salaries of persons on survey parties were fixed as follows :—

Engineer in charge.....	\$1,500.
Assistant Engineer.....	900.
Rodmen	480.
Chainmen	360.

There was always one Engineer in charge of each party, and the number of Assistant engineers, rodmen, and chainmen, varied according to the work to be done and the extent of country to be examined. Each survey party had to employ, in addition, a certain number of axemen and labourers, who were engaged by the engineer as they were required, and paid at the ordinary rate of wages in the locality.

The supplies for such a staff, scattered over so large an area of country, required considerable arrangement and expenditure. In order to insure the greatest possible economy, and, at the same time, secure efficient work, the commissioners deemed it

desirable to appoint an officer to each district, who, under certain general instructions, should see to the commissariat matters, pay all certified accounts after due examination,—pay the salaries of the staff monthly, and supervise the expenditure generally. Much good has resulted from the appointment of these officers. Order and system have been introduced, and all accounts, when in order, have been paid monthly. The salary paid to these paymasters and commissariat officers, is \$1,200 each.

As the work is put under contract from time to time, the survey parties are broken up, and the members employed as a resident staff for a section, on the system already explained. When the whole work is under contract, a good deal of the present commissariat expenditure will be unnecessary; but it will have to be kept up for some time along the valley of the Matapedia, and on the line between Bathurst and Moncton.

LEAVE OF ABSENCE.

The commissioners feeling that they were not in a position to judge correctly as to the propriety of granting leave of absence when asked for, have left this matter almost entirely in the hands of the chief engineer, and have advised him accordingly. Foreseeing, however, that all the engineer staff could not be fully employed in the present winter season, the commissioners decided that where employes could not be utilized in the engineer offices, they should get leave of absence until spring, receiving one month's salary on leaving, and another on returning to their duties, but paying their own travelling expenses in both cases.

CONTRACTS.

It was considered very desirable that a portion of the work in each Province should be put under contract at as early a date as possible, the Confederation Act requiring an early commencement of the work; and therefore tenders for the construction of 90 miles of the line were called for, to be sent in by 8th February, 1869, viz. :—

40 miles in Quebec,
24 " New Brunswick,
26 " Nova Scotia.

Although the surveys were not as thorough and complete as could be desired. Profiles of the line had been prepared, showing the general nature of the work, the depths and lengths of cuttings and embankments, the width of bridge openings, and the proposed position of culverts and water courses. The chief engineer had prepared a very full and careful specification of the mode in which the several portions of the work were to be executed.

Before the appointment of the commissioners, the chief engineer had recommended that the contracts should be let upon a schedule of prices, without any definite sum as the cost of the whole work in each contract. In this view the commissioners could not concur. Without the fullest and most reliable information as to the quantities of the different kinds of work, if tenders had been sent in with prices for about thirty different items, the commissioners would have had no means of applying the prices to quantities, so as to ascertain the relative cheapness of the tenders, or the probable cost of the entire work. It is however unnecessary here to discuss that question, as it was fully dealt with in a Report to Council, of date 26th January, 1869, a copy of which is appended hereto. (Vide Appendix B.) That report was approved by Council, and the course proposed in it has consequently been adopted.

It is with great regret that the Commissioners felt that duty required them to arrive at a different conclusion from that of the chief engineer. They have endeavoured to conduct the discussion of the question in a spirit of courtesy and fairness, and they trust they have succeeded. They have now the satisfaction of knowing, that with the full information which has been afforded to contractors in all the lettings subsequent to that

of Section No. 7, the commissioners and the chief engineer have generally concurred in the mode adopted for letting the contracts.

On 8th February, 1869, the commissioners received 249 tenders for the four sections advertised, viz. :—

For Section No. 1	...	72	Tenders.
"	"	2	...
"	"	3	...
"	"	4	...

Contractors were informed in the printed conditions of contract exhibited, that

1. "Plans and profiles are exhibited to intending contractors, and they will be supplied with all the information in the possession of the Commissioners as to quantities, character of work, description of soil, &c., but contractors must satisfy themselves as to all the points connected with the work, as the Commissioners will in no way whatever be bound by any information so afforded."

2. "The tender must specify the lump sum for which the work will be constructed, and the rate per mile."

3. "The contract will provide that no extras of any kind whatever will be allowed. The work must be completed to the full satisfaction of the Commissioners, and no greater sum will be paid than the amount of the accepted tender."

4. "The Contractor will be alone responsible for the quantities of the different kinds of work of every description."

Upon examining the tenders it appeared that the prices for the whole contract, in tenders for

Section No. 1,	varied from	\$175,000	to	\$700,000
"	"	2,	"	299,000
"	"	3,	"	288,000
"	"	4,	"	297,000

The Commissioners were convinced, that, with such a great discrepancy in the tenders of men, many of whom had been largely engaged in constructing public works throughout the Dominion, the public would not be satisfied with any course on the part of the Commissioners, but that of strict impartiality. Full and clear notice had been given that contractors must estimate the quantities for themselves, and that under no circumstances would any extras be allowed, or any sum paid beyond the amount of the tender.

The Commissioners, therefore, decided upon recommending acceptance of the lowest tenders, offered by respectable parties, able to furnish responsible sureties.

The contracts for Section No. 1, at \$189,700, and for section No. 2, at \$299,000 were thus awarded to Messrs. G. and J. Worthington, well known as large contractors in Ontario and Quebec, for Railway Companies and for the Imperial Government. They have already executed a considerable portion of the work, and there is no reasonable doubt that they will satisfactorily complete their contracts.

Section No. 3, at \$288,000, and Section No. 4, at \$297,000, were let to Messrs. Elliott Grant, and Whithead, a respectable firm, residents of Ontario, all the members having been engaged in the construction of Public Works.

On 11th February, 1869, tenders for three further Sections of the line were advertised for, viz. :—

Section No. 5,	in Quebec,	26	miles long
"	"	6,	"	New Brunswick
"	"	7,	"	Nova Scotia

As before, plans and profiles, (and also approximate quantities of the different kinds of work to be done as estimated by the Chief Engineer), were exhibited, but it was as before distinctly announced that the Commissioners were not responsible for any of the

quantities given. Tenders for these three sections were received on 5th April, 1869, and numbered 253 in all, viz:—

For Section No. 5, 83 tenders			
"	"	6, 86	"
"	"	7, 84	"
For Section No. 5, the tenders ranged from \$345,997 to 1,014,000			
"	"	6,	" 237,000 " 633,150
"	"	7,	" 333,600 " 1,008,000

After full consideration the Commissioners believed that the public interest required them to continue the policy which they had adopted at the previous letting, and after a most careful enquiry into the standing and position of the parties tendering, and the responsibility of the sureties offered, they decided to recommend the acceptance of the tenders of

Mr. E. Haycock, for Section No. 5, for	\$361,574
Mr. J. Jobin " " 6, "	241,500
Messrs. Sutton and Angus " 7, "	413,955

The Commissioners are bound to state that the information given to contractors for these Sections also, was not as full as could have been wished, but it was all that could be furnished at the time.

On 3rd August, 1869, five more Sections were advertised, viz:—

Section No. 8, in Quebec	20½ miles in length
" " 9, " New Brunswick.	20½ " "
" " 10, " Do	20 " "
" " 11, " Nova Scotia.....	4½ " "
" " 12, " Do	21½ " "

in all 90 miles. With reference to these five Sections, the line had been cross-sectioned, and detailed information as to the quantities of different kinds of work to be executed was furnished to intending contractors.

Whilst, therefore, the contractors for the first seven sections had to make upon their own estimate of work to be done, the contractors for Sections No. 8 to 12, had the fullest possible information. In all future contracts the same complete information will be given.

On 18th October, 1869, tenders were received for Sections No. 8 to 12, viz:—

For Section No. 8, 53 tenders			
"	"	9, 35	"
"	"	10, 39	"
"	"	11, 40	"
"	"	12, 50	"

in all 217 tenders. They ranged as follows:—

For Section No. 8, from \$100,000 to \$268,644			
"	"	9, "	220,632 " 633,528
"	"	10, "	308,395 " 695,050
"	"	11, "	61,713 " 167,000
"	"	12, "	539,174 " 1,341,229

After very careful consideration and enquiry, the Contracts were awarded to the following parties viz:—

Section No. 8 to	Mr. Duncan Macdonald, for ...	\$100,000
" " 9 "	Messrs. J. B. Bertrand and Co. ...	354,897
" " 10 "	Messrs. McBean and Robinson ...	362,083
" " 11 "	Messrs Davis, Grant and Sutherland	61,713
" " 12 "	Messrs. Sumner and Somers ...	597,600

These twelve Contracts cover 251 miles of the Railway, and in the aggregate amount to \$3,567,022. The value of the work done upon them to 31st December, 1869, is \$335,766.

At the close of the year 1869, it became apparent that some of the contractors were in difficulties, and that in consequence, they were not making sufficient progress with their work. Frequent and urgent applications were made by the contractors to the Commissioners for assistance and relief, but the only answer to be given was, that the contractors had voluntarily entered into their engagement, and that they must be held to a strict fulfilment of them.

In two instances, the contractors failed to use the money received on their estimates in paying their workmen. The Commissioners applied the amounts of the next estimates, in paying the workmen on these two sections as far as the funds would permit.

On the 13th January, 1870, the Commissioners, in accordance with the terms of the contract, notified the contractors for Sections No. 3 and 4, and their sureties, that at the expiration of seven clear days, the contracts would be annulled, and that they would be held responsible for all damages that might arise in consequence. And on the 25th January, notices that the contracts had been annulled, were served on all the parties.

On the 22nd February, 1870, and 5th March respectively, similar notices were served upon the contractors for Sections Nos. 5, 6 and 7, and their sureties.

Section No. 3 and 4 have again been advertised, and will be re-let on 4th April next. Sections Nos. 5, 6 and 7, will be advertised soon, and re-let before the end of April.

Four additional sections, covering 74 miles of railway (and, with previous contracts, making a total of 325 miles), have been advertised to be let on 4th April next.

The Commissioners trust that the course which they have pursued, will show to those who may tender in future, that the engagement is one not to be lightly undertaken; and that strict fulfilment of the contract will be required in all cases. No one will have the slightest excuse for mistakes now when full information is given.

The Commissioners are not surprised that some of the contractors have failed. In executing large works, sub-contractors often fail. And if the work had been let to any one contractor, en bloc, he must have sub-let it in Sections, and must have had the same difficulties with sub-contractors, which the Commissioners have had with some of theirs.

Whilst the Commissioners regret the failure of contractors to prosecute their work, they may remark, that the failure does not, in any way, hinder or delay the final completion of the whole line, inasmuch as of the contracts annulled, one is situated in Quebec, others in New Brunswick, and others in Nova Scotia. And the most difficult and important parts of the work on the line, (which the chief engineer will not be prepared to place under contract for a short time to come) will have to be constructed ere these Sections can be in connection with each other. Neither have the public interest suffered in a monetary point of view, as the works executed upon these Sections, have only been paid for in proportion to the lump sum of the whole contract in each case. The remainder of the line, about 117½ miles, will be placed under contract in the coming spring, including the heavy bridges across the Restigouche and Miramichi Rivers.

ROUTE FROM MIRAMICHI TO MONCTON.

As great diversity of opinion existed regarding the proper place for crossing the Miramichi River, and also, about the location of the line, from that river to the intersection of the European and North American Railway, the Commissioners, during their first inspection of the line, made particular enquiries as to the relative advantages of crossing the river at Chatham, or at Newcastle, or at a point still higher up, and beyond the limit of navigation. The result of these enquiries, was to satisfy the Commissioners, that the most judicious point for crossing, would be above the Aram Channel, where the river diverges into two branches. The advantages of this crossing are, that it can be made at much smaller cost, and avoids the necessity for swings for the passage of vessels.

Several surveys having been made along the sea coast, from Miramichi to the

intersection of the Shediac Road, the Commissioners having decided upon crossing the Miramichi River, at the point above mentioned, authorized the survey of a new line, as nearly direct as possible, from that point to Moncton. The result of this survey, showed a saving of 10 miles in length, and of \$700,000 in cost, as compared with the frontier line; and a saving of 6 miles and \$155,000, as compared with the second or "Lawson" line. The crossing of the Miramichi River, really settled the location of the line from there to Moncton. Any line nearer to the coast than the one decided upon, could only be built if the crossing were fixed at Chatham. The cost of a bridge at that point, was so serious as compared with the site settled upon, that the Commissioners felt it to be impossible to come to any other conclusion than that arrived at. Before finally recommending the adoption of the direct line to Moncton, two of the Commissioners in August last, at the request of the parties interested, again drove through the country from Shediac to Richibucto, in order that they might form an opinion from personal observation. Having made these enquiries, and received the report of the Engineers, the Commissioners considered that no other course was open to them, but to report to the Governor in Council, in favor of the adoption of the direct or "Interior" line to Moncton. The adoption of that line, whilst not adding to the total distance to Halifax, brings the Intercolonial Railway, 13 miles nearer to St. John and utilizes 7 miles of the European and North American Railway.

RIGHT OF WAY.

The Commissioners, being desirous of obtaining fair and disinterested valuations of the lands necessary for the right of way, decided to appoint two valuers from time to time as the work progressed, to inspect the lands required and report upon their value, the one valuator to be a resident in the Province in which he was to act. The Commissioners believe the result of this arrangement will be found very satisfactory, but as payments are now being proceeded with, they do not deem it desirable to submit a statement of the results at the present time.

ROLLING STOCK.

Tenders for the delivery of 40 engines, 250 box cars, and 150 platform cars, have been advertised to be received on 17th instant.

EASTERN EXTENSION RAILWAY.

In March, 1869, the Government called upon the Commissioners to report upon the propriety of adopting the Eastern Extension Railway from Painsee, on the European and North American Railway, to the boundary between New Brunswick and Nova Scotia as a part of the Intercolonial Railway. That line was being built by a Company, under contract with the Government of New Brunswick. After careful enquiry, the Commissioners recommended that the line be adopted, provided it was handed over complete for \$24,000 a mile, or \$894,000 for the entire line of 37 $\frac{1}{4}$ miles. This was ultimately agreed to, and the line is now the property of the Dominion for the sum named. It is now opened to Sackville, and it is hoped that by the Summer of 1871 the Intercolonial Railway may be further opened to a point near Spring Hill, and also from Truro to Folly River. This will only leave unfinished a distance of about 35 miles between Halifax and St. John.

BRIDGES.

The Commissioners are of opinion, that in the main the bridges should be constructed of wood, on the "Howe" Truss principle. There are, however, several places where it will be desirable to construct them of iron. The principal points are at Trois Pistoles, Metis, Restigouche, Nipissiguit, Miramichi, and Folly River. At all these crossings

the bridges will be either very long or high, and by adopting an economical description of iron bridge the cost will not be very much greater than if they were built of wood.

CONCLUSION.

The Commissioners believe that they have now dealt with all the questions upon which information as to their proceedings is required.

They have endeavoured to carry on the duties entrusted to them, with the view of completing the railway within a reasonable time, and in the most economical manner. They will continue to carry on the work upon these principles, and they believe that a steady persistence in the course which they have adopted will enable them to complete this great work in a substantial manner, and at a cost which will be satisfactory to the country.

They have much pleasure, in conclusion, in expressing their satisfaction with the zeal and assiduity with which Mr. Fleming, Chief Engineer, and the staff under him, have performed the duties with which they have been entrusted.

A. WALSH.

C. J. BRYDGES.

A. W. M'LELAN.

ED. B. CHANDLER.

Commissioners.

Commissioners' Office, Ottawa, 15th March, 1870.

LIST OF DOCUMENTS ATTACHED HERETO.

- Appendix A.—Copy of letter, 27th January, 1869. S. Fleming, Esq., Chief Engineer to Sir J. A. Macdonald.
- Do B.—Copy of Report of Commissioners to Council about mode of letting contracts.
- Do C.—Copy of Minutes and Proceedings of Meeting of the Inhabitants of County of Westmoreland, held at Moncton, December 17th, 1868.
- Do D.—Copy of Report of Committee of Privy Council, 9th April, 1869, authorising survey of line from Mirimiac to Moncton.
- Do E.—Copy of letter, October 9th, 1869. Mr. Light to Mr. Fleming, on same subject.
- Do F.—Copy of letter, 19th October, 1869. Mr. Fleming to Secretary, on same subject.
- Do G.—Copy of Report, 21st October, 1869. Commissioners to Council, recommending adoption of interior line.
- Do H.—Memorandum of Districts, Sections, Contracts, &c., as at 31st December, 1869.
- Do I.—Copy of Specifications and Forms of Contract. [*Printed in Vol. No. 3. Sess. Papers, 1869.*]
- Do K.—Copy of Letter from Chief Engineer, of date 14th March, 1870.

INTERCOLONIAL RAILWAY.
Statement showing the position of Contracts, &c., as at 31st December, 1869.

DISTRICT.	Letter of Sections.	No. of Sections.	Miles of Sections.	ORIGINAL CONTRACTORS.	Date of Contract.	When to be finished.	Amount of Contract.	Value of Work done on Contract.	Per cent. of work done.	MEMORANDA.
St. Lawrence, 120½ miles.	A	1	20	G. and J. Worthington	March 4, 1869	July 1, 1871	189,700	68,063	31.80	Total Mileage..... 488½ Completed..... 454 Under Contract..... 297½ Advertisised for 4th April..... 73½ 371 117½
	B	2	20	G. and J. Worthington	do	do	299,000	57,230	18.55	
	C	3	26	E. Haycock	April 29, 1869	do	361,574	48,762	12.26	
	D	8	20	D. Macdonald	Oct. 26, 1869	do	100,000			
	E	13	20	Advertisised for 4th April		July 1, 1872				
	F	11	20	Advertisised for 4th April		do				
	G	11	20			do				
	H	1	3½			do				
	I	3	24	Elliott, Grant, and Whitehead	March 4, 1869	July 1, 1871	288,060	28,575	9.02	
	K	6	21	Jacques Jobin	April 22, 1869	do	241,500	26,325	9.91	
	L	9	21	J. B. Bertrand and Co.	Oct. 20, 1869	do	354,897	1,951	0.55	
	M	15	12	Advertisised for 4th April		July 1, 1872				
N	16	18½	Advertisised for 4th April		do					
O	10	20	McLean and Robinson		July 1, 1871	362,683				
P	6	6			do					
Q	20	20			do					
R	20	20			do					
S	21	21			do					
T	1	8	Part of E. and N. A. Railway		Completed					
U	1	37	Eastern Extension Railway		Almost do.					
V	1	4	Davis, Grant, and Sutherland	Oct. 26, 1869	Sept. 1, 1870	894,000	894,000	Whole.		
W	4	27	Elliott, Grant, and Whitehead	March 4, 1869	July 1, 1871	61,713	1,045	1.51		
X	7	24	Sutton and Angus	April 29, 1869	do	257,000	46,200	14.14		
Y	12	20	Summer and Somers	Oct. 26, 1869	Part Sept. 1870	413,955	53,731	11.80		
Z	12	20	Summer and Somers	Oct. 26, 1869	Part Sept. 1871	597,000	3,944	0.65		
						4,461,022	1,229,766			

APPENDIX A.

(Copy.)

INTERCOLONIAL RAILWAY,
OFFICE OF THE ENGINEER IN CHIEF,
HALIFAX, January 27th, 1869.

*To the Honorable Sir John A. Macdonald, K. C. B.,
Minister of Justice &c.*

SIR—A considerable difference of opinion exists between the Commissioners of the Intercolonial Railway and myself, relative to the terms on which Tenders should be invited for the construction of the road.

This difference of opinion is on points which seem to me to be of very grave importance. I may be entirely wrong in my views, but, entertaining as I do a very strong conviction of their correctness, I should not consider myself as doing my duty to the Government or to myself were I not to submit to you, for the information of the Privy Council, my reasons for the conclusions at which I have arrived.

I am quite sure the Commissioners will give me credit for having no other object in taking this step than that of honestly discharging the duty devolving upon me in my position as Chief Engineer. They will have no difficulty in understanding how painful it is to me, entertaining, as I do, the highest respect for them personally, to seem to place myself in a position of apparent antagonism to them, but the matters in which we differ, though of a kind upon which different minds may honestly arrive at very different conclusions, are so important that they well deserve the most careful deliberations of the Council.

It is on the Government, and not on either the Commissioners or myself, that the real responsibility of the decision will be thrown. I shall have done my duty when I have placed my views before you as I already have before the Commissioners, and urged the adoption of that course which in my judgment would best subserve the public interests.

You will recollect that in September last the Privy Council directed me to prepare plans, profiles, specifications, and conditions of contract and forms of tender to be subsequently submitted for their approval and sanction, and also to give public notice that these, as soon as prepared, would be exhibited at the offices at Ottawa and Halifax and at certain intermediate Stations on the line.

I accordingly gave the notice as directed, and applied myself at once to the preparation of the plans, specifications, &c.

In preparing these documents, it was necessary to bear in mind that the Government wished to place certain portions of the line under contract with as little delay as possible, and that they were unwilling to postpone the commencement of operations until all the working plans should be fully matured and such detail measurements made, as would enable the Engineer to exhibit to intending Contractors an accurate bill of quantities.

It seemed to me that therefore the only course left, having a due regard to the public interests, was to adopt the system of executing the work by a schedule of prices. I accordingly recommended that system, and in preparing the specifications and conditions attached, it was my anxious desire to define clearly, not only how every description of work was to be executed, but how it was to be paid for: to leave nothing loose or ambiguous in the terms of the Contract, so as that no opportunity should be afforded for misunderstandings between any parties; that the Contractor should know before hand that he would be paid for every kind of work he performed, and that the Engineer should have no difficulty in ascertaining the exact amount the Contractor was entitled to receive. To the specification and conditions of Contract, I added a special notice to intending Contractors, the main object of which was to warn them that the terms of the specification would be

rigidly adhered to, and that therefore they should not offer to undertake the work at less than it could be done for, in the hope of being compensated for their loss by any claim for extras, and also to induce them to rely upon their own judgment and information procured by themselves and not to be misled by any information obtained at second hand.

The specification and other documents so prepared were subsequently submitted to the Privy Council, by whom they were carefully and deliberately examined and discussed in detail. Certain amendments were suggested and added by members of Council, and on the 9th November last, the whole were formerly approved and adopted in Council.

I was thereupon directed to publish and distribute the several documents so sanctioned, which were signed by me as Chief Engineer, and were dated the 6th October, 1868. 1500 copies were distributed, 1000 English and 500 in French.

The Commissioners were appointed some time in December last. My first meeting with them took place at St. John, (N.B.), on the 29th day of that month. They informed me that they had changed the specification and system of contracts adopted on the 9th November, and had prepared others founded on a different principle.

Having given much thought and careful attention to the preparation of the documents which had been submitted to Council, and having drawn them so as to guard the public interests in the manner I considered the most effective, and the Government having added several clauses, conceived in the same interest and adopted to the same objects; I was deeply grieved to learn that the conclusions at which the Commissioners had arrived, as to the best mode of letting the contracts, were so different from those which I hold, felt it my duty to recommend, and which the Government had adopted.

I explained to the Commissioners my reasons for preferring the form that had been sanctioned, and remonstrated against the changes they had decided to make, but failed to convince them that my views were correct.

On the 19th December, (ten days before), the Commissioners intimated to me by telegraph, that new specifications and terms of contract would be required, but I knew nothing of the changes they intended to make, until the day upon which I met them at St. John. They had, before leaving Ottawa, so far matured their arrangements that they brought with them draft proof sheets in print of the new specifications and terms of contract, which, with some modifications adopted by them at St. John, were subsequently published and distributed.

On the 31st December and 1st January, I accompanied the Commissioners to Halifax, and on the 2nd January, I wrote you a hurried unofficial note giving generally my views, and stating that I would at the earliest possible date forward you an official communication on the subject.

Since the date of that note, I have thought the whole matter carefully over, and am more and more convinced that the views I hold are correct, and that the Commissioners are mistaken in supposing that the public interest will be served by the course they proposed.

Be that as it may, I apprehend that the duty of settling the mode of construction devolves upon the Government.

The Second Section of the Railway Act provides that "the work shall be constructed in such places, on such grades, and in such manner, with such materials, and in such specifications as the Governor in Council shall determine and appoint, as best adapted to the general interest of the Dominion." Whether, therefore, the one plan or the other is adopted, it would seem to demand executive action. Even though the decision to which the Government had already come, in approving the first specification and system of contracts, should turn out to have been adopted, on insufficient or incorrect information, it must be binding till the Government reversed it. Before a contract can be entered into under a different specification, new action by the Executive is necessary. Whether I am right or no in so construing the Act, it is my duty to call the attention of the Government to it, so as that the altered specifications, &c., if they meet the approval of the Government may not want the formal ratification which the Act seems to require.

The leading principle running through the specification prepared by me, is, as I have already stated, that works actually done should be paid for by the quantity and measurement. It leaves no room for extras, because all work done is done at rates fixed by the contract, and is paid for at prices agreed on. It is open to the objection, that until the surveys are absolutely complete and finished, the amount payable under the contract cannot be ascertained with entire accuracy.

The system of the Commissioners requires the contractor to undertake the work at a fixed sum per mile for the section. It aims to avoid extras, by requiring the contractor to name a lump sum. In the language of the specification, "the contract will provide that no extras of any kind whatever will be allowed; the work must be completed to the full satisfaction of the Commissioners, and no greater sum will be paid than the amount of accepted tender."

It also declares "that plans and profiles will be exhibited to intending contractors, and they will be supplied with all the information in the possession of the Commissioners as to quantities, character of the work, description of soil, &c., but contractors must satisfy themselves as to all points connected with the works, as the Commissioners will in no way whatever be bound by any information so afforded."

This form of tender would be unobjectionable if the Commissioners were in a position to state, or the intending contractor to ascertain with accuracy, the amount, the character, and the quality of the work to be done; but no one of these particulars is attainable within the time allowed for the tenders.

The cost at which a given quantity of any particular kind of work, defined in the specification, can be done under ordinary circumstances, is a matter which requires little calculation from persons accustomed to railway works, but it is a very different matter to fix a price when the requisite data are not furnished or procurable.

In England, railway contracts are let in different ways, but where companies are in good financial positions the usual mode is as follows:

Plans and sections or profiles together with general plans and special drawings for every structure on the line are prepared. The drawings are really working drawings and indicate the exact quantities of the various kinds of mechanical work. The profiles and cross-sections, the exact quantities of excavation. All these quantities carefully made up are shewn by the Company's Engineer on a schedule called the "Bill of Works." On this bill and the accompanying drawings the contractor bases his tender. He determines on a schedule of prices for the different kinds of work, applies the schedule to the quantities and makes up the amount for which he tenders to do the work, by ascertaining what it comes to at each scale of prices.

The schedule accompanies the tender, and the Company's Engineer, by applying it to the specification ascertains if the calculations have been made with accuracy. If inaccurate the tender is rejected.

When a tender is accepted, a contract is drawn up in conformity therewith, but provision is always made for necessary and unavoidable changes, this too even in cases where a deal of time has been spent in making the various plans and measurements. In case anything should be added to what is stated in the bill of works, or shewn on the drawings, or in the event of any of the works so stated and shewn not being required to be constructed, an addition or deduction accordingly is made at the schedule prices.

This system is, therefore, in effect the same as the one I recommended. Every contractor is paid for the work he actually does and no more. The only difference is that the quantities are ascertained before the work is let and not during its progress or at its close. The proprietors of the railway, are by this system free to alter and vary the character and quality, and amount of the work, deriving the benefit of any changes which reduce its cost, and paying only for increased work at fixed rates.

This is a very satisfactory system, and I adopted it so far as the difference in the circumstances permitted. It would have been very desirable to complete all cross

sections, determine the sizes and prepare the drawings of all the structures before letting the contracts at all, but it is very obvious, that this, running over 500 miles of railway, in circumstances like the present, would involve much delay. At this period of the year, with the depth of snow which in winter covers the ground, the cross-sections could not be made. The sizes of culverts and bridges can be determined only after the freshets of next spring. Unless the Engineer has had the opportunity of seeing the extent to which the streams are swollen by the melting snow and spring floods he can only guess at the size and character of the structures required, and cannot fail to make some much smaller and others much larger than he would construct them if he had proper information.

So little is known of a large part of the country through which the Intercolonial passes that no one can undertake to fix, with any certainty, what size the structures should be. The sizes of culverts and bridges proposed are, therefore, in many cases, merely conjectural. A similar uncertainty exists as to the quantity of all other kinds of work, more especially as to rock and earth excavation in side hill and rocky broken ground.

Every effort has been made within the limits of possibility, to obtain information on these points, but many of the details require much time, other require the revolution of the seasons to enable the Engineer to procure the requisite information. In the absence, therefore, of the necessary information on the part of the Commissioners, with the utter impossibility, at this season of the year, of obtaining it themselves, or of intending contractors obtaining it on the ground, it seems to me, that to ask for tenders in the form proposed, to do the work that cannot be defined with any approach to accuracy, is to invite a leap in the dark. No man can tell with accuracy the quantity, much less the description of the excavation he undertakes to make, or the width or size of the culverts or bridges he proposes to put up to span the streams. A tender under these circumstances is a mere conjecture, and a party proposing to take a contract, unless he is rash or inexperienced, and determined to secure the work at all hazards, will base his tender upon quantities much greater than the Engineer may subsequently find necessary, and will also add a large margin for contingencies, the consequence is that the work would cost very much more than if the contractors were paid simply for the work done according to fair schedule prices.

The public will, therefore, pay largely for the uncertainty.

By the plan proposed, the contractor nominally assumes all risk, and if he can do the work at the price he names and secure a handsome profit, he really does bear the risk, but, in that case, the Government actually pay for the uncertainty, in the enhanced price which it has enabled him to get, and which has yielded him his profit.

But if he is a loser, or can make it appear that he is, or even if he has not made all the profit he expected, he will try, in some way, to make good his loss of the expected profit by claims for extras. It will be difficult to shut him out by the most stringent forms of expression in the contract. Indeed, the terms of the specification and contract proposed by the Commissioners, taken in connection with the imperfect data furnished the contractor, and on which his tender must be based, are so extremely unreasonable as to convince him that the conditions cannot possibly be enforced; and this will be the ground on which he will establish the very best equitable claims for extras. Under this conviction, many will tender, and they will have as little hesitation in signing any contract, however stringent the Commissioners may be pleased to make it.

I think experience goes to substantiate this in all cases where public works have been undertaken by Governments. I need not adduce dozens of similar cases in these Provinces, it will be a more pointed illustration to bring forward instances in which railways have been constructed directly by Governments.

The only railways within the Dominion which have been constructed by Government are those in the maritime Provinces. When the Nova Scotia Railway, from Halifax to Trenton and Windsor was undertaken, the system now proposed by the Intercolonial Railway Commissioners was adopted; the most stringent provisions were inserted in the specifications and contracts, a lump sum was to be paid per mile, the contractor was

required to complete everything to the entire satisfaction of the engineer; he expressly renounced all claims to extras; he was told he must depend upon his own examinations and not be guided by the Government surveys for quantities and character of excavation, and this was done after the Government believed they were in possession of accurate information on these points. Yet, when the contracts came to be closed, every contractor had his claims for extras on the very point of quantities which he had expressly engaged to risk.

Irrespective of large amounts paid for extras, by the Board of Commissioners, further claims were made and pressed. The Government and the Legislature, relying on the terms of the contracts, fought off these claims for a year or two, but, in the end, both Government and Legislature had to succumb, after an infinite amount of trouble and agitation, and the contracts, let by lump, had, in the end, to be paid for by measure.

This system proved an utter failure in Nova Scotia, and notwithstanding that every precaution was taken in framing the contracts, it resulted in the construction of a very indifferent and unfinished road, with many perishable and now unsafe structures; in some cases, even the masonry has already fallen into ruins and has had to be rebuilt. The system further resulted in the ruin of the Chief Engineer, an honest and estimable gentleman, the withdrawal of public confidence from the Commissioners; it broke up one Government, led to the destruction of another, and the work, although never properly completed, cost the Province a very large sum for extras, and nearly double the amount of the original estimate.

In New Brunswick the railway from St. John to Shediac, was contracted for in much the same way, and although the consequences were probably not so disastrous, successive Governments and Legislatures have been worried and embarrassed by the applications and influences of contractors to obtain their claims for extras. The railway has now been in operation nearly two years, many of these claims amounting, it is said, to a very considerable amount, still remain unsettled, and the Dominion Government, now the actual owners of the railway, will probably before long learn more particularly about them from other quarters.

In view of the difficulties which all experience has shown to result from entering into contracts for the construction of public works, on undefined or imperfect data, and wishing to guard against these difficulties, it appeared to me the fairest way, alike to the Government and the contractor, to adopt the principle that the contractor shall be paid for all the work he performs, at fixed remunerative prices, and that no work shall be done or paid for, except what the Government requires.

It is evident that this plan would secure the construction of the railway at the minimum cost, and without risk or loss to any one, for if any contractor undertook to build it for less, say, under the Commissioners' system, he would undertake to do it for less than cost, and no Government can expect to build a railway or any considerable part of it at the expense of individuals.

On this plan the engineer is free to alter and improve the work, as from observation in its progress he gains additional information of what is absolutely needed. The contractor cannot object, he is paid for the work he actually does at the prices he has himself fixed. The Government will not require either to do unnecessary work or pay for work neither needed nor done.

Once fixing on this as a principle, I thought it very necessary it should be clearly understood that there was to be no deviation from it; I therefore attached much importance to the special notice to contractors annexed to the first specification.

While I wished every person who tendered, to be paid for work actually done and no more, I know how essential it is to the satisfactory progress of a work, that the sum received by him should equal at least the actual cost. It was my object, that the contractor should be paid, even well paid, but not overpaid. I wished him to understand that he must take care to rely entirely upon his being able to do the work tendered for at the price he named, and to exclude all hope or expectation of his receiving in any shape anything beyond what exact measurement would yield.

It was my object in this manner, while guarding against extras by a principle which did not admit extras, to have it also plainly understood that if in defiance of an express notice not to attempt the work beneath cost, a contractor should tender too low, he must himself bear the consequences of his mistake.

Whilst I aimed by this notice at preventing any one from offering to do the work at less than it would actually cost, another object it had in view was to secure competent men as contractors. The intention was, not to exclude altogether from tendering men without practical knowledge, and whose energy, judgment, and business habits might be of service on a contract but to render it necessary that such person should associate with those who had gained experience on similar works. In connexion with this, I may say, that I described to members of the Government the additional precautions which I thought would be advisable to take, in order to make sure that the work should be placed in good hands.

These I considered two essential points, first, that the work should fall into the hands of competent men, and second, that their contract prices should be ample. These were the purposes intended by the special notice to contractors taken in connexion with the specifications, &c., and unless these objects are effect, we may look in vain for the satisfactory completion of the work, either in respect to time, character or cost. A very low tender might indeed be received and accepted, but it does not at all follow, that the work will be completed for the price; experience rather goes to show, that very low tenders prove the most expensive in the end, hence the precautions I thought it my duty to advise.

This notice to contractors seemed to meet the views of the Privy Council, and was amended by yourself so as to better fit it for the purpose intended.

I regret that the Commissioners have not attached the same importance that I did to this notice. The difference of the system adopted by them would require some variation in the language, but I think it would have been useful, even if altered, so as to adapt it to the new system.

Both specifications give power to the Engineer to make alterations in grades, location, cuttings and dimensions, or character of structures, during the progress of the work. This power in the one case can be exercised with freedom, and when exercised, is no hardship to the contractor, and may be a great benefit to the Government, but under the new specification any exercise of it is attended with difficulty. If it is found from additional information of the character of the county or locality acquired as the work goes on, that an alteration could be made so as not to injure the road, or so as to improve it, while largely reducing cost, the Government gain nothing by the saving. If an alteration, however beneficial and necessary, adds to the cost, the addition must be at the expense of the contractor. In consequence there will be a perpetual struggle on the part of the contractor, if not to obtain alterations that reduce expense, at least to resist those which increase it. Every improvement that adds to the cost is liable to be considered an arbitrary addition, made by the Engineer to burden the contractor. This provision, in the circumstances under which the work is undertaken, would seem to place it in the power of the Engineer to ruin or enrich a contractor at his pleasure, and this cannot fail to subject every act of the Engineer, however honest his intentions may be, to suspicion and unfair interpretation. It cannot but limit largely his power to make desirable improvements, when every alteration he makes, exposes him to charges either of oppression or of favoritism, nor does it seem to be desirable to place an Engineer in such a position, that no alteration, of the most obvious and necessary kind, can be made without involving the element of a dispute. A dispute which, beginning with the Engineer, will find its way first to the Commissioners and then to the Government, and which, with the persistency that distinguishes claims made in the interest of individuals, as contrasted with the modified resistance that public functionaries feel it their duty in the interest of the people to offer, will be very apt to end as they have done under similar circumstances and elsewhere, in the triumph of the contractors and the sacrifice of the public funds. It is impossible to calculate the number and variety of claims for compensation which will arise out of contracts of this character, running over hundreds of miles, claims made by

parties who will have established a large local interest in these Provinces, and will be able to unite in favor of their claims, influences and considerations, wholly irrespective of merits or character.

Seeing this in the distance it is my duty to bring it thus distinctly to the notice of the Commissioners and Government.

All this might be avoided by the simple expedient of paying for the work actually done. The Engineer would then be at full liberty to make any alterations in the alignment, the grading, the character of the structures, &c., which he might deem advisable as increased information pours in upon him after the contracts are let. Such alterations are continually made in England, even where there is abundance of time for surveys, and where the time has been taken, where the country is open and accessible, where there is every opportunity before hand to acquire the most correct and thorough information, and when it would seem that there ought to be no expense for changes, but if desirable even in such cases, it is absolutely indispensable where the surveys extend over such a length, where the line is largely through wilderness, where there are no inhabitants who can give the Engineer any information beyond what he can get with his own eyes, and where it is hardly possible to suppose that more perfect examinations and surveys would not suggest improvements. It seems to me that the character of the country through which the railway passes, the circumstances under which the surveys have been made, all leads to the conclusion that it is in the interest of the public, that the utmost liberty should be given to the Engineer to avail himself of additional information as the work proceeds, and that this should not be a liberty in words only, but one that can be exercised without apparent injustice to any body, and without leading to endless difficulties.

On a line like the Intercolonial Railway, traversing a country in the condition and with the peculiarities of the one in question, the Engineer will, under the most favorable circumstances, have enough to do to carry out properly the multifarious duties appertaining to his office, and it seems hardly fair to him to add to the difficulties and responsibilities with which he will be surrounded, those serious perplexities and complication which will inevitably spring from the adoption of the system favored by the Commission.

There is one objection offered to the system I recommend to which I ought to refer. It is the only objection which the Commissioners, so far as I know, have made to it; at all events it is the only one which they have made in my hearing. It is objected that if payments are made on the Engineer's Certificates of quantities it puts it in the power of a dishonest Engineer to collude with a Contractor and defraud the public by returning larger quantities of work than are really executed. This objection would be more difficult to meet if any one Engineer possessed the power of giving certificates unchecked and uncontrolled; but this is not the case, in ascertaining quantities there are a great variety of checks, and any attempt to fraud would have to involve a large number of persons, beginning with the Rodmen and Assistant Engineers, and going up through the Division and District Engineers, and finally the Chief Engineer, while the whole is subject to be checked at any time by the materials under the control of the Commissioners on record in the offices.

The plan in contemplation is to have standard Lithographed Drawings of all Culverts, Bridges and other structures, taking care to reduce them to the simplest forms and fewest varieties, to adapt these drawings to the peculiarities of the ground in each case, to show thereon in red lines and figures the work exactly as executed, as it is build; to have these drawings and a sufficient number of accurate copies properly attested by the Inspector of Works, the Assistant, the Division and the District Engineers, and when so attested forwarded as records to the Head Offices.

Records of every structure exactly as executed would be kept in this way. Cross sections and detail measurements of all excavations and all other kind of work would be checked, attested, and recorded in the proper offices; in like manner each Engineer would thus exercise a complete check over those under him and the Chief Engineer over all. The Commissioners would also have it in their power, with or without the knowledge of the Chief Engineer or any member of his staff, to ascertain for themselves whether or not the returns made to them were correct.

An attempt to defraud under such circumstances would be very unlikely, and the

possibility of success still less likely. But if the objection to the system is founded upon the possibility of fraud or corruption in the Engineering Staff, what is to be said of the case of an engineer invested with unlimited power of alteration in contracts to be performed for a fixed sum, when, without any very obvious departure from the line of duty, he might ease or burden a contractor almost at pleasure, and that without taking anybody into his counsels, or being subject to detection or control. If the danger of dishonesty is proportioned to the opportunity, it cannot be doubted that this system opens a door for fraud, which does not and cannot exist in the other one recommended by me.

Whatever objections, therefore, may fairly be brought against the system I have recommended, it does not seem to me to be open to the one mentioned by the Commissioners, on which they would seem to lay some stress.

There is another point on which the Commissioners have, I think, prematurely come to a decision, and which seems to me to be worthy of attention. Originally it was proposed to build iron bridges. The plan of the Commissioners is to substitute wooden ones. They propose to build the bridges of pine.

This alteration invites attention to the comparative merits of wooden and iron bridges, under circumstances such as those now existing, and as the question seems to me one of very great importance, I trust the Council will not think me obtrusive in making this matter the subject of a few observations.

For half a century back a great deal has been heard of the pine forests of New Brunswick, and it is not to be wondered at that a proposal should be made to construct the bridges on the line of the Intercolonial Railway of timber instead of more durable materials, under the belief that there would be no difficulty whatever in rebuilding them from the adjacent forests as the timber in their construction from time to time fell into decay. There were at one time large tracts of most valuable pine in the Province of New Brunswick. Until lately the English market was largely supplied with timber from this quarter, but lumbering operations have been carried on to such an extent that all or nearly all the marketable pine along the numerous water channels, or within reach of them, has now been removed. So much is this the case, not only in New Brunswick, but also in Nova Scotia and Quebec, that, on an overland journey from Halifax to Quebec by any travelled route, the eye can scarcely detect a single pine tree. With regard to Nova Scotia, if the bridges in this Province be made of pine, I am satisfied it will have to be imported, and in New Brunswick and Quebec, although a sufficient quantity to erect the first set of bridges may have escaped the axe of the lumberman, in some of the more remote recesses of the forest land, it will be no easy matter to renew them in the future with native timber. I state these facts from my own observations, for, although there are many persons who know particular sections of the country much more intimately than I do, there are not many who have travelled more through the three Provinces in all directions, or had a better opportunity of acquiring knowledge respecting their natural features and productions. My own observations respecting the almost total destruction, at no distant day, of pine timber in these Provinces, is confirmed by statements from others. Only the other day, a gentleman who has been engaged during a life time in extensive lumbering operations, and who is now a member of the Senate, informed me that in 20 years there would be scarcely a pine tree standing in New Brunswick. I mention these facts in order to remove the mistaken impression that it would be an easy and inexpensive matter to re-build timber bridges from the inexhaustible forests of the country, as they periodically fell into decay.

It has been shown as an actual statistical fact that, in the early days of railways in the United States, wooden bridges lasted on an average only ten years. Latterly, greater care has been taken in their construction, as well as in their protection, and now the average length of the life of a wooden railway bridge has proved to be about twelve years. Taking the life of a wooden railway bridge, therefore, at twelve years, it is apparent that $\frac{1}{12}$ th, or $8\frac{1}{3}$ per cent. of the whole cost is chargeable against it every year for renewals. In addition we have the interest on capital consumed in its first construction, viz. four per cent. in this instance.

In comparing the relative cost of iron and wooden bridges there is another charge against the latter which the former is free from—I refer to the cost of employing watchmen as a protection against fire, a precaution absolutely necessary, at all events during the summer months, and which becomes no inimportant charge on the bridge of perishable materials. This charge might range, according to circumstances, from one to four per cent. on the cost of the bridge; but excluding altogether the wages of watchmen from the comparison, we find that a wooden bridge is chargeable as above with $12\frac{1}{3}$ per cent. per annum for the use of capital employed in its construction and re-construction.

Generally speaking, an iron bridge can be put up for about double the cost of a wooden one. Reckoning the money expended on its first cost at the rate of interest to be paid on the recent Intercolonial Loan, and as compared with a wooden bridge, costing double as much, we have, say eight per cent. per annum chargeable against the bridge structure, if iron instead of wood be employed.

This, I submit, is a fair way of comparing the cost of bridges built of wood and iron respectively, and from this it is clear that the bare charges on capital are as $12\frac{1}{3}$ is to 8, or, in other words, while the actual cost of a wooden bridge for construction and re-construction is $12\frac{1}{3}$, that an iron bridge is only 8, and if to the former be added the current expenses for watchmen, which are dispensed with in the latter, the difference in favor of the iron bridge is proportionately increased.

I do not say that iron bridges are everlasting, but the period when they will require to be rebuilt seems so remote that they may practically be considered permanent. The ordinary repairs of wooden bridges are always heavy—far more so than that of iron bridges. The latter require scarcely anything more than an occasional coat of paint; and this, wooden bridges ought also to have.

There is another way of putting this point, which illustrates very clearly the comparative economy of wooden and iron bridges, and that is, to estimate the annual burden on the resources of the Country of building and maintaining the different structures.

If a bridge be built of iron, with capital like that in the hands of the Commissioners, at four per cent., the annual charge on the Revenue is, for every \$1,000 of the cost of construction, four per cent., or \$40 00

If, on the other hand, a wooden bridge be built, it will require but half the capital, and, consequently, at the outset, the charge for interest would be but 20 00

But as it would require to be rebuilt at the end of 12 years, and as in ordinary cases, capital will not probably be raised under six per cent., the second time it is built the charge would be \$30 to be added to the former \$20, making in all 50 00

After 24 years the charge would be 80 00
or double that of the iron bridge; but the disadvantage increases every time the structure requires to be replaced, till, finally, no comparison can be instituted between them.

From the foregoing it is evident, that although the immediate outlay on wooden bridges on the Intercolonial Railway, would be less than on iron bridges, when interest, renewals, watchmen, repairs, and all other expenses are taken into consideration, the former would actually cost far more than the latter.

The utility and economy of iron bridges is now pretty well established even in the United States, where, in the early history of railways, primitive constructions of wood were all that could be undertaken. In that country, the question was, and in some districts still is, not as to the superiority or economy of iron over wood, but, of a railway with temporary structures, or no railway at all. Previous to the outbreak of the late war, some of the important lines had commenced replacing their wooden bridges with iron structures. The New York Central had rebuilt some twenty-two of their bridges between Albany and Buffalo, constructing them entirely of wrought iron. In the Southern States numbers of iron bridges were also being erected. The Pennsylvania Central as well as the Baltimore and Ohio, adopted the policy of replacing all wooden bridges with iron ones, as fast as the former gave out, and both these companies have renewed in this way, quite a number of their most important bridges with iron. And on the Hartford and New-

Haven Railway, a single iron bridge has recently been completed at an expense of \$265,000. I may here note that this bridge took the place of a Howe Patent Truss, the second wooden bridge erected on the same site with in 22 years.

In Canada we have had all the wooden bridges on the Northern Railway, replaced by permanent structures of iron. On the Brockville and Ottawa Railway, two spans of iron were erected last year, at a cost of about one-half more than the original wooden structures, and five other spans of iron are being prepared for erection during the present year.

On the Great Western of Canada, a large number of the wooden bridges have been rebuilt with iron. This Company intend ultimately, I believe, to have the whole of iron; and they have only suspended the re-construction of the whole, in that material at once, for want of funds.

Fortunately the bridges on the Grand Trunk Railway are generally constructed of iron. Suppose, in order to appreciate the importance of having those on the Intercolonial Railway of the same material, that the Victoria Bridge, and all the other bridges between Rivière du Loup and Sarnia, were at the present moment of perishable material, and in an unsafe condition, as they would unquestionably be, if timber had been employed in their construction.

For a railway of such national importance as the Intercolonial, it would I think be a very grave error to build the bridges of wood. True, the traffic is not expected to be great, however, important in other respects the line may be, but this is really one of the strongest reasons why economy should be studied in avoiding temporary and perishable works. If the earnings of the railway are going to be light, it will never do to trust to the profits from traffic for the completion of the line in a permanent manner, or for the maintenance of perishable, and, in consequence, expensive works to keep up.

The saving effected in the first outlay, from the employment of wooden bridges, would be very small, not to be mentioned as an equivalent for the reduced standard of the railway, or for the increased annual charge for repairs and renewals, for the risk of accidents by fire, or for the increased danger to life and property.

The serious accidents which are constantly occurring through the failure of wooden bridges on American railways, to say nothing of the unseen risks more frequently run, ought to be a warning against their use in the present instance.

I have not yet remarked, in discussing the merits of wood and iron bridges, that the renewal of wooden bridges at several points on the Intercolonial Railway would be accompanied with a good deal of difficulty.

It would be necessary to erect temporary staging alongside of the bridge sites to carry the trains, while the old bridge was being removed and the new one constructed in its place. At some points this temporary structure alone would be very costly, besides which, a feeling of insecurity would be engendered in the public mind by them, and the necessity for their erection. These temporary structures would, of course, add to the cost of rebuilding the wooden bridges, and thus renewals would be more costly than the construction of the bridges in the first place.

I know of no section of country in the Dominion where iron bridges can be erected with equal advantage, or at less cost than on the route which the Government have fortunately selected for the Intercolonial Railway. Seagoing vessels can reach within a short distance of all, or nearly all, the bridge sites, while the bridges can be built in England and brought out in parts of convenient size, which can be floated from the ship's side to the points where they are required, or to most of them.

Thus the charges for internal carriage and repeated handling, which are heavy under ordinary circumstances, are saved, or would be trifling, and therefore this increases the force of the contrast between the two kinds of structures in the present instance.

Having, I think, clearly shown that the iron bridges, in addition to all their other recommendations, are, in the long run, by far the most economical, I can only see one argument in favour of the adoption of wooden bridges, and that argument can only be

used by those who view the union of the Provinces as an experiment very likely to prove unsuccessful.

If there is any probability of the railway being allowed in a few years to fall into disuse, then make, not only the bridges, but everything else as primitive and temporary as possible; or, perhaps better still, build no railway at all. If, on the other hand, the Government have any faith in the union, and believe as I do that it is destined to last, then it will be studying true economy to make the railway as durable, substantial, reliable, and permanent as possible.

I do not enter upon the question how far we are morally pledged to the British Government to construct a railway of a permanent character. It is certain that all the calculations upon which the Imperial Government have acted have been based upon the idea of permanence. Whether they would have felt disposed to guarantee our bonds, if it had been put to them that the money received would be expended in a manner to require the raising of another large amount at the end of twelve years, and that the political objects of the work could only be secured by our being able to borrow largely at that period for reconstruction or renewals. These and similar considerations I feel to be outside of the line of my duty, but they cannot fail to have some weight with the Privy Council.

I have said enough, I think, to convince you of the advisability of constructing the bridges of iron, as originally intended; and I may be permitted to add, in a few words, my opinions with regard to the construction and character of the works generally.

Whilst avoiding extravagance and waste of every description, in all services and in every department of the railway;—whilst limiting the expenditure on stations to the simplest kind of accommodation, to meet the wants of the country in rolling stock, to the least supply at first likely to be required, and limiting the first outlay in a similar manner on all other services above and beyond that which constitutes the roadway;—I would advise, as true economy, that all works under the rail track should be solidly and carefully built, and of the most durable and imperishable materials.

In conclusion, I may further be permitted to observe that, with all the reasons in favor of iron and against wooden bridges, and with the strong conviction in my mind of the great superiority of the former; I think that the substitution of wooden bridges would be an insignificant error compared with the adoption of the system of contracts, which, without duly weighing all the circumstances, I think the Commissioners seem to have favored.

A system which, in every step from the beginning to the end of construction, involves the elements of dispute;—a system most unjust to the Engineer, inasmuch as it will inevitably add immensely to his toil and responsibilities if he does, or attempts to do, his duty in the interest of the Government and the public, the consequence will be a perpetual struggle between him and the Contractors: he will be deeply involved in all the difficulties into which the system will lead, and powerless to effect an escape. All experience goes to show that, under this system, the Contractors will triumph in the end over both Engineer and Commissioners, and the public will have to pay for it.

It is urged on behalf of the system favored by the Commissioners that the tenders, when received and accepted, would show the Government and the country what each section of the railway will cost, and the full amount of liability incurred; this, doubtless, would be extremely satisfactory if it proved correct, but it is, I fear, jumping at a conclusion rather too rapidly. We cannot altogether disregard the warnings of experience, and these warnings most clearly point out that this will turn out a complete mistake. It is urged that wooden bridges would effect a great saving in the expenditure immediately to be incurred; any saving so effected would, I am satisfied, be neutralized ten-fold by the adoption of the Commissioners' system of contracts in the place of that system originally adopted by the Government. The new specifications and terms of contract would lead directly to difficulties, during construction, of the most serious kind; they would result in the building of an imperfectly constructed railway, with perishable structures, entailing heavy charges for maintenance, while the old specification and

conditions of contract would not only avoid the perplexing difficulties referred to, and give us a substantial railway, with iron bridges and all structures of the most permanent kind, (thus favorably effecting maintenance expenses,) but they would, in addition, save in the first cost alone hundreds of thousands of dollars; indeed, I may confidently say, hundreds of thousands of pounds.

I do not pretend to advance that the original system which under the circumstances of the case I have felt it my duty to recommend, would prove to be entirely free from difficulties, some would doubtless spring up, from time to time, as they always do, even under the most carefully matured scheme of operations, but it is purposely designed to avoid those which are inseparable from the other system, difficulties of a kind which always prove serious and embarrassing, and which so frequently turn out in the long run to add immensely to all pre-conceived ideas of expenditure.

I have thus, at a greater length than I could have desired, laid before you the reasons which convince me of the superiority of the plans originally proposed for the construction of the Intercolonial Railway. These opinions are honestly entertained, and I trust have been respectfully and inoffensively expressed.

I need scarcely say again how much I regret the circumstances which have forced me to write this communication, and how painful it is to me, in the discharge of my duty, to appear to be in a position of antagonism to the Commissioners, for whom I entertain, individually, very high respect; but whatever may be my own views, the same considerations which make me feel it my duty, as a servant of the Government, to lay them frankly before you, make it equally my duty, when the Government shall have expressed their judgment, to do every thing in my power to carry out their views in concert with, and under the instructions of the Commissioners, and I need hardly say that no prepossessions of my own in favor of any plan, will interfere in any degree with my devoting myself, with all the energy I possess, to carry out the wishes of the Government in the matter in question.

I have the honor to be, Sir,

Your obedient servant,

(Signed,)

SANDFORD FLEMING,
Chief Engineer.

APPENDIX B.

INTERCOLONIAL RAILWAY COMMISSIONERS' OFFICE,

OTTAWA, 26th January, 1869.

The Commissioners for the construction of the Intercolonial Railway having, after full discussion with Mr. Fleming, the Chief Engineer, adopted the system of lump sum per mile, in letting the contracts for this work, and Mr. Fleming having addressed an unofficial letter to Sir John A. Macdonald, entering a vigorous protest against this mode of letting, and setting forth his reasons for preferring the system of a schedule of prices, the Commissioners deem it their duty to submit to the Honorable the Privy Council a statement of the reasons which have induced them to adopt the system set forth in the "Conditions of Contract" issued by them, a copy whereof is attached hereto.

Mr. Fleming appears to have come to the conclusion that the proper course to adopt in letting these contracts is to base them upon a schedule of prices, having no fixed sum at which each section is to be completed. He bases this opinion, as the Commissioners understand, mainly upon the ground that the surveys are not yet sufficiently

complete to enable him to say what the quantities of earthwork, masonry, &c., will be, and that, therefore, he cannot supply contractors with sufficiently definite information to enable them to say the sum which they will be able to complete each section for.

He states that the season of the year prevents the possibility of making the necessary cross-sections to determine the quantity of material in the different cuttings and embankments.

He states, further, that it is yet impossible to say what quantity of masonry will be required, as he is not prepared to state positively the sizes of the different bridges and culverts, and, therefore, that he is not able to give contractors information upon which they may base tenders at a lump sum, or at so much per mile.

He argues in favor of a contract on a schedule of prices, as it appears to the Commissioners, mainly upon two grounds: first, the impossibility of his supplying statements of quantities; and, secondly, his want of knowledge of the size and dimensions of bridges, culverts, &c., so as to enable him to say what quantity of masonry will be required.

It must be obvious that it would be entirely beyond possibility, under such circumstances, for the Commissioners or the Government to estimate either the probable cost of the work on each section, or the relative value of tenders, if they are to be given in, as Mr. Fleming proposes, upon a schedule of prices. Of course, if Mr. Fleming is unable to give contractors statements of quantities upon which to base their tenders, he is equally unable to afford the Commissioners any satisfactory information in regard to the different quantities, and the various kinds of work to be executed.

The result then would be, that if the Commissioners receive a number of tenders based upon a schedule of prices, such schedule of prices covering, according to Mr. Fleming's proposal, no less than 29 different items, they would be utterly unable to decide which tender it was most desirable to accept, and have no data whatever upon which to found any calculations in regard to the relative economy or otherwise of the different tenders. Neither could they have any idea from such tenders what the cost would be of the works they let. This cannot admit of doubt. But a very brief examination will show the correctness of this view very clearly.

It will be enough, without going into all the 29 items in Mr. Fleming's schedule, to take a few to illustrate the matter. The tenders, on the schedule principle would then produce some such result as follows, viz:—

Tender.	Solid rock.	Loose rock.	Earth excavations.	1st Class Masonry and Cement.	1st Class Masonry and Lime.	2nd Class Masonry and Cement.	2nd Class Masonry and Lime.	2nd Class Masonry, Dry.
	cts.	cts.	cts.	§.	§.	§.	§.	§.
A.	75	35	25	12	11	11	10	5
B.	80	39	18	14	14	16	10	6
C.	60	59	40	10	8	9	7	4
D.	35	25	30	12	10	10	8	7
E.	1.00	70	40	9	9	8	8	6
F.	50	42	40	12	11	11	19	3
&c., &c.								

The more the number of tenders, the greater will be the difficulty.

But with the sample given above, and they would be sure in the actual tenders to show more serious discrepancies and variation in price, it would be impossible to form any idea at all as to which was the most advantageous tender. It will be remembered that the above example deals only with eight items, whilst the proposed schedule includes 29 items, making the difficulty of deciding of course still greater.

No estimate even could be made as to the most desirable tender, unless the quantities were known; and this information, Mr. Fleming states, he cannot supply

Neither could there be any estimate of what each section will cost until it was completed.

The Commissioners are clearly of opinion, that under such circumstances, tenders by schedule of prices, would render it entirely impossible, from the beginning, to know what the ultimate cost of the work would be; and would be certain in the end to lead to endless disputes, owing to difference of opinion between the contractor and the engineer in regard, first, to the quantities of each description of work executed, and then in regard to the classification of items according to the tender under which it was to be paid for.

It is also clear that in a line of railway, extending over nearly 500 miles, the Chief Engineer cannot, under any circumstances, of his own knowledge, be able to speak of the different kinds of work executed by various contractors, divided into 20 or 25 contracts. The Chief Engineer would have, of necessity, as the work progressed, no personal knowledge of the mode in which the work was being done. It would be impossible for him to measure the different kinds of work, or to decide from personal knowledge or observation, under which item of the schedule they are to be paid for. This duty can only be done by those actually upon the spot; and it is a duty which experience has always proved must of necessity be left, to a very large extent, to the youngest engineers upon the line, whose return of quantities must, as a matter of necessity, be accepted as correct, and who, from day to day, are necessarily in constant communication with the contractors.

For these reasons, the Commissioners have the strongest possible opinion that to attempt to let the contracts for the Interoceanic Railway upon a schedule of prices, as proposed by Mr. Fleming, would be disastrous in the extreme; and could only have one termination, and that, one which would entirely shipwreck the reputation of the Engineer, the Commissioners, and the Government.

It is necessary, perhaps, to notice the objection which Mr. Fleming makes to the fact that he is not yet prepared to say what is the proper size for the various bridges, culverts, and other structures, to span the different streams and watercourses.

The Commissioners cannot but regret that after engineers have been so long engaged in preparing the plans, and have had necessarily so many months' opportunity to judge of the sizes of streams, and of obtaining information upon the subject from the people in the country, they are now unable to give anything like definite information as to the size of the structures to be put up.

If this really is the case, the Commissioners are at a loss to understand upon what principle the plans are made to show, as they do, culverts and bridges of varying size and dimensions; varying, as the Commissioners can only suppose, in accordance with the evidence which has been obtained in regard to the size and volume of the streams. But, even if the information upon this subject was as incomplete as it is stated to be, it does not in the least, in the opinion of the Commissioners, render it necessary to resort to so hazardous a plan as that of letting such large works upon a schedule of prices to be applied to unknown quantities.

No doubt it is undesirable to make structures of a greater size than is really necessary; but it is clearly safer to err in the direction of making the water-ways large enough, than to attempt by false economy to make them so small that they will lead to future destruction of the works. Further than this, it is a question upon which the majority, at any rate, of engineers, concur, that in heavy embankments of 40 feet depth, or upwards, it is a matter of no great consequence, as regards cost, whether the roadway is made of a solid embankment or by bridge work, with a series of openings. Many engineers are indeed of opinion that after embankments reach 40 feet in depth, it is absolute economy to substitute bridges with stone or brick piers; and in regard to culverts, it must be borne in mind that the most judicious plan in this climate for constructing them is to build in embankments of moderate depth, a wall on either side of the opening, and span it for the track of the railway, by stringers upon which the rails are carried. If this is done, of course it is a matter of no consequence whatever whether the walls are 4, 6, 8, or 10 feet apart, the only difference being, and that one in the direction of economical construction, in the length of the stringers to span the opening.

It must be further clear that any changes in the size of culverts will be some larger and some smaller, making, in all probability, no great difference in the aggregate of the work on each section.

For all these reasons, the Commissioners are of opinion, as already stated, that the attempt to let contracts upon a schedule of prices would lead to inevitable disaster; and that the only safe and reasonable plan is to adopt that which is now universally adopted, and to let contracts at a lump sum for the completion of the work, with a schedule of prices attached, to enable the engineer to make up progress estimates as the work proceeds.

The Commissioners believe, from the examination that they have made, and the plans and profiles prepared, that contractors will have no difficulty whatever in forming their own opinion as to the amount of work to be executed upon each section; and they feel perfectly convinced that the tenders which will be sent in will prove without a doubt that experienced contractors will have no difficulty whatever in making their tenders according to the plans adopted.

Parties would be found to tender, on a schedule of prices, who have no experience or knowledge of the work which they would have to execute. They would put in tenders at very low prices per yard for the different descriptions of work, trusting to be able in the long run, to establish claims for "extras," and to use political influence to get such claims allowed.

According to the conditions of contract, and the contract which the Commissioners propose to have executed, all such claims will be rendered impossible; the contractor being compelled by the terms of his contract to complete the work for the specific sum at which he tenders to do it.

It is right, perhaps, in dealing with this question, to advert to the course of proceeding which has been adopted in different countries, in regard to the mode of letting contracts for large works.

In Canada, the first large work that was put under contract was the Great Western Railway, and its contracts were all based upon a schedule of prices, without any information being given as to the quantities of the different kinds of work to be executed.

It is perfectly notorious that the Great Western Railway cost not less than 50 per cent. beyond the amount which it was originally supposed it would cost; and a main reason for such extra cost is to be found in the following extract from the Report of that Company, dated 29th of September, 1854, and after the whole line had been opened throughout, from Suspension Bridge to Windsor, viz:—

"The Contracts before alluded to, and under which the line has principally been constructed, must now be explained, first premising that, in their general features, they are similar to most railway contracts in America, upon the model of which they were framed, by engineers and others who had been concerned in the construction of railways in that country. These contracts *are wholly dissimilar to English contracts*; they specify no defined sum which the works are to be constructed for, but the price is fixed in this way—they contain clauses which provide that the different kinds of work shall be executed at certain prices per yard, no word being said about the whole quantity, or gross number of yards comprised in each contract. For instance, the contract runs thus:—

" For Indurated earth,	cts. per yard measure in excavation.
" Common earth,	" "
" Hard pan,	" "
" Rock,	" "
" Masonry,	dollars per yard.
" Brickwork,	" "
" Bridging,	" per 1,000 feet, B.M.

"And so on for all the different kinds of work which the contractor may have to execute in forming the part of the line let to him."

It will be seen from this extract, that the contracts were wholly dissimilar to English contracts, inasmuch as they specified no definite sum for which the works were to be constructed.

This is exactly the course which Mr. Fleming proposes to adopt in regard to the Intercolonial Railway, and which undoubtedly, if carried out, would result in the same difficulty, litigation, and ultimate extra cost that occurred in the case of the Great Western.

So strongly did the Great Western Company feel the mistake which they had made in the letting of their contracts for the main line, that when they came to construct their branch from Hamilton to Toronto, they let it for a lump sum without any schedule of prices, and when the state of the surveys was far less satisfactory and forward than is the case for those portions of the Intercolonial Railway now to be let. In the same way, when they subsequently let the contract for the construction of their Sarnia Branch, they adopted the lump sum principle, and abandoned the schedule of prizes. In both these cases, viz: the Hamilton and Toronto and Sarnia branches, the works were completed in the terms of the contract, and for a lump sum, and no serious dispute arose afterwards in regard to claims for extras.

It may be as well, perhaps, to state here, that the different sections of the Grand Trunk Railway were all contracted for at the rate of so much per mile, and in no case was work executed on a schedule of prices.

It is right to explain here, that the accounts of the Grand Trunk Company show that the execution of the works; according to the amount per mile was done without any large claims for extras; the extra cost for the Grand Trunk line having mainly arisen from the depreciated price of its securities, and the consequent discount when they had to be realized.

A contract has been lately let in the Province of Quebec, for a line of railway, 35 miles long, from Lennoxville to the Province line, where it connects with the Passumpsic Railway in the United States.

The contract has been let at a lump sum, the contractor having tendered on a general plan and profile, without any statement of quantities, and without any detailed plans of the structures to be erected. The price is a moderate one per mile, and the contractor assumes all risks of quantities, &c.

In Ontario also, a contract has lately been let for a portion of the Wellington, Grey, and Bruce Railway, and this has been let for a lump sum, and not on a schedule of prices.

Mr. Fleming is mistaken in regard to the mode in which contracts are let in England. All contracts for a number of years past, for the execution of railway works, have been let upon a lump sum principle, a schedule of prices being attached to the contracts, to enable estimates to be made of the progress of the works, and to provide for extra work, if any, which, during the progress of the contract, might be ordered; but it is a matter about which there is really no question whatever, that English railway contracts have, for a long time past, been let only upon the lump sum principle; and that plans of the different structures are supplied after the contract is signed, and during the progress of the works, according as circumstances may, in the opinion of the engineer, seem to be desirable.

The same plan is adopted in England for other large works beside railways. For instance, the Thames Embankment in London, has been let in sections, the contractor undertaking to complete his section for a lump sum, he taking all risk of quantities, &c.

Again, in all the large Indian railways, where the payments are all cash, and where the interest and principal of the capital is guaranteed by the Indian Government, the contracts have all been at so much per mile of railway.

In the case of the Indian railways, the contracts were let when surveys were of the most incomplete description, and had simply been rough lines run by military engineers. No detailed drawings of structures were exhibited or prepared, and the contractor had, in point of fact, to survey and locate the line after he had signed his contract, and agreed as to the lump sum per mile at which he would do the work.

In the Province of New Brunswick, arrangements were made lately for the construction of lines of railway, which are known as the Western Extension from St. John, in the direction of Bangor in the United States, including a branch to Fredericton.

These lines had been let at so much per mile, the plans and surveys being less complete than is the case with the plans of the Intercolonial Railway for those portions now to be let.

But the most striking instance of the impolicy of letting large contracts on a schedule of prices is to be found in the case of the Pictou Railway, constructed within the last few years by the Nova Scotia Government. This railway is less than 50 miles long, from Truro to Pictou. It was originally let on a schedule of prices by the Government of Nova Scotia, in small sections of about five miles each. The contracts were let at what were afterwards stated to be too low prices; the price per yard for earthwork, and for masonry being, it was stated, low, and being undertaken by parties said not to be properly responsible, or having sufficient experience. The result was, that the majority of the contractors failed to execute their work, and the Government was compelled to take it entirely out of their hands. The course which they were ultimately compelled to adopt is, in the opinion of the Commissioners, a very striking example of the mistake that would be made if contracts were attempted to be let on the Intercolonial Railway on a schedule of prices.

Upon the failure of the original contractors of the Pictou line, the Government entered into an arrangement to complete it, as left by the defaulting contractors, not upon a renewed plan of a schedule of prices, but on a lump sum for the entire completion of the work remaining to be executed. This appears to the Commissioners to be most conclusive upon the question, and they are surprised that Mr. Fleming, as the Engineer for the construction of the Pictou and Truro Line, should again recommend the course which, in the case of that line, proved so disastrous and produced such serious controversy in the Country and in Parliament.

In the United States, also, the rule is now to let works on the lump sum principle, and not on a schedule of prices.

There is a very late instance to this effect. On the 24th December, 1868, the Commonwealth of Massachusetts let a contract for the completion of the Hoosac Tunnel. The contract is for a lump sum, with a schedule of prices to enable progress-estimates to be made of the work done. It contains the following clause, viz. :—

“It is understood and agreed that the Commonwealth is in no event to be responsible for the correctness of the estimates of quantities, distances, &c., given in the schedule; nor shall the specific details of work to be done, as given herein, be construed in any manner to relieve the contractors from the full and complete performance of the entire work of the completion of the Hoosac Tunnel, exclusive of the part now under contract to B. N. Farren, to be performed under this contract, nor in any way affect the gross amount to be paid by the Commonwealth to the contractors, as stated in the contract.”

It thus appears that painful experience in Canada and Nova Scotia has proved the disastrous effects resulting from letting contracts on a schedule of prices. In Canada, New Brunswick, and Nova Scotia, all late contracts have been let upon similar terms to those proposed by the Commissioners. The same plan is universally adopted for all large works in England, India, and the United States.

The Commissioners have the strongest conviction, that in adopting any other system than that of the “lump sum” for the contract, they would be sacrificing alike their own reputation and their duty to the Government and the Country.

A. WALSH,
ED. B. CHANDLER,
C. J. BRYDGES,
W. F. COFFIN,
Commissioners.

(Copy.)

APPENDIX C.

Minutes of a public meeting of the inhabitants of the counties of Westmoreland and Albert, called by the Sheriff of Westmoreland, in compliance with a requisition to him for that purpose, to consider various matters connected with the route of the Intercolonial Railway, and held in Daulap's Hall, town of Moncton, December 17th, 1868. Meeting organized at 11 o'clock, a.m., by the appointment of Blair Botsford, Esq., as chairman.

The first resolution was moved by the Hon. Bliss Botsford, Speaker of the House of Assembly, seconded by the Hon. John Lewis, of Hillsboro', Albert County, Member of the Legislative Council of New Brunswick, and being put to vote, was carried unanimously.

The preamble and resolution is as annexed: Whereas, we have reason to believe by a recent survey of the Intercolonial line of Railway, from the Richibucto river to the European and North American Railway, at or near the point where the Major Robinson line intersects the latter, that great engineering difficulties have to be overcome by adhering strictly as possible to the Major Robinson line between those two points; and, whereas, we believe that a cheaper and shorter route can be obtained by running from the Richibucto river, over the table land between the source of the rivers that flow into the river St. John, and the gulf of St. Lawrence, traversing as it must those rivers at a point where they are of insignificant size, and where easy grades can be obtained to and through a natural level gorge, separating the high ridges of lands called the "Indian," "Lute's," and "Steere's," mountains, and thence to the European and North American Railway station, near the town of Moncton; and, whereas, the adoption of the last named route for the "Intercolonial line of Railway," as suggested by Mr. Fleming, would considerably shorten the distance between the River du Loap and the cities of St. John and Halifax, the principal emporiums of the Maritime Provinces, as well as tap the head navigable waters of the Bay of Fundy, and connect with the bridge crossing the Petitcodiac river to the county of Albert, probably destined hereafter to be the terminus of a railway traversing that valuable county.

And, whereas, it is most desirable that a thorough and minute examination of the last mentioned route should be forthwith made, with a view to subserve and advance the material interests of the people of the Dominion of Canada.

Therefore, Resolved, As the opinion of this meeting, that the "Queen's Privy Council for Canada," be respectfully solicited to advise His Excellency the Governor General, to order a survey to be made between the Richibucto river and the European and North American Railway station near the town of Moncton, or to some other point westward of the present contemplated junction.

Stephen Binney, Esq., moved, and Alex. Wright, Esq., seconded the second resolution, which also passed without dissent, and is as follows:—

No. 2. Resolved, That a petition setting forth the above facts be prepared, signed by the chairmen, and forthwith transmitted to His Excellency the Governor General.

On motion, a Committee consisting of the Hon. Bliss Botsford, the Hon. John Lewis, Stephen Binney, Esq., and the chairman, was appointed to draft a petition to His Excellency the Governor General of Canada, in accordance with the terms of the second resolution.

Alex. Wright, Esq., moved, and John Wallace, Esq., Member of the House of Commons for Albert County, seconded the third resolution, which passed unanimously, and is as follows:—

No. 3. Resolved, That a copy of these resolutions and proceedings of this meeting, duly authenticated and countersigned, respectively by the chairman and secretary, be enclosed to the Commissioners of the Intercolonial Railway.

The chairman having left the chair, John Wallace, Esq., was called thereto, when the committee appointed to prepare the petition to the Governor General, submitted their report, which was adopted.

The thanks of the meeting were tendered to Blair Botsford, Esq., for his able conduct in the chair, after which he resumed the chair and proposed three cheers for Her Most Gracious Majesty the Queen, which was heartily responded to, and the meeting dispersed..

(Signed,)

BLAIR BOTSFORD,
Chairman.

(Signed,)

H. T. STEVENS,
Secretary of Meeting.

APPENDIX D.

COPY of a Report of a Committee of the Honorable the Privy Council, approved by His Excellency the Governor General in Council on the 9th April, 1869.

On a Report, dated 3rd March, 1869, from the Interecolonial Railway Commissioners, stating that in consequence of representations made to them, both by petition and verbally, during the recent inspection made by them of the proposed route of the Railway, they, on the 2nd January last, adopted the following Resolution, viz. :—

“Resolved, That Mr. Fleming be instructed to make a survey of the Country between Moncton and Miramichi, as prayed for in the memorial laid before the Commissioners at St. John, on the 30th December, 1868, and to report the result.”

And that the Commissioners are about to organize parties to prosecute the survey.

The Committee recommend that the survey ordered by the Commissioners be sanctioned, and that on such survey, the Commissioners do fully report on the whole subject of the location of the line between Bathurst and the European and North American Railway.

Certified.

(Signed,)

WM. H. LEE,
Clerk Privy Council.

APPENDIX E.

(Copy.)

NEWCASTLE,
October 9th, 1869.

MY DEAR SIR—By last mail I enclosed you the sections of the several River Crossings on the North Shore from Konchibouguae to Shediac, which are all that are of consequence.

The sections were taken generally of sufficient length, on either side of the stream, to show the high lands adjacent.

Most of the Rivers are shallow estuaries, with channels in the centre, in no case exceeding 400 feet in width, and 30 feet deep, except at the Richibueto, which is 50 feet

deep at the present Post Road Bridge. This depth can however be reduced to 30 feet by adopting a line some 600 feet higher up the stream, where a good crossing can be had.

These rivers are not so formidable as their widths should seem to indicate. The streams above the tide-way are comparatively insignificant. It will therefore be necessary to provide a sufficient number of spans in the channel to pass the highest freshet water and accommodate the navigation. The rest of the water way may be embanked with rock or earth, the last of which, if made with flat slopes and properly protected from the wash of the tide, will stand.

You mentioned in your letter of the 28th of July, "That the Commissioners did not think it necessary to incur much expense in procuring the above information." I have therefore not deemed it necessary to "bore" these river beds, and I am unable therefore to form an accurate estimate of the cost of bridging them, but judging from the depth of silt above, the Bed Rock in the Miramichi which runs through similar strata, and which has been most carefully bored in several places within the last two months, I should anticipate an average of some 20 feet of mud and sand before a suitable foundation will be reached.

Assuming that it is the intention to erect piers and abutments of substantial masonry on permanent and approved foundations, it would not be safe to estimate the cost of these structures at less than half a million of dollars, or say some \$400,000 in excess of the bridging of the Interior line.

The difference in length of the Shore Line *via* Chatham and Richibucto, compared with the middle line ran last year, and the Interior Line surveyed this last summer, from the fact of no continuous survey having been made of the Shore Line, can only be approximate; yet I think, with sufficient accuracy for the present purpose. I measured it from the small scale map of the country, prepared in this office this spring, with great care, and in which all the lines actually surveyed had been laid, having added a reasonable amount for curvature. Starting, therefore from the *common point near Newcastle*, the Shore Line will be found at least from 86 to 87 miles in length to Painsic Junction. The Middle Line, by actual location survey, is 82½ miles between the same points crossing.

The Interior Line (when located) from the same point at Newcastle to its intersection with the European and North American Railway at Moncton, will be between 76 and 77 miles in length, or say 10 miles less to build than the Shore Line, and 5½ miles less than the Middle Line to form a connection with the European and North American Railway.

With regard to the cost of constructing the several lines, the quantities per mile on the Middle and Interior, are generally so similar that for this purpose the cost of each may simply be estimated by the ratio of their relative lengths.

From a careful reconnaissance of the Shore Line, I am of opinion that the quantities of work (exclusive of the extra bridging already named) will vary but little from the other two.

Assuming that a sum of \$30,000 per mile will be a fair estimate on the interior and Middle Lines for grading, masonry, bridging, track, and ballast complete, exclusive of stations and rolling stock, and taking this data as a basis for an estimate, the following sums will be obtained, which will, I think, be approximately correct:—

87 miles of Shore line, at \$30,000 per mile	\$2,610,000
Extra bridging, assumed at	400,000
	<hr/>
82½ miles Middle line, at \$30,000.	\$3,010,000
77 miles Interior line, at \$30,000.....	2,475,000
	2,310,000

By this it will appear that the Interior Line is \$165,000 cheaper than the Middle, and \$700,000 cheaper than the Shore Line. This is exclusive of the extra cost of additional station accommodation and rolling stock that will be incidental, ultimately, to increased length of line, to say nothing of increased running expenses that must inevitably follow.

The above figures are within the mark, as I feel confident from a careful study of the subject, that a location survey passing through Chatham and Richibucto, if ever made, will make the actual distance more than I have stated.

As there has been some discussion on this subject, both in the press and amongst other parties, where these figures have been impugned, I believe I may be permitted to state, in further exemplification, that the distance from the present crossing of the Miramichi (on the south side of the south-west branch) fully three miles beyond the common point at Newcastle to Chatham is as near as can be obtained 8 miles

From Chatham to Richibucto, by a very direct post road is..... 38 "

Mr. Lawson makes the distance from his crossing of the Richibucto to Painsec on his location to be 39 "

85 "

It may be as well to remark, in passing, that Mr. Lawson crosses the Richibucto at the mouth of Molus river, some 12 miles south-west of the town of Richibucto. Thus materially reducing the versed line of the arch to be traversed in going from Chatham to Painsec junction, and from the fact of the mouth of the Molus river being considerable to the southward of the town of Richibucto, any line passing through that place to Painsec must necessarily be longer than the corresponding portion of Mr. Lawson's location.

With regard to the effect the three lines will have upon the relative distances between Newcastle, St. John, and Halifax, respectively, the Interior Line, *via* Moncton, will be 17 miles less to St. John, and 3 miles less to Halifax than the Shore Line, *via* Painsec, to the same places, and 12½ miles less (to travel) to St. John, and 1½ miles farther to Halifax than the Middle Line.

In reference to the influence these lines may have upon the settlement of the country, it may be said, generally, that the Interior opens up a new county, fully one-half of which, perhaps two-thirds, is fit for settlement. Thriving settlements are already found extending from the south-west Miramichi, for a distance of about 10 miles south of the Barnaby river, and about as many miles north over Jutz and Indian mountains out of Moncton. The residue of the distance, however, some 50 miles, is through unsettled lands.

The Middle Line traverses a county somewhat similar as regards the number of settlers and the quality of the land.

The Shore Line passes nearly its whole length through a country more or less settled, though there are considerable intervals often between the houses, and the line of settlement generally, merely fringes, as it were, the public road and the coast line, extending however in some instances miles up the larger rivers where thriving settlements are formed on the Konchibouguac, Konchibouguacis, Richibucto, and Buctouche rivers; the last named of which is as far as the shore line, arriving at Painsec, would probably follow the coast. These settlements however will soon extend back and beyond the Interior Line should it be made.

The number of inhabitants that will be affected by the adoption of either of the lines is difficult to estimate, and without a census, any statement must be considered merely as approximate. I should think that some 8000 people at least would come within the influence of the Middle and Interior Lines between the Miramichi and Moncton, including the two thriving towns of Nelson at the northern, and Matchu at the southern terminus, allowing 5000 to the towns and 3000 the intervening country.

The Shore Line also passes through the town of Nelson which in fact will be influenced equally by either of the lines. It then passes through Chatham, a town said to contain some 5000 inhabitants; then through a sparsely settled country to Konchibouguac and Konchibouguacis, containing each from 300 to 400 inhabitants. Then on to Richibucto and Kingston, whose population collectively would be under 2000. From here it is probable the line would keep near the post road, and cross the two Buctouches near the villages of the same name, which collectively may contain some 500 people. From the crossing of the Buctouche to Painsec, the line will probably pass through a very similar

country to that traversed by Mr. Lawson's line. The total number of settlers on the Shore line I should estimate as follows :—

Nelson to Chatham	2,000
Chatham Town	5,000
Chatham to Richibucto	2,000
Richibucto to Kingston	2,000
Richibucto to Buetoche	1,000
Big and Little Buetoche	1,000
Buetoche to Painsee	2,000
Total	15,000

or say, double the number at present on the Interior Line which would seem to be a full estimate of the population that would be accommodated by the Shore Line.

There are other settlements along the coast, such as Bay du Vin, Escumenee, &c., which from being some distance from the proposed line, I have not thought it necessary to take into consideration.

Trusting that I may have been fortunate enough to afford you some information upon this vexed question.

I remain,

My dear Sir,

Very truly yours,

(Signed.)

A. L. LIGHT.

SANDFORD FLEMING, Esq., Engineer in Chief,
Intercolonial Railway, Ottawa.

APPENDIX F.

(Copy.)

INTERCOLONIAL RAILWAY, OFFICE OF THE CHIEF ENGINEER,
Ottawa, October 19th, 1869.

C. S. Ross, Esq., Secretary Intercolonial Railway, &c.

SIR,—I have to day received from Mr. Light, Engineer for the Miramichi District, a letter containing the additional information desired by the Commissioners respecting that portion of the country between Moncton and the River Miramichi, and the result of various railway surveys and explorations which have been made in that part of New Brunswick.

I cannot do better than enclose a copy of Mr. Light's communication.

The three lines referred to are designated as follows :—

1st. The *Shore Line*, which runs from Newcastle to near Chatham, Richibucto, &c., to Painsee Junction.

2nd. The *Middle Line*, which runs from Newcastle more direct to Painsee Junction than the Shore Line, keeping at some distance from Chatham and the other points above mentioned.

3rd. The *Interior Line*, which runs direct to the nearest point of connection with the E. N. A. Railway west of Moncton.

It would appear, from the within information, that the probable cost of the three lines would be about in the following proportion :

The Shore Line	\$3,010,000
The Middle Line	2,475,000
The Interior Line	2,310,000

The probable length of railway to be constructed on each of these lines, from a common point near Newcastle, is estimated as follows :

The Shore Line, say	86½ miles
The Middle Line, say	82½ do
The Interior Line, say	76½ do

The running distance to St. John and to Halifax would be effected to some extent by the adoption of one or other of these lines, considering first the running distance to Halifax, the length of line from a common point near Newcastle to Painsee Junction, will show how they stand in this respect.

The Shore Line.....	86½ miles
The Middle Line.....	82½ do
The Interior Line.....	76½
Add existing Railway to Painsee Junction.....	7 83½ do

The running distance towards St. John, from a common point near Newcastle, to a common point in the existing Railway West of Moncton, will be as follows :—

By the Shore Line.....	86½ + 7	93½ miles
By the Middle Line	82½ + 7	89½ do
By the Interior Line.....	76½	do

Mr. Light estimates the number of inhabitants directly accommodated by the adoption of either of these lines, about, as follows: This is exclusive of the population in other sections of the Dominion beyond the common points near Newcastle and Moncton affected by the shorter or longer running distance on the several lines.

By the Shore Line.....	15,000
By the Middle Line.....	8,000
By the Interior Line.....	8,000

With regard to the character of the country for settlement and other particulars, I beg to refer the Commissioners to the within comments.

In drawing a comparison between these lines, it appears,

1st. That the Middle Line is the most direct line to Halifax, being one mile shorter than the Interior Line, and four miles shorter than the Shore Line.

2nd. That the Interior Line is the most direct to St. John, being three miles shorter than the Middle Line, and seventeen miles shorter than the Shore Line.

3rd. That the Interior Line is the shortest to construct, the length of railway to be built being six miles less than the Middle Line, and ten miles less than the Shore Line.

4th. That the Interior Line would prove the cheapest, the estimate of probable cost being \$175,000 less than the Middle Line, and \$700,000 less than the Shore Line.

5th. That the Shore Line passes through the best settled sections of country, the local population averaging nearly 100 per mile more than on the Middle and Interior Lines.

6th. That the Interior and Middle Lines pass through new lands, one-half or two-thirds of which are said to be fit for settlement.

The above information will now, I trust, enable the Commissioners and the Government to select the most eligible line for final location.

I have the honor to be, Sir,

Your obedient Servant,

(Signed,)

SANDFORD FLEMING,
Chief Engineer.

APPENDIX G.

COPY of Report of the Commissioners of the Intercolonial Railway to Council, of date 21st October, 1869.

INTERCOLONIAL RAILWAY COMMISSIONERS' OFFICE,
Ottawa, 21st October, 1869.

The Commissioners for the construction of the Intercolonial Railway, to whom has been referred the question of the route of the railway between the Miramichi River and the line of the European and North American Railway, beg to report to the Governor in Council, that they have carefully considered the matter, and have had the advantage of hearing personally the views entertained by deputations from Chatham and Richibucto, now in Ottawa.

The Commissioners have also visited the locality, and personally examined into the question. They also called upon the Chief Engineer for a report upon the subject, a copy of which is appended hereto.

It appears that three lines have been suggested, which may be described as follows, viz:—

No. 1, the Shore Line, which would run near Chatham and Richibucto to Painsee Junction. This line would require the construction of $86\frac{1}{2}$ miles of railway.

No. 2, the Middle Line, would run from the Miramichi, without going nearer to Chatham than six miles, and would be about ten miles inland from the Harbor of Richibucto, and would require the construction of $82\frac{1}{2}$ miles of railway.

No. 3, the Interior Line, would run by the nearest course from the Miramichi to Moncton, and would require the construction of $76\frac{1}{2}$ miles of railway.

The No. 1, or Shore Line, appears to be impracticable, as it would cost \$700,000 more than the Interior Line, and \$545,000 more than the Middle Line, besides lengthening the Line, both to Halifax and St. John. It does not seem possible to meet the wishes of the inhabitants of Chatham, without involving a great extra cost, both in first construction and in future working. The railway will run within six miles of Chatham, and it cannot, by the main line, be carried nearer to that town without, after crossing the Miramichi, running almost parallel to the line on the north side of the river. The Commissioners, therefore, cannot recommend the adoption of the Shore Line.

The question, as regards Chatham, being thus disposed of, the route of the line is only affected by its proximity or otherwise to Richibucto.

No. 2, or the Middle Line, will cost \$165,000 more than the Interior Line, No. 3. It would require the construction of six miles more of railway, and the permanent cost of working that additional distance. It will make a longer distance to St. John by thirteen miles, and shorten the distance to Halifax about one mile. The extent of bridging on No. 2 will be considerably greater than on No. 3, of course involving greater cost of maintenance.

Taking all the facts into consideration, the Commissioners cannot see any public

grounds to justify the increased outlay, and they therefore recommend that the Interior line, No. 3, be adopted.

(Signed,)	A. WALSH,
"	ED. B. CHANDLER,
"	C. J. BRYDGES,
"	A. W. McLELAN,
	Commissioners.

APPENDIX K.

(Copy.)

INTERCOLONIAL RAILWAY, OFFICE OF THE CHIEF ENGINEER,
Ottawa, March 14th, 1870.

C. S. Ross, Esq., Secretary.

SIR—As requested, I now submit a few observations on the labors of the Engineering Staff.

It does not seem necessary to allude to the exploratory survey made some years ago, it will, probably, be sufficient for me to report briefly on the general result obtained by the expenditure incurred since the union of the Provinces; distinguishing, as far as practicable, the work done by the Staff after the route was adopted by the Privy Council, from that done previously.

The whole line from Rivière du Loup to Truro, with the exception of one or two short sections between Newcastle and Moncton, where minor changes may be found advisable, is now finally located for construction; of this distance 326 miles in all are now under contract or ready for contract, and the whole of the remainder, except 76 miles between the River Miramichi and Moncton, will be ready for contract by the end of next month. By midsummer next the whole extent of the line may be placed under construction. The distance from Rivière du Loup to Truro, by the line adopted and located for construction, will be very close on 490 miles.

The above information furnishes in a few words the net results of the labors of the Staff, as well as of the expenditure incurred on engineering account up to this time. It however conveys a very imperfect idea of the actual work which has been accomplished.

A comparison can scarcely be made between the results and expenditure in this case, and that of Railway surveys in other countries, more favorable for operations of this kind. In an open country, where the Engineer can see around him, he can easily decide as to the advisability of incurring the expense of instrumental measurements in any particular direction; and in the United Kingdom, where he has the benefit of the Ordnance maps, showing in minute detail every feature of the country, and giving exact vertical as well as horizontal distances, he can with great ease at once proceed to define the most suitable position for the line of railway; but in a country like that between Rivière du Loup and Truro, in great part densely wooded, some of it without inhabitants, portions of it even without roads, it is clear that surveying operations can only be conducted under great disadvantages and the comparative cost, on Engineering account, must, as a consequence, be heavy.

The circumstances of the case, as a rule, required that the Engineering Staff should find shelter at night under canvas, in all weathers. This mode of life is not objectionable for a short time in the summer season; but the personal discomfort experienced during a protracted campaign, including the rainy season of autumn, and the following months of winter, with a very low temperature (occasionally 20 to 30 degrees below zero), and snow from 3 to 5 feet deep, is not inconsiderable. A large portion of the staff remained

under canvas, without intermission, from April 1868 to May 1869; another portion has been similarly situated nearly the whole of the present winter. In justice to the staff, and in appreciation of the endurance and perseverance displayed by those members of it who have been so much exposed, it is right that I should allude to this, because an impression seems to prevail in some minds that the Engineering Staff of the Intercolonial Railway, has been and is now engaged in mere holiday work. Even in summer time railway surveying has its inconveniences and troubles: the intolerable insects, which in some sections abound, are occasionally found to be beyond all endurance.

I have already said that the length of line actually located for construction, although practically the net result of the labors of the staff, scarcely gives any idea of the work which has been done to produce this result. The engineer in a wooded country, is very much like a mariner in unexplored waters, and without a chart. If it be a flat country, his work is not so difficult, but if the inequalities of surface be great, as in much of the country through which the line is to be constructed, it is only after repeated trials, involving a great deal of laborious work, that he can tell when he approaches the best position for the railway. To show how much time and labor and expenditure has been incurred in thus feeling the way to the one end in view, I have had compiled, from various returns, the total length of lines which have been instrumentally surveyed.

From this, it would appear that in the aggregate, over 3,100 miles of trial lines have been surveyed, nearly 1,200 miles of line have actually been located, and more than 1,200 miles of cross-sections have been made, giving a gross total of more than 5,500 miles, which have been surveyed instrumentally, and of this from 5,100 to 5,200 miles have been both chained and levelled over. It may also be added that a very large proportion of this distance has been cut with the axe through the woods. This does not of course embrace an endless distance which has been explored on foot and not measured.

It needs no argument to prove that all this work has been sound economy. I am satisfied that the time and money spent in these surveys has been well spent, and that the cost of construction will be very materially reduced thereby.

A great deal of necessary work has been done other than surveys;—test-pits have been sunk wherever deemed necessary, over nearly the whole length of the line, so that contractors should have every opportunity of gaining information respecting the work to be done, and, in addition to the ordinary duties of the staff in the field, a great deal of time has been occupied in making calculations of quantities of each kind of work to be done on the sections already under contract, as well as those to be placed under contract.

The staff as now organized by the Commissioners, on my recommendation, is arranged as follows:—

The whole line is divided into 25 engineering divisions, which correspond with the same number of contracts now or hereafter to be made. These divisions are lettered from A to Z. The whole line is also formed into four districts, each of which embraces a certain number of divisions. Four district engineers are appointed, each of whom have general charge, under the Chief Engineer, of the whole work in each respective district. Division engineers have immediate charge of, and are resident on, each section under contract. They have generally two assistants, with rodmen and chainmen.

The four districts are named, The St. Lawrence, The Restigouche, The Miramichi, and The Nova Scotia Districts respectively.

The *St. Lawrence District* extends from Rivière du Loup, 129½ miles easterly, to a point beyond Lake Metapedia; it comprises divisions A to F inclusive, and is placed in charge of Samuel Hazlewood, Esq.

The *Restigouche District* extends from the easterly end of the St. Lawrence District, 127½ miles, to a point beyond Bathurst; it comprises divisions G to H inclusive, and is placed in charge of Marcus Smith, Esq.

The *Miramichi District* extends from the easterly end of the Restigouche District, to Painses Junction on the St. John and Shediac Railway, a distance of nearly 115 miles; it comprises divisions O to U inclusive, and is under the charge of Alexander Luders Light, Esq.

The *Nova Scotia District* extends from Painses Junction to Truro, a distance of over 117 miles; it comprises divisions V to Z inclusive; it is under the charge of W. H. Tremaine, Esq.

As all the divisions are not as yet under contract, the permanent appointments are not all filled up. The several engineers who have been engaged on surveys, are understood to be only temporarily appointed.

I have every reason to be well satisfied with the duties performed by each member of the staff as it now exists; whether on survey or on construction, they have, as a rule, worked most assiduously, and have strained every nerve to carry out instructions in the best manner and in the shortest time. I think the work accomplished affords ample proof of this.

Members of the staff on construction, have labored most diligently; under the peculiar circumstances of each case they have had a great deal to do. The contractors, during the past summer, generally began at all the light work on their contracts, and thus gave the engineers in charge more trouble in "setting out," than if the workmen had been concentrated on the heavy excavations. Again, when the contracts came to be closed, the labor in measuring up for re-letting, was very great, owing to the ground being disturbed at so many points.

Up to this time, every member of the staff has been fully employed, and it will require every exertion during the remainder of the winter to prepare the plans and necessary calculations for letting the remaining sections of the line.

I may take this opportunity of stating, that I think the principal engineers on the staff should be placed on a more liberal footing than at present, I am decidedly of opinion it is in the public interest that they should. I refer mainly to the district engineers, although, as far as the payment of necessary travelling expenses on duty is concerned, I allude, also, to those engineers immediately in charge of contracts. It would place them all in a more independent and altogether more satisfactory position.

With regard to the district engineers, three of them at all events were selected by me and engaged for a considerable time before the appointment of the Commissioners. I led them to expect that their salary would in each case be \$3000 per annum with all necessary and reasonable travelling expenses on duty allowed, and they were actually paid in accordance with this understanding up to the time the Commissioners came into office at the end of 1868. I feel satisfied that this rate of compensation is not by any means too much for the four district engineers, when the onerous professional duties they are required to perform is considered, and I avail myself of this opportunity of again recommending it.

I wrote you on this subject on the 15th of April last year, at the time when I received remonstrances from the gentlemen referred to, against a reduction in the rate of salary they were led to expect, and I enclose with this, copies of letters, which, for the purpose of conciliation, I deemed it advisable to write to them soon afterwards.

I may here observe, that owing to the languid progress which has hitherto been made in prosecuting the works, the district engineers' expenses in supervision and travelling from point to point, have not been so great as I anticipated when I wrote you on the subject in April last; but, hereafter, when construction is carried on with vigour, their expenses must necessarily be very considerable, much more than any public officer should be called upon to pay out of his limited salary.

I am, Sir,
Your obedient servant,
SANDFORD FLEMING,
Chief Engineer.

Letters Enclosed.

To C. S. Ross, - - April 15th, 1869.
" A. Hazlewood, - May 31st, "
" A. L. Light, - - June 9th, "
" W. H. Tremaine, June 9th, "
" Marcus Smith, - June 9th, "

(Copy.)

INTERCOLONIAL RAILWAY, OFFICE OF THE CHIEF ENGINEER,
Ottawa, April 15th, 1869.

C. S. Ross, Esq.,
Secretary.

SIR,—Will you be good enough to inform the Commissioners that all the district engineers have remonstrated against paying their travelling expenses out of their salary, and that they seem to think that the decision of the Commissioners must have arisen through some oversight.

With regard to this it may not be improper to remark, that salary is the compensation which the engineer gets for his services and exclusively for his own benefit, but in order that his employers should have the utmost advantage of his experience and judgment, it is imperative that the district engineer should have free and rapid means of access to every part of the works under his charge. This entails very considerable expense, varying in amount according to locality and the progress of the work, but over the amount, the engineer has no control, and were he compelled to defray these out of his salary, the result would be, that he would be paid exactly in inverse *ratio* to his exertions. For the harder he worked, the more he would be out of pocket, and if he did his duty thoroughly he would often find his salary reduced below that of the junior officers of his staff. But as no one can be expected to make such a sacrifice, it follows to withhold or limit the travelling expenses of the district engineer would in one case compel him to neglect his most important duties altogether, and in the other to perform them very inefficiently. This is so well understood by the most rigid economists, that I have never known or heard of a case where all necessary expenses were not allowed and treated as totally distinct from salary.

This is indeed no question of petty economy, but one of vital importance, considering the extent of the works a district engineer has under his charge, for it is well known that he can often save in one week by personal inspection and judgment more than his travelling expenses would amount to in three or four years.

The same remarks apply to the division engineers, but as the latter have only 20 or 30 miles of railway to superintend they need never be more than one or two nights from their quarters at one time, and the travelling expenses will be proportionately lessened. But a District comprises five or six Divisions, and the engineer should be oftener abroad than at home, and until the works are well advanced he would require two pair of horses and two men to enable him to do his work thoroughly.

I think it will only be necessary to draw the attention of the Commissioners to this matter in order to have it set right.

I am, &c.,
(Signed,) SANDFORD FLEMING,
Chief Engineer.

INTERCOLONIAL RAILWAY, OFFICE OF THE CHIEF ENGINEER,
Halifax, May 31st, 1869.

S. Hazlewood, Esq., District Engineer,
Rimouski.

MY DEAR SIR,—With regard to the payment of district engineers' expenses, I feel reluctant to trouble the Commissioners further on the subject at the present time. When in Ottawa, last month, I informed them that all the district engineers remonstrated against defraying their travelling expenses out of their salary, and I represented to the Commissioners very strongly the importance and economy of placing the engineers on a more liberal footing. I urged that the salary of the engineers should be considered the compensation allowed them for their time and professional services, that it should be

such as to satisfy them, that it should be exclusively for their own benefit, and that all reasonable and necessary travelling expenses on duty, should be paid in addition, so as to secure for the public service the greatest advantage possible from their experience, judgment, and energy.

You are aware that the Commissioners have limited the amount to be paid district engineers for salary and all expenses to \$3,200, this sum after allowing \$3,000 for salary, as originally intended, leaves only \$200 for expenses, a sum which I am quite certain the Commissioners will come to see is wholly inadequate, and which I am well convinced they will ultimately supplement.

In the meantime, I sincerely trust that you will not allow this question of travelling expenses to limit your usefulness in any degree, that you will spare no reasonable and proper cost in maintaining the most efficient and vigilant supervision of all the works and services in your district; that you will keep an exact account of all necessary expenses incurred by you on these duties, and you have my assurance that in the long run they will be paid.

I am desirous that you should be in a position to devote your mind and all your energies to the important work placed under your charge. I am most unwilling that you should feel that your own compensation must be in inverse ratio to your exertions, as it would be, if you were obliged to defray the expenses referred to, and I take this means of satisfying you that I shall do everything in my power to have the matter set right.

Believe me, &c.,

(Signed.) SANDFORD FLEMING,
Chief Engineer.

(Copy.)

INTERCOLONIAL RAILWAY, CHIEF ENGINEER'S OFFICE,

55, Gaspé, June 9th, 1869.

MY DEAR SIR,—I would have written you sooner on the subject of travelling expenses had I not been so much engaged with other matters.

I had occasion to write Mr. Hazlewood on the subject some time ago, and as my letter to him dated 31st May, conveys my views I cannot now do better than enclose a copy to you.

You can readily understand my anxiety, in the interest of the undertaking, to see the Engineering Staff in the greatest possible efficiency, and that no trifling consideration of cost should in any degree withhold from the work the full advantages of your professional knowledge and energy. You will, therefore, I trust be good enough to consider the remarks which I have made in the enclosed, to apply equally in your own case.

I received your letter of June 3rd, at Halifax, on Monday night, before leaving, and your telegram from Richibucto, last night at Shediac. I am glad to hear of the satisfactory progress of the several surveying parties. When the surveys between Moncton and Miramichi connect, be good enough to telegraph me at Rimouski. Until you hear from me, you will use your own judgment in continuing the work until all the information required is obtained.

Believe me, &c.,

(Signed.) SANDFORD FLEMING.

A. L. Light, Esq.,
Miramichi District.

(Copy.)

INTERCOLONIAL RAILWAY, CHIEF ENGINEER'S OFFICE,

55, Gaspé, June 9th, 1869.

MY DEAR SIR,—I had occasion to write Mr. Hazlewood, of the St. Lawrence District, on the subject of travelling expenses some time ago, and as this letter to him

conveys my views on the subject of travelling expenses, I cannot do better then send you a copy.

I am, as you will readily understand, desirous that the Engineering Staff should be efficient, and that the work should have the fullest advantages from your energy and professional knowledge. I have, therefore, to request that you will consider my remarks in the enclosed, to apply equally in your own case, and that you will maintain in your District the most vigilant supervision possible.

Yours, &c.,

(Signed,)

SANDFORD FLEMING.

W. H. Tremaine, Esq.,
Nova Scotia District.

(Copy.)

INTERCOLONIAL RAILWAY, CHIEF ENGINEER'S OFFICE,

55, Gaspé, June 9th, 1869.

MY DEAR SIR,—I intended writing you sooner on the subject of travelling expenses, but I was really so much engaged, up to the moment of leaving Halifax, that it was not in my power. I had occasion, however, to write Mr. Hazlewood on the 31st May last, and as I conveyed to him my views on this subject, I cannot do better than enclose a copy of my letter to him.

In the interest of the undertaking, I am naturally very anxious that it should receive the fullest advantage from your energy and professional knowledge. You will therefore be good enough to consider the remarks in the enclosed, to apply equally in your own case, and allow no trifling consideration of cost, in travelling over your District, to interfere, in any degree, with the most vigilant supervision and the maintenance of the Engineering Staff in the greatest possible efficiency and usefulness.

Believe me, &c.,

(Signed,)

SANDFORD FLEMING.

Marcus Smith, Esq.,
Restigouche District.

SUPPLEMENTARY REPORT OF THE COMMISSIONERS OF THE INTERCOLONIAL RAILWAY.

Advances on Plant, and Percentage.

Certain contractors having made application in September last, for an advance on plant, and to get payment of the percentage retained in terms of the contracts, the Commissioner called upon the Chief Engineer, to report upon both subjects, which he did in the following terms:

"The percentage retained in the hands of the Commissioners is, I feel assured, a great deal too much, and in view of the present circumstances, I think it would be advisable to reduce it to a mere nominal amount, if the whole of it cannot be relinquished.

"But even with a system of certificates, which will give to the contractors the amount due to them, nearly a fortnight earlier in the month, and even yielding to them the whole of the percentage retained, I am satisfied from all I have learned, that this alone, will be insufficient to enable them to proceed with the work properly; and it will be necessary, in order to accomplish this object, to assist them still further.

"They have all made an expenditure in procuring plant, and in making preparations

of various kinds, which cannot be represented by work actually done and certified. I would go as far as to recommend an advance on this account rather than lose the present favorable season, by even a partial suspension of active operations.

"The following shows the percentage retained in each case, and as far as I have been able to gain information, it also shows the probable amount of expenditure by the contractors in making preparations, opening quarries, building shanties, and furnishing plant:—

	Percentage retained.	Plant, preparations, &c.
"Section No. 1	about \$5,381	\$ 1,600
2	about 3,670	12,000
3	1,727	13,000
4	2,775	1,000
5	about 2,810	3,200
6	2,070	6,000
7	1,817	1,000

"In consideration of the above, and in view of all the circumstances, I would very strongly recommend as liberal an advance as possible to the several contractors, feeling satisfied that ample security is afforded in the *actual value of the work executed.*"

"(Signed),

SANDFORD FLEMING,
Chief Engineer."

Upon receipt of this report from the Chief Engineer, the Chairman reported to Council, and thereupon authority was given to the Commissioners, that the percentage so retained, be paid to the contractors applying, on the following conditions:

"1st. That the sureties for the contractors shall assent to the advance.

"2nd. That this indulgence is to be considered as extending only to the existing contracts, and is not to be invoked as a precedent, either as to the present or any future contractors.

"3rd. That it shall not be considered in any way as affecting the power of the Commissioners to deduct from future estimates and to retain a sum equal to the percentage proposed to be advanced to them as above."

Under these regulations, and in all cases with consent of the sureties in writing, the percentage, to 30th September, 1869, was paid to the several contractors upon application. The percentage which has accrued subsequently, to September, 1869, has not been paid to the contractors, although in the cases of Sections Nos. 4 and 7, when it was found the laborers were not paid, and where the Commissioners annulled the respective contracts, the percentage has been applied or retained towards payment of these wages of laborers.

Of the advances made on plant, one was to Messrs. Elliott, Grant and Whitehead, contractors on Section No. 3, for the sum of \$10,000, secured by a bill of sale of the plant upon that Section. Of this amount, \$6,028 has been covered, through subsequent estimate percentage, &c., leaving a balance of \$3,972 still secured by the plant.

The other advance, \$1,800, was made to Mr. Edward Haycock, contractor for Section No. 5, secured by bill of sale and assignment of a quarry. The whole of this advance has been repaid.

The Commissioners finding that making advances on plant, might lead to inconvenient complications, decided upon discontinuing the system, and therefore declined a subsequent application.

A. WALSH,
ED. B. CHANDLER,
A. W. McLELAN,
Commissioners.

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