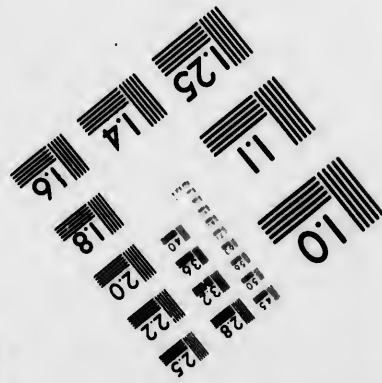
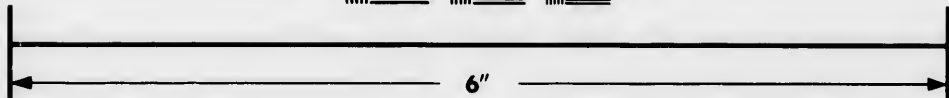
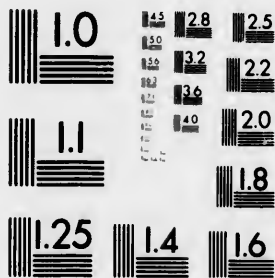


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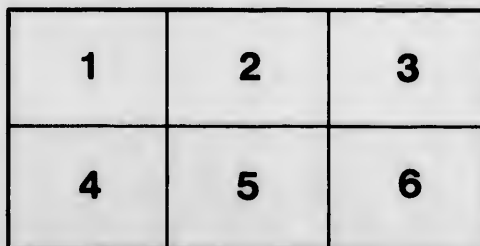
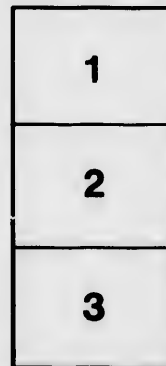
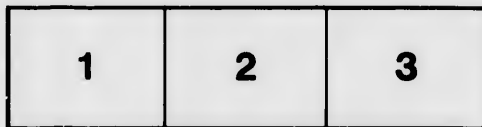
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NORTH SHORE RAILWAY

FOUNDATIONS IN DEEP WATER

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NORTH SHORE RAILWAY.

FOUNDATIONS IN DEEP WATER,

BEING A REVIEW OF "REMARKS BY THE GOVERNMENT ENGINEER,
ON THE 'CONTRACTOR'S STATEMENT OF FACTS.'"

BY SILAS SEYMOUR,

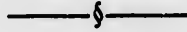
GENERAL CONSULTING ENGINEER.

QUEBEC, August 13, 1877.

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INTRODUCTORY.



The present Government Engineer, in charge of what was formerly known as the "North Shore Railway," has never, since his first advent upon that road, lost an opportunity, either in his official reports, or through the public press, to misrepresent and degrade the character of the work which was provided for, and being executed under the original contract and specifications, previous to the time when his own assumed superior foresight, and vast engineering skill and acquirements, were providentially called to the rescue; and the road was thus apparently saved from becoming an engineering and commercial failure; and also an immense slaughter-house to the travelling public, who might venture to risk their lives upon it.

Having, as is very well known, been chiefly instrumental in securing the commencement of the work; and also having very justly been held responsible for the preparation of the original contract and specifications, which provided for the character and class of road to be constructed, I have, in justice to my own character and professional reputation, never failed to repel these charges and insinuations, in such language and terms as the occasion seemed to justify or require. In a recent publication, over his own signature, this Government Engineer has reiterated the same views, in a very dogmatic and offensive manner; and hence the occasion for the present pamphlet.

The subject treated of is one which has necessarily carried me back through several years of history ; as well as through many documents connected with the railway, from which such extracts have been made as seemed necessary to a complete understanding of the subject.

To those who are familiar with the relations which have heretofore existed, and which now exist, between the parties to this controversy and myself, it will be unnecessary for me to say, that the views presented in this pamphlet, are not predicated upon any particular desire on my part, to favor the interests of either party ; my only object and desire being to vindicate myself from unfounded assertions and insinuations with reference to my professional capacity ; as well as to my good faith and allegiance to the best interests of the late North Shore Railway Company, during the time when I was honored with its confidence and support ; and also to defend the sanctity of contracts from invasion by unscrupulous and ignorant Engineers, who may, for the time being, suppose themselves to be clothed with the most arbitrary and despotic power.

I had indulged the hope, that there would be no further occasion, on my part, for publications of this nature, at least until after the completion of the railway ; at which time, if my life should be spared so long, it is my purpose to publish a history of the Enterprise, which will demonstrate the fact, that but for the unjustifiable interference of this same Government Engineer ; together with such aid and encouragement as he has from time to time received from other influential parties, solely for the purpose of promoting their own selfish views and interests, the North Shore Railway would now be an accomplished fact. And, also,

INTRODUCTORY.

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that this same interference has thus far resulted in no real or substantial improvement in the class of road originally contemplated and provided for; while, at the same time, it has been the cause of several hundred thousand dollars of useless expenditure, and the waste of several years of invaluable time.

S. SEYMOUR,

General Consulting Engineer.

Quebec, Aug. 13th, 1877.

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NORTH SHORE RAILWAY.



FOUNDATIONS IN DEEP WATER.



It appears, from a Pamphlet recently published by Mr. A. L. Light, Government Engineer, in charge of what was formerly the North Shore Railway, which Pamphlet is entitled: "Remarks of the Government Engineer of the Eastern Division of the Q. M. O. & O. Railway, on the Contractor's "Statement of Facts," that differences of a very important nature exist between the Contractor and the Government Engineer, respecting the nature and cost of "*Foundations in deep water*," as provided for in the existing contract and specifications for the said Railway.

The following extract from Mr. Light's Pamphlet will explain the nature of these differences, so far as can be inferred from the language used by the respective parties:

"FOUNDATIONS."

1. The Contractor states: "The schedule based on the specifications attached to contract, provides for \$118,000, for the entire work of foundations on the whole line. The classes of foundation the chief engineer has exacted where artificial works were necessary, and which were operated upon last season, and those proposed to be done as per plans now before me, will entail an expenditure of \$350,000, or an excess of \$232,000, over what is already provided. When this present contract was made, it was based on and included all the plans, specifications and conditions of previous contracts then in existence, (see last paragraph of preamble, page 5 of printed contract), with the various additions as contained in the circulars, &c., alluded to in same paragraph. All the plans and specifications, (see page 53, of printed contract) for artificial foundations were approved of by the railway company, before signing the present contract, and as Messrs. Baillaigé and Light, to whom was referred the whole matter of class of road, did not object to the plans and specifications then adopted by the company, but recommended alteration and strengthening of some (see clause 6 of Baillaigé and Light's report, page 51, printed contract), before the plans above referred to were made, the borings to ascertain nature and depth of soil at Batiscan, St. Maurice, St. Anne, and Bout de l'Île were made under the then engineer, and in some cases a second boring was taken of the foundations; all this, together with the fact that some of the foundations were already done, fixed them to be as per plans and specifications then forming part of contract, with the addition as provided in report,

“ and the sum of money required for this service, monied
“ out for each item, Schedule B.”

REMARKS.—“ It is true the present contract was based on the specifications and conditions of previous existing contracts, but the plans were specially ignored ; I always pronounced them to be deficient, and the quantities deduced from them “too small ;” but I am not responsible for them, as they were arranged before I took charge of the work. The structures built on them were condemned in my report to the Government, of 12th January, 1875, and also in the joint report of Messrs. Baillaigé and Light, of the 13th March, 1875, embodied in the contract, (see Appendices Nos. 3 and 4). A special clause in the latter stipulates that the contractor binds himself to make all changes in plans, &c., (see Appendix 5). I knew the foundations would have to be enlarged, and clause 1, above mentioned, was meant to cover them. It is quite possible that these enlargements are much more extensive than the contractor contemplated, but they are just what they should be. The value of these foundations, as nearly as can now be arrived at, is \$268,000, or an excess of \$150,000 over schedule quantities. The additions are merely sufficient to make the works safe and permanent, a more important consideration than that of expenditure.”

Some of the statements contained in the “ Remarks of the Government Engineer,” respecting these foundations, are so erroneous, that, although if strictly true, they would not change the aspect of the case in the least degree, yet, as a matter of history, it may be as well, before proceeding further, to correct them.

He says : “ the plans were specially ignored ; I pronounced them to be deficient, and the quantities deduced

from them too small." The record shows, that the only official expressions used by the Government Engineer, respecting these foundations, previous to the date of the Government contract, were : 1st, in his report to the Government, of January 12th, 1875, where he gives an opinion that they are "*hazardous*" ; and, 2nd, in the joint report of March 13th, 1875, signed by Mr. Baillaigé and himself, where he says that "*they shall be so altered and strengthened to the approval of the undersigned, as to ensure that safety and stability which, in their opinion, they do not now possess, &c.*" The first of these expressions naturally conveys the same idea, or impression that would be conveyed in speaking of a defective round or step in a ladder ; or the want of a single brace, or even nail, in a scaffolding, to wit : that it was "*hazardous ;*" and the second expression conveys the idea, quite clearly, that they "*shall be so altered and strengthened as to ensure that safety and stability which they do not now possess,*" or in other words, that the *hazardous* feature shall be remedied ; and not that the *entire ladder or scaffolding* should be condemned or *ignored* merely for the want of a single round, brace, or nail.

The Government Engineer says further, that " the structures built on them were condemned in my report to the Government, of January 12th, 1875 ;" Whereas, a careful study of that report will show that the only structure which it condemned, was the pier on the west side of the Jacques-Cartier River ; and that the principal reason urged for its condemnation, was that "*This pier is founded on rock, which, from its want of elasticity, like the stone sleepers on the old railways, will augment the shattering effects of passing trains, that will surely wreck it sooner or*

later," which objection certainly could not apply to structures founded on the piers now under consideration.

The further fact, that no structures had been built upon the foundations in question, at the date of the Government Engineer's report of Jan. 12, 1875, would seem to show that they could not very well have been condemned in that report.

The Government Engineer says further, that: "I knew the foundations *would have to be enlarged*, and "clause one," above mentioned, was meant to cover them. It is quite possible that these *enlargements* are much more extensive than the Contractor contemplated; but they are just what they should be, &c."

It appears, however, that, instead of "*enlarging the foundations*," as the Government Engineer says "he knew they would have to be;" he has since, *and only since* the date of the Government contract, altogether discarded or "ignored" the specifications which, in the first paragraph of his "Remarks," he admits formed the basis of that contract; and that he has substituted in their place, and forced the Contractor to construct foundations of an entirely different, and as he freely admits, of a much more expensive character.

Instead of "enlarging," or "altering and strengthening" the character of the foundations, which were provided for in the contract, under his joint report of March 13, 1875, he has gone back to what the former Chief Engineer, in his remarks, as hereinafter quoted, styles: "the old stereotyped plans in use for such purposes," any innovation upon, or departure from which "are liable to the severest criticisms from a peculiar class of the Engineering profession, who never like to depart from old customs."

This plan, as adopted by the Government Engineer, involves the commencement of the bridge masonry at the bottom of the river, instead of at a point but two feet below low-water mark, as provided for in the original plans and specifications; thus substituting *first-class masonry*, for piles and *crib-work*, a distance, or height of from five, to twenty-five feet, as the case may be, which plan is evidently not an enlargement, alteration or strengthening of the original plan; but an *entire and radical substitution* of another plan in its stead; for the excessive and, so far as can now be foreseen, the useless cost of which, the Contractor very properly claims payment as *extra work*, not contemplated and provided for in the contract.

The Government Engineer says further: "The value of these foundations, as nearly as can now be arrived at, is \$268,000 or an excess of \$150,000 over schedule quantities. The additions are merely sufficient to make the work safe and permanent, a more important consideration than that of expenditure."

It will be shown that the revised schedule "B," of Sept. 1, 1875, makes provision for this class of work, only to the extent of \$108,186 which is \$159,814 less than the Government Engineer's present estimate of its cost. It also appears that the Contractor claims the difference to be \$232,000.

It is not apparent, however, whether the difference claimed by either party, applies to the cost of the *foundations proper*, computed from the bottom of the bridge masonry in each case respectively; which, in one case, would commence at the bottom of the river, and in the other, at a point about two feet below low-water-mark; thus, as a matter of course, saving the difference between the cost of solid ma-

sonry, and the cost of piles and crib-work, between these points, which would be a very large item in this excess, unless it is otherwise provided for in the schedule.

An examination of schedules "A" and "B" will show that the quantity of "first-class masonry" is the same in each; except that schedule "B" contains a separate item, for "additional masonry recommended by Baillaigé and Light, 5,000 c. yds." And inasmuch as the only "additional masonry" that had been recommended by these gentlemen, will be found referred to in their joint report of March 13, 1875, where a large increase in the dimensions of bridge piers, &c., is required, it is assumed that this allowance of 5,000 c. yds. is intended to cover that item only.

The difference in the cost of constructing these foundations upon the two respective plans, was roughly computed by the Chief Engineer and the Contractors, during the time of negotiating the original contract, at \$250,000; and the consideration finally agreed upon in that contract, was based upon the understanding that the "composite plan" of foundations would be adopted, except in cases where it might be found to be entirely impracticable.

This original consideration was substantially adhered to in the "supplemental contract" with the present Contractor, dated Feb. 21st, 1874. And the quantities embraced in the schedule marked "A," as computed under that contract, are referred to in the existing Government contract, as having formed the basis of that contract.

It therefore appears quite clear that, notwithstanding the assertion contained in the heading to revised schedule "B" to the effect, that everything was added that had been "recommended by Messrs. Baillaigé and Light," no provision

has ever been made for any increased cost in this class of work ; and it is equally clear that no such change in the character of the work was contemplated, either by the Government Engineer, or the parties to the contract, at the date of its execution.

If the mind of the Government Engineer had been thoroughly and honestly convinced of the insufficiency, or the inadaptability of these foundations, at the date of his first report to the Government, or at the date of his joint report upon the Government standard, or even at the date of his preparation of the revised schedule upon which the Government contract was based, it clearly became a duty which he owed, not only to the Government which employed him, but also to the Railway Company, the public at large, and to himself, to have withheld his approval from all items in the monthly estimates which related thereto ; also, to have submitted plans and specifications for such structures as he could conscientiously approve ; and to have included, in the revised schedule, an amount sufficient to cover their increased cost ; and in the event of his estimates, plans, specifications and schedules being disapproved by the Government, to have resigned his position at once.

Referring to the last clause of the Government Engineer's remark, to wit : " that the additions are merely sufficient to make the works safe and permanent, a more important consideration than that of expenditure," it may be observed, that while no intelligent railway man will take issue with the proposition, that *safety* and *permanency* are of far more importance in railway structures than the consideration of *expenditure* ; yet, it appears from the record, that such undisputed and eminently qualified railway au-

thorities as Mr. Walter Shanly, Mr. Sandford Fleming, Mr. Charles Baillaigé, and Sir Charles Fox and Sons, to say nothing of the opinion of the late Chief Engineer of the Railway, which, as hereinafter stated, was founded upon a long and extensive *practical experience* upon the very question now under consideration, have already taken issue with the proposition, that the plans and specifications in force, under the Government contract, were insufficient to produce a class of work which would be fully equal to the requirements of the contract.

It was remarked by the late Chief Engineer, in an extract hereinafter quoted, and referring to the plan now under discussion, that the Government Engineer evidently "does not understand, either the theory of the plan, or its practical adaptation:" which remark was predicated upon the fact that the Government Engineer had stated, in his report, then under review, that: "Should the surrounding crib settle, the pier would be destroyed." Whereas, as will be seen from the specifications, the most important feature of the plan, is, that the crib may settle, independently of the piles, firmly upon the bed of the stream, and thus either prevent scouring about the piles; or take the place of such scouring as may occur, without in the least degree affecting the stability of the piles, or their ability to support "the entire weight of the masonry and superstructure," which it is provided shall come upon them.

The Government Engineer seems also to have forgotten, or to have entirely ignored the important fact, that piles if equally well driven, and held in position, will sustain no more weight if sawn off at the bottom of the stream, than they will if sawn off two or three feet below low-water mark; also, that, by the plan which he has substituted,

the weight, which is to come upon these piles, will be largely increased, and in many cases more than doubled, by reason of the fact, that they will be obliged to sustain all the additional weight of the masonry between the bed of the stream, and a point about two feet below low-water mark; and also the additional fact, that, while his plan affords no greater, if as great protection against scouring; yet if it should occur, this great additional weight upon the piles, will cause them to either yield, or fail entirely, much sooner than they would otherwise do.

In discussing the question at issue between the parties, with reference to this important item, which, according to the Government Engineer, amounts, "as nearly as can now be arrived at," to an excess of \$150,000, as against the Contractor; and which, according to the Contractor, amounts "to an excess of \$232,000 over what is already provided," it is proposed to consider:

1st. What was required of the Contractor in regard to these foundations, under his contract with the North Shore Railway Company, dated 21st Feb., 1874, which contract is kept alive by, and forms part of his existing contract with the Government.

2d. What additional work and expenditure are required by the terms of the existing Government contract, which were not provided for by the original contract of Feb. 21st, 1874; and,

3d. Whether such additional work and expenditure are covered by the gross or lump sum named in the Government contract, or whether they are to be paid for as extra work, or expenditure.

I.

REQUIREMENTS OF THE ORIGINAL CONTRACT.

By referring to the preamble of the existing Government contract, dated Sept. 24, 1875, and also to the pre-existing contract of Feb. 21st, 1874, it will be seen that the latter contract is an emanation from, or a continuation of still another contract of prior date, to wit: April 5th, 1872, which had been entered into by and between the North Shore Railway Company and the Chicago Contracting Company; which original contract had, with the consent and approval of the Railway Company, been transferred and made over to the present Contractor.

It will also be observed that, although the contract of Feb. 21st, 1874, provided for modified terms of payment, which were regarded as somewhat more favorable to the Contractor than the terms specified in the original contract, and therefore, by consent of both parties, contained some stipulations requiring a corresponding increase of expenditure, on the part of the Contractor; yet there was no change whatever made in the general specifications which were attached to, and formed part of the original contract; and consequently the character of the railway and equipments remained the same; it always being well understood, and freely admitted by all parties in interest, that all materials, workmanship and equipments, should be fully up to the standard of a "*First class Railway.*"

It was distinctly expressed in the original contracts: "that the said materials, workmanship, and fixtures required in the construction, equipment, finishing and com-

pletion of the railway shall be *first class* in their character ; and that they shall conform, in every respect, to the requirements of law, to the general railway acts, and other statutes referring to the said company ; and to the annexed specifications."

The consideration of seven million dollars, specified in the original contracts, consisted largely in subsidies granted to the Railway Company by the Provincial Government, and the city of Quebec. The subsidy from the Government was granted upon the condition that : " the main line of said railway shall be a *first class road* ; and shall have been accepted as such by the Lieutenant Governor in Council, on the report of the Provincial Railway Board " The subsidy from the City was granted upon the condition that it should be payable : " according to the progress of the work ; and pro-rata to the total cost of said road between Quebec and Montreal, *on the certificate of an engineer appointed by themselves.*"

With these safeguards in the main body of the contract ; and in view of the fact, that the Contractor would not become entitled to the subsidies from the Government and the City, unless he complied substantially, and in good faith, with the conditions upon which those subsidies were granted, it did not appear to be either necessary, or advisable, in the preparation of the general specifications, to enter so much into detail, as would otherwise have been done.

In fact, it would have been quite impossible for the Engineer of the Railway Company, in preparing the specifications, to forecast the views which might, at some future day, be entertained by the Lieutenant Governor in Council, or by an Engineer to be appointed by the Government, and another by the City of Quebec, with reference to many of

these details, in relation to which the best railway authorities, and many of the most celebrated railway Engineers, are totally at variance with each other, at the present day.

The only safe course, therefore, appeared to be, for the Engineer to provide in the specifications, for all the safeguards respecting the future character of the work, that had been necessarily omitted from the main body of the contract; and to leave as many of the details as possible open for future decision, after the views of the Government and City authorities should have been more thoroughly known and developed.

Accordingly, under the head of "General Provisions," in these specifications, it was provided as follows :

" 6. It is intended that the materials and workmanship, both in the roadway, track, structures, buildings and equipments shall all be *first class*, so far as regards strength, durability and practical adaptation. Nothing *superfluous* will be required; but everything must be executed neatly, thoroughly and in good taste, so as not to offend the eye, nor to convey an idea of carelessness or want of skill in execution."

" 7. Working plans and *specifications more in detail*, for the more important mechanical structures, depot-buildings, machine-shops, engine-houses, &c., will be furnished by the Engineer, as they may be required from time to time, during the progress of the work."

It was very naturally to be supposed that, before any material progress had been made in construction; or at least before any considerable amounts had been advanced to the Railway Company, by the Government and City of Quebec, on account of their respective subsidies, some indication would have been given by the representatives of

these respective parties, as to the character or class of the different structures provided for under the contract; as well as of the work which had already been done, and materials that had been furnished under it.

The fact, however, that no question was raised upon this subject by either of these parties, until after an expenditure had been made by the Contractor of about a half million dollars, of which about two hundred thousand dollars had been advanced by the Government and the City, shows quite conclusively that, at least, up to that date, say Nov. 1st, 1874, no reasonable objection could have been made to the character of the work.

Inasmuch as the Board of Directors of the Railway Company, which approved the contract, and the estimates, was composed of a majority of Directors who were appointed by the Government and the City of Quebec, it is to be inferred that every thing that was calculated to affect the true interests of these parties, was duly looked after and protected.

In accordance with the provisions of the "General specifications" above quoted, with reference to the power and duty of the Engineer to furnish the Contractor with "working plans and specifications more in detail," "as they may be required from time to time, during the progress of the work," the Chief Engineer, on the 24th of February, 1874, transmitted to the Contractor, detailed "specifications for foundations in deep water," together with plans and other information relating thereto, all of which were accompanied by the following letter :

Quebec, Feb 24, 1874.

" DEAR SIR,

I hand you herewith as follows: specifications for foundations in deep water; cross-sections of the rivers St. Anne, Batiscan and St. Maurice, showing the character of the bottom, depth of water, and approximate location of the abutments and piers; Mr. Chandler's revised bills of timber required for the crib and pile foundations, at each of the above rivers; tracing plans of foundations in about ten, and thirty feet water respectively.

All of the above are as near approximations as it is possible to make at the present time; and they will, of course, be subject to such changes as may be deemed important, during the progress of the work.

The bills for L'Assomption and Ottawa rivers are being prepared, and will be handed to you in a few days

Yours truly,

S. SEYMOUR,

Engineer in Chief.

Hon. Thos. McGreevy,

Contractor N. S. R., Quebec."

On the following 16th of June, 1874, the Chief Engineer likewise placed in the hands of the Contractor "Circular No 2, for the information and guidance of the Engineer department and Contractor, with reference to certain matters which are left open for the decision of the Engineer, in the general specifications for the main line." This circular bears date June 12th, 1874, and forms part of the existing contract with the Government.

A reference to "Circular No. 2," will show, that although almost every other item of work required in the formation

of the permanent-way, or road-bed, is particularly referred to therein, except the item of "Foundations in deep water," yet no allusion whatever is made to that item, for the obvious reason, that this subject had been fully explained and decided, in the "Detailed specifications," previously promulgated by the Chief Engineer.

There can be no doubt, however, that these "Detailed specifications for foundations in deep water," were as fully binding and obligatory, both upon the Contractor and the Railway Company, as they would have been, if fully incorporated into, and forming part of "Circular No. 2," ; and it seems equally conclusive that the binding force of "Circular No. 2," would have been in no manner affected, either by embodying in it, or excluding from it, the provisions contained in the "Detailed specifications for foundations."

With reference to the binding force of "Circular No. 2," it may not be improper to quote from an opinion expressed by that eminent authority in all railway matters, Mr. Walter Shanly, Civil Engineer, which will be found in Appendix No. 5, to a "Report of the Chief Engineer upon the situation," published in pamphlet form, and dated March 4, 1875.

After referring to certain clauses in the contract and specifications which bear upon that subject, Mr. Shanly says: "Circular No. 2 is just such a detailed specification as the engineer had, under the general provision referred to, a right to furnish, &c." Also, "It seems to me that the detailed specification (Circular No. 2), which you not only had a right, but were, in a manner, bound to furnish the Contractor," &c.

Appendix No. 7, of the same pamphlet, also contains corroborative views upon the same subject, as expressed by the legal advisers of the Railway Company.

The question, as to the binding force of these specifications, was also submitted to Mr. Sandford Fleming, Chief Engineer of the Canadian Pacific Railway, who expressed the following opinion: "I therefore think the "detailed specifications for foundations in deep water," may be considered as fully authorized by the contract, and in consequence, binding on the Contractor." (See page 10. of Mr. Fleming's report of Feb. 10, 1875.)

Assuming then, that the "Detailed specifications for foundations in deep water," were of binding force, and formed part of the original contract of Feb. 21st, 1874, it remains to ascertain the nature of their requirements.

Without referring to the specifications at length, it will be sufficient to state their substance, as contained in the following extracts: "In cases where solid rock is not easily attainable, it is proposed to furnish substantial and durable foundations for bridge masonry in deep water, by means of a *composite sub-structure, to be formed of piles, surrounded by a rough strong crib-work, filled with stone.*"

"It is intended that the *entire weight* of the masonry, and bridge superstructure, shall be supported by the *bearing piles*; and that the crib shall keep the piles firmly in position; and at the same time, protect them from the effect of scouring or undermining, by reason of the action of the current upon the bed of the stream."

"The following method of construction will be adopted, subject to such modifications as may, from time to time, be directed by the Engineer, during the progress of the work."

After describing, in great detail, the manner of executing

the work up to the top of the platform which is to receive the masonry, at a point "about two feet below low-water-mark, in the river," the specifications close as follows: "After the platform has been securely anchored in its place upon the piles, such further protection, or guard piles shall be driven; and such additional connections, fastenings and finish, shall be put upon the top, and on the sides of the crib-work, including brush and rip-rap around the bottom, as may be required by the Engineer, for the purpose of protecting it thoroughly from the injurious action of the water, ice, or any other danger to which the foundation may be exposed."

The general specifications attached to the original contract, contained the following provision respecting the same character or class of work:

"Whenever solid rock is not found, the foundations will consist, either of paving, concrete, piling, or platforms of timber or plank, as the Engineer may direct; the whole to be protected by sheet-piling, rip-rap, crib-work, or cofferdams, when necessary; and executed in the most thorough and substantial manner."

It is also important to consider, in the same connection, whether these foundations, if constructed in accordance with the foregoing specifications, would meet the requirements of the contract, so far as the term "*first class railway*" is concerned.

The first question that was raised upon this point, was suggested by the Government inspecting Engineer, Mr. A. L. Light, in a report to the Government, under date of Jan. 12, 1875; the following extract from which will be found on page 34 of a pamphlet entitled: "Historical Review of

the Government Standard; by the Engineer in Chief," dated April 6, 1875.

"*Fourth.*—The proposed plan of founding piers on soft bottoms, in the deep waters of the larger rivers, which in some instances are 25 feet deep at low water, although economical, I consider hazardous. The mode proposed is to build the masonry on a platform placed upon piles driven in 3 feet squares, and cut off 4 feet under low tide level. These piles being enclosed within a crib of round logs, notched, and bolted together, laid partly open, and filled with loose stone. Should the surrounding crib settle, or a jam of ice, or logs break the enclosure, contingencies very probable, the pier would be destroyed.

The following extract from the same pamphlet (see pages 49, 50, 51 and 52), will show the views which were entertained by the Chief Engineer upon the subject; and also some of the reasons why the plan was adopted; also the opinion of Mr. Charles Baillairgé, City Engineer of Quebec; together with that of the distinguished scientific as well as practical Civil Engineers, Sir Charles Fox & Sons, of London, England.

"When the Chicago Contracting Company made the first proposition, and negotiated the present contract for constructing the road, the parties, all of whom were practical railway men, were particular to inquire respecting the kind of sub-structure that would be required for the masonry of the bridges over the many large streams, which the profiles then exhibited to them, showed were to be crossed by the Railway; and I informed them that, so far as I could then judge, from a somewhat superficial examination of these streams, the foundations would be of the same character as

those which I had previously adopted for a railway bridge of a mile in length, across the Potomac River, at Washington, U. S. ; which, as they very well knew, were composed of piles, driven in 30 feet water, and protected by cribs filled with stone ; and had then stood the severe tests of high floods and ice-jams of the Potomac River, during a period of ten years.

“ If the above assurance had not been made by me, I do not think that the contract would have been closed upon its present terms ; although the specifications, as quoted above, which I afterwards prepared, were fully approved by the Chicago Contracting Company, and were allowed to form part of the contract.

“ I am not aware that the present Contractor, when he assumed the contract, about one year ago, had any knowledge of the above facts. And I do not even know whether they will be regarded, by any one but myself, as having a material bearing upon the present question.

“ I will freely admit that the plans objected to by the Government Engineer, are to a certain extent an innovation upon the old stereotyped plans in use for such purposes ; and therefore, that they are liable to the severest criticisms from a peculiar class of the Engineering profession, who never like to depart from old customs. I have therefore taken great pains to satisfy myself fully as to their safety, as well as their adaptability to the purposes for which they are intended, upon this road. And I have also taken suggestions from several practical Contractors, as well as from many sound practical Engineers, with reference to such changes in my original plans, as would tend to increase their safety, and facilitate their construction.

" I have therefore come to regard the perfected plans as being entirely unobjectionable, provided the specifications and directions of the Engineer and Inspector are adhered to in every particular by the Contractor, during their construction.

" I had the honor of addressing a communication to the President and Directors, on the 16th July, 1874, in which the following paragraph occurs :

" To illustrate this principle, I will refer briefly to but a single instance of the many which must necessarily occur during the progress of the work.

" The plans which I have designed for the sub-structure, or foundations in deep water, required for the masonry in the bridges which are to span several of the large Rivers, which the line of Railway crosses, are peculiarly my own; and are much cheaper than the ordinary stereotyped plans in use for such purposes. But in order to render them perfectly safe and permanent, the greatest care and attention must be exercised in carrying out every detail of the plan, in the execution of the work. If the power to see that this is done, through the agency of Engineers and Inspectors of my own selection, and in whom I have the most entire confidence, is taken from me, I hold that I cannot justly be held responsible for the success of the plan. The failure to drive one single pile to the required depth, or to place one single bolt in the right position, might endanger the safety of the entire structure, which, although it might stand until after the Railway Company had accepted the road from the Contractor, would be liable to be undermined, and destroyed during the very next freshet that might occur."

" It is quite evident to my mind, however, that the Government Engineer, judging from his remark that " should the surrounding crib settle, the pier would be destroyed," does not understand, either the theory of the plan, or its practical adaptation.

" I take the liberty of quoting the following extract from a Report recently made to the City Council of Quebec, by Mr. Charles Baillaigé, City Engineer, as showing his opinion of these foundations :

" Persons unacquainted with Bridge building on a mud bottom, may not have confidence in this system of founding piers of stone masonry on what they may consider such a perishable material as wood ; but it is well known that wood, which is altogether and at all times completely under water, is imperishable, logs having been recovered from under water in Europe, which were known to be more than 800 years old, in a perfect state of preservation. Again, as to solidity and stability, I may say that hundreds of the most important and heaviest works in Europe and the United States of America are founded, in some cases, on wooden piles, driven into the bed of Rivers, Estuaries, &c., &c., as is now being done at Batiscan and Ste Annes."

" The following extract, from my letter to the President of June 5th, 1873, before referred to, will show the opinion of " Sir Charles Fox and Sons " upon the same subject :

" We have examined the details of the River Bridges, and having been informed by General Seymour, as to the nature of the foundations, and the extent and power of the ice-drifts in the several Rivers, we are satisfied with the designs, and consider them well adapted to their purpose."

The views entertained by Mr. Walter Shanly, Civil Engineer, upon the same subject, will be found on page 9, of Appendix No. 5, of pamphlet entitled: "Report of the Chief Engineer upon the situation," dated March 4, 1875, from which the following is an extract:

"In respect of the desirability of the kind of foundation you propose, and which the Government Engineer pronounces "hazardous," it is beyond controversy that the wood-work would have nothing to fear from the inroads of natural decay. Always under water, it would be as durable as the stone itself. I have myself built bridge-piers of which the under-water portions were of crib-work; and now recall one long bridge, in particular, the sub-structure of which was so constructed; where, I venture to say, any signs of deterioration that are to be discovered, after twenty-three years of trial, may be looked for rather in the stone work above, than in the wood-work below water.

"Next, on the question of *stability*, I am of opinion that, in fitting localities, as perfectly secure and stable base, whereon to erect piers of mason-work, may be constructed on the composite plan, forming the subject of discussion, to such a height, some 25 feet, as your specification contemplates; always assuming that the above water, or mason-work portion of your pier, will not *much* exceed, in height, that of the timber-work portion below.

"Where such kind of structure may be judiciously used, however, will always largely depend on local conditions; and not being familiar with any of the places where you design adopting this system, I am not prepared to give more than general views upon it, adding that I would be timorous of using it in streams where the bottom is of

shifting character, the current swift, and the ice above, liable to break-up and "run" rather than melt gradually out. Under such a condition of things, the cutting process, which would be relentlessly, and year after year, exercised on the upper courses of the wood-work, might ultimately have a damaging effect on the stability of the structure. There are certain of the *details* of your crib-work in which, were we to sit down together to discuss them, I might be found to differ from you "

The question as to whether these "plans of artificial foundations, provide for a first-class structure, safe, and adapted to their positions," was also submitted to Mr. Sandford Fleming, who gave the following opinion: "This is a matter of opinion, in which Engineers may honestly differ. Setting aside my own preference, I have no hesitation in saying that, *under certain circumstances*, the plans of artificial foundations, with some modifications, *might be advantageously adopted.*" (See page 14, of Mr. Fleming's report).

Referring to Mr. Shanly's well-timed remarks with reference to "*local conditions*," &c. And also to Mr. Fleming's cautious expression of "*under certain circumstances*," it should be stated here, that the crossings of the Ste. Anne's and Batiscan Rivers, are situated in shallow tide-water, but a short distance above their confluence with the River St. Lawrence; and that the bottom of the rivers, and the action of the streams are such, that wooden crib piers, partially filled with stone, and entirely unsupported by piles, have stood unmoved, during the past several years, underneath the ordinary truss road bridges which are located but a few rods below the Railway crossings.

The crossing of the St. Maurice, is situated somewhat

above the action of the tides ; and the water, for a portion of the piers, is considerably deeper than the other crossings. The bottom, however, is quite firm ; and cribs filled with stone, and resting upon the naked bottom, which have been sunk, many years since, for booms, in the immediate vicinity of the crossing ; as well as those of the old road bridge, a short distance below, and which have been standing some twenty or thirty years, still remain in their original position.

The foregoing facts also demonstrate, quite conclusively, that the sub-structures in question would be equally free from danger on account of ice jams, or any other cause. It should also be observed, that the "perfected plans" referred to in the foregoing statement of the Chief Engineer, had been prepared with a view to a sufficient base, in proportion to the respective heights of the piers, in order to give the piers which might be located in the deepest water, the same relative strength and stability as those located in the more shallow portions of the stream.

In view of the foregoing facts, and considerations, it therefore seems safe to assume, that the plans and specifications, which were in force for this class of work under the original contract, at the time when the existing Government contract was entered into, and of which it forms an important part, were all that was required for the purpose of securing a first-class Railway, in accordance with the true spirit and meaning of these contracts.

That the Government Engineer was also fully persuaded of this fact, not only at the date of the report above alluded to, in which "he considers them hazardous" ; but also at a later date, March 13th, 1875, when he, in conjunction with the City Engineer, says : "That the foundations for piers

in deep water shall be so *altered and strengthened*, to the approval of the undersigned, as to ensure that safety and stability which, in their opinion, they do not now possess; *this modification, we are of opinion, is clearly within the scope of the contract,*" is clearly evidenced by the fact, that at the date of these reports, he had approved estimates in which were embodied items amounting in cash values to \$15,017,97, for this class of work alone. It will also be borne in mind that the joint report, above referred to, of March 13th, 1875, is the document referred to in the existing Government contract, as forming part thereof.

There are also two other documents referred to in the same contract, as forming part thereof, and marked respectively "A." and "B." which, if properly considered, should exercise an important bearing upon the question.

The first, marked "A," purports to be a "schedule" prepared by the former Chief Engineer of the Railway Company, dated Oct. 23, 1874, and showing the estimated cost of the main line under the original contracts; in which the items relating to the cost of foundations in deep water, aggregate \$102,462.

The second, marked "B," purports to be a "schedule" prepared by the Government Engineer, dated Sept. 1, 1875, and showing the cost of completing the main line, "computed at prices to make a bulk sum of \$4,314,000, as arranged by the Government, and based on the amended quantities stated in a schedule dated Oct. 23, 1874, and signed Silas Seymour, (late) engineer in chief, *adding also the increase* recommended by Messrs. Baillaigé and Light in their report to the special committee, dated 13th March, 1875, to render the road acceptable to the Government and the Corporation as a first-class railway," &c., &c., in

which schedule the items relating to the cost of foundations in deep water, aggregate \$108,186; being an excess of only \$5,724 over and above the aggregate for the same items as embodied in the schedule previously prepared by the Chief Engineer of the company. The quantities in each schedule will be found exactly identical, the excess being due to a slight increase of price in some of the items.

Another important fact should also be stated in this connection, to wit: That the first estimate prepared by the Government Engineer, under the existing Government contract, embraced items relating to foundations in deep water, which had been either prepared, delivered or placed in the work, in accordance with the plans and specifications previously prepared by the Chief Engineer of the Railway Company, amounting, in the aggregate, to about \$40,000.

In virtue of the foregoing facts, it would appear :

1st. That, on January 12th, 1874, the Government Engineer considered the foundations in question as merely *hazardous*, but not sufficiently so to justify him in eliminating from the monthly estimates, the items which related thereto, amounting to \$15,000.

2nd. That, on March 13th, 1875, the same Government Engineer was of opinion that this same class of work "should be so altered and strengthened, to the approval of the undersigned, as to ensure that safety and stability which, in their opinion, they do not now possess."

3rd. That, on September 1, 1875, the same Government Engineer prepared a revised schedule of quantities for the entire main line, which purported to contain the necessary provisions and allowances for the altering and strengthening process referred to in his report of March 13th, 1875, but which, in fact, made no provision of the kind.

4th. That, the same Government Engineer prepared and certified, to the Government which employed him, estimates bearing date Dec. 31st, 1875, and March 1, 1876, respectively, in both of which were embraced items to the amount of about \$40,000 which related entirely to the class of work in question, and which was nearly 40 per cent of the total amount provided in the schedule for its completion.

There seems to be no doubt therefore, that not only the original contract with the Railway Company, dated Feb. 21, 1874; but also the existing contract with the Provincial Government, dated Sept. 24, 1875, requires the Contractor to construct just such foundations in deep water, as are described and provided for, under and in virtue of the "Detailed Specifications for foundations in deep water," which were placed in his hands by the Chief Engineer of the Railway Company, on the 24th of February, 1874, and nothing more.

II.

ADDITIONAL REQUIREMENTS OF THE GOVERNMENT CONTRACT.

The opening clause in the Government Contract (immediately succeeding the preamble), is as follows :

“ The said Honorable Thomas McGreevy hereby undertakes, binds and obliges himself toward the said party of the second part, to do and perform all the obligations and to execute all the works which, under his aforesaid contract, of date the twenty first of February one thousand eight hundred and seventy-four, he was bound to do and perform to and in favor of the said Company, subject however to the requirements of a certain circular called circular No. two, dated the twelfth of June, one thousand eight hundred and seventy-four, signed Silas Seymour, and hereunto annexed to form part of these presents ; and subject also to such changes as by the said report of Messrs. Baillairgé and Light have been introduced in said proposed work ; and subject moreover to any additions, alterations and improvements which have been set forth, or are delineated or appear in the contract schedules marked A. B. and C., and in the amended profiles and plan marked No. *one, two, three, four* and *five* herewith signed and specially referred to as forming part of these presents. ”

The succeeding clause “ 3, ” is as follows :

“ 3. It is further expressly understood and agreed by and between the parties hereto, that the work to be done and materials therefor furnished on main line, under this contract shall be determined and governed, firstly by a certain

schedule of quantities dated the twenty third of October, one thousand eight hundred and seventy-four, hereunto annexed and marked A; and secondly, by an amended schedule covering the same work, with some additions thereto, said amended schedule marked B, prepared and signed by the Government Engineer, and bearing date the first September one thousand eight hundred and seventy-five; and as to such portion of said work to be done on the Piles Branch, the schedule of work and materials shall be the schedule hereunto annexed marked C, and herein before referred to."

The succeeding clause "13," is as follows:

"13. The party of the first part doth hereby undertake promise, bind and oblige himself, his heirs and assigns, to fully and faithfully perform and execute all the conditions and the covenants herein contained and set forth, as well as those mentioned and set forth in the above cited contracts, and report of Baillaigé and Light assented to as above mentioned (which are not hereby annulled) subject and according to the specifications thereunto annexed and to the specifications hereunto annexed, relating as well as to the main line as to the Piles Branch, steamboat on the St. Maurice, &c., &c., for and in consideration of the sum of four millions seven hundred and thirty-two thousand three hundred and eighty-seven dollars and fifty cents, which shall be paid to him as hereinafter provided."

These three clauses seem to cover every item or class of expenditure, which the Contractor undertakes to incur, both on account of the Main Line, and the Piles Branch of the Railway, for the consideration of \$4,732,387.50, as specified in the contract.

A careful analysis of these provisions will show that the Contractor undertakes ;

1st. To carry out all the requirements of the contract dated Feb. 21, 1874.

2d. Also the requirements of "Circular No. 2."

3d. Also, "Such changes as, by the said report of Messrs. Baillaigé and Light, *have been introduced in said proposed work.*"

4th. Also, "Any additions, alterations, and improvements which have been set forth, or are delineated, or appear in the contract schedules marked A. B. and C. ; and in the amended profiles and plan marked Nos. 1, 2, 3, 4 and 5 herewith signed, and specially referred to as forming part of these presents."

It is very manifest, that the 1st, 2d and 3d items, above specified, including also (as previously shewn), the "Specification for foundations in deep water," were obligatory upon the Contractor, under the original contract of Feb. 21st, 1874, for the reason that both the Railway Company and the Contractor had fully agreed and undertaken to carry out all the requirements of the joint report of Messrs. Baillaigé and Light, dated March 13, 1875, previous to the date of Government Contract.

Therefore, the additional requirements embodied in the Government contract, are contained in the 4th item, in connection with other portions of the contract ; and will be found to consist chiefly, if not entirely, in the substitution in part, of *iron*, for wooden bridges ; the substitution of *steel*, for iron rails, upon the Main Line ; and the removal of the limit to the cost of right of way.

It is quite clear that any changes in the plans and specifications for foundations in deep water, which might have

been introduced in virtue of Messrs. Baillaigé and Light's joint report, previous to the date of the Government contract, would have been equally binding upon the Contractor under the Government contract; provided always, that these changes came within the scope of these detailed specifications.

But inasmuch as no change whatever had been so introduced, or even suggested; while on the other hand Mr. Baillaigé had reported in the most complimentary terms upon the character of these foundations; and the Government Engineer had, unqualifiedly, approved every estimate which contained items relating thereto; and had also omitted to make any provision or allowance, for any increased cost of this class of work, in his revised schedule, dated September 1, 1875, under which, as specified in the Government contract, "the work to be done and materials therefor furnished, on the main line under this contract, shall be determined and governed;" it therefore appears to be conclusive, that the Contractor is not bound to incur any expenditure, except as extra work, on account of these foundations, which is not fairly contemplated and provided for under the plans and specifications which were in his hands, and in full force, at the date of the Government contract.

III.

AS TO WHAT CONSTITUTES EXTRA WORK.

There are three separate and distinct clauses in the Government contract, which seem to contemplate and provide for certain contingencies, under which the gross or lump sum of \$4,732,387.50, which is named therein as a full consideration for the performance thereof, may be departed from.

The first is clause No. 1, which reads as follows :

" 1. The party of the first part hereby covenants and agrees to make all changes in grades, plans, specifications and otherwise, in conformity with the Government requirements from time to time, as the said work progresses ; and it is fully understood and agreed by and between both parties hereto, that the profiles, plans, working drawings and detailed specifications of the different works, structures, buildings and equipments, shall be made by the said Contractor and fully approved by the Government Engineers, before work is begun upon them, and that all work and materials shall be subject to his inspection and approval before being accepted and paid for by the Government. It is further understood and agreed by and between the said parties hereto, that the decision of the Government Trustees or Commissioners, upon the report of the Government Engineer, shall be final and conclusive as to all materials used or work done or in course of doing, which materials shall be of the best description of their respective kinds and satisfactory to said Engineer, and such as shall ensure a first-class road, which the said Honorable Thomas

McGreevy, doth hereby bind and oblige himself to construct and deliver."

This is the clause referred to in the "Remarks of the Government Engineer on the Contractor's statement of facts," (as previously quoted from) which the Government Engineer states was especially intended to cover the question of foundations in deep water; and he appends it to his "Remarks" as a perfect answer to the Contractor's claim for an extra allowance on account of the changed character of these foundations, under the following heading: "*Class No. 1 of contract, wherein the contractor binds himself to make all changes in conformity with Government requirements.*"

There can be no doubt that this clause binds the Contractor to do all that the Government Engineer claims, provided that the Government is willing to pay for any *extra work* that may be involved in these requirements, as provided for in clause No. 16 of the same contract, as hereinafter set forth; neither is there any doubt that the Contractor would be bound to the same effect, even though the above clause had been entirely omitted from the contract.

The specifications for the main line, which are attached to and form part of the contract, state, that "*The work will in all cases, be under the direct charge and control of the Engineer, and his orders must be complied with in every respect, and under all circumstances*": which provision covers the same ground, but in language much more terse and to the point, than the clause referred to by the Government Engineer; but it does not follow, from either or both of these arbitrary provisions, that work so ordered by the Engineer, and performed by the Contractor, is not to be

paid for as extra work, provided it is entirely "*superfluous*," when considered in connection with the 6th clause of the same specifications.

The second clause, in the contract, relating to "extra work," is clause "4," which provides for changes in the location of the line, which may result, either in increasing or diminishing the total consideration, in the ratio of such increased or diminished cost, when computed at schedule rates.

The third, and, as bearing upon the question now under consideration, by far the most important clause in the Government contract, which relates to the payment for extra work, is clause "No. 16," which reads as follows :

" 16. And the parties hereto hereby declare, that although the schedules have been prepared and hereunto annexed, by which the several species of work to be done and materials to be furnished, and the supposed relative quantities and amounts of each have been ascertained and set forth with more or less precision, nevertheless it is hereby declared that all earthworks, masonry, buildings, workshops and erections, and every other matter or thing necessary to construct or erect a first class railroad, shall be done, furnished and performed by the contractor, and shall be considered to be stipulated for and exigible under the present contract, and no work shall be considered as extra work, and allowed for, unless a special declaration so characterizing it shall have been made and signed by the Government Engineer and the commissioners or trustees, and authorized by the Government, before such work shall have been commenced ; it being further expressly agreed and understood that any omission or error in this agreement or in the said above cited contracts and the specifications

thereto and hereunto annexed, shall not be taken advantage of by the said Contractor ; but that the whole work done and materials used shall be of the best description, whether especially mentioned or not, so as to secure a first class railway and equipment ; and that all work and materials necessary to be done and used to create a first class road shall be considered as coming within the scope and meaning of this present agreement."

In order to fully understand the true intent and meaning of this clause in the contract, it should be borne in mind, that it was fully understood and agreed by both parties thereto, that the main line of the Railway should be *first class* in its construction, and in all its appointments ; and that the total consideration therefor, including the Piles Branch, should not exceed the gross, or lump sum named in the contract.

The important question, as to what constituted a first class Railway, had been fully discussed and determined upon before the signing of the contract ; and all the provisions, conditions, and safe-guards relating thereto, had either been embodied, or referred to in said contract.

It also became necessary to provide for some equitable mode of making monthly or intermediate payments, during the progress of the work, which would not have been required if the Contractor had been able to complete the entire contract without such payments. Hence the original contract of April 5, 1872, which forms part of the Government contract, contains a provision, " that, for the purpose of enabling said Engineer to arrive at a just and equitable basis for said monthly estimates and payments, it shall be his duty, immediately after the execution of this agreement, or as soon thereafter as the necessary surveys, plans and

estimates can be made, to prepare a schedule which shall embrace, so far as may be anticipated, all the different items of expenditure to be made and liabilities to be incurred by parties of the first part, under and by virtue of this agreement." Also, "and the said Engineer shall place opposite to each item in the said schedule, such a relative amount as in his judgment the said item should bear in proportion with the total cost, as per this agreement." Also, "the monthly estimates, as made and certified by the said Engineer in Chief, shall be based upon and in *pro rata* of the work done, materials and fixtures delivered and ready for delivery, and payments made under the general heads embraced in the said schedule for the main line and piles branch respectively."

The schedule above referred to could not be attached to the contract, for the reason that it could not, from the nature of the case, be prepared until several months after the date of the contract; but even if it had been so attached or referred to in the contract as an existing document, neither the quantities nor the prices or values therein specified, would have been binding upon the parties to the contract, except in so far as they formed the basis which had been mutually agreed upon for the payment of monthly estimates.

A question upon this subject having been raised by the Contractor, and submitted for decision to Mr. Sandford Fleming, Civil Engineer, in 1875, was decided as follows: "The schedule was prepared under the contract for the purpose of enabling the Engineer to arrive at a just and equitable basis for monthly estimates and payments; and so far as I can judge, *for that purpose only*." — See page 13 of Mr. Fleming's report of Feb. 10, 1875.

This first schedule has formed the basis of all subsequent

schedules, down to the revised schedule of the Government Engineer, dated Sept. 1st, 1875, which is referred to in the clause of the contract now under consideration.

It would appear, however, that, in order to set at rest any question that might arise hereafter, with reference to the binding effect of the quantities and prices which were named in the schedule ; and inasmuch as certain references had been made to the schedule in the body of the contract, the Government took the very wise precaution to explain and stipulate, in this section, to the effect, that no variation or departure from the quantities named in the schedule would release the Contractor from doing everything that was required by the terms of the contract, in order to produce and deliver to the Government a *first-class railway* for the gross sum or consideration therein named ; and that no claim for extra work would be considered and allowed by the Government, unless the same should be brought to its notice in the manner therein specified.

There can be no doubt that, under this clause, the Government Engineer had it in his power to increase the dimensions of these foundations ; to change the details of the plans ; and to add to the quantities of the different materials required for their construction, to any reasonable extent, so that they would be so altered and strengthened, as to ensure that safety and stability which, in his opinion, they did not possess at the date of the joint report of Mr. Baillargé and himself, so long as these changes were, as expressed in the same report, kept "*clearly within the scope of the contract.*" But he had no more authority under it, to substitute solid stone masonry for them, than he had to substitute the "*stone sleepers used on the old Railways,*" for the *wooden sleepers provided for in the contract.*

Several months previous to the date of the Government contract, the Government Engineer had been requested by the Chief Engineer of the Railway Company, in the presence of the committee of Directors which had the matter in charge, to indicate upon the plans of "foundations in deep water," which were then before him, such changes or modifications as he would insist upon; and, after being urged by the committee to do so then, and there, he promised to consider the question at an early day, in connection with the Chief Engineer. If this had been done at the proper time, there could now have been no question raised upon the subject.

It appears, however, that the Government Engineer, either did not understand the plans sufficiently well to enable him to suggest any improvements in them; or, that he preferred to hold this, as well as several other similar matters, in abeyance, until after the Government contract had been signed, which contained his famous "*Clause one*"; and which he says "*was meant to cover them.*"

By taking the latter course, it is quite easy to see, that, according to his construction of the contract, he would place, not only the Contractor's private fortune, but also the Government Treasury under contribution, for the purpose of enabling him to realize his long cherished idea, of being entitled to the credit of having built the best Railway in Canada.

The fact that the term "extra work" is used at all in the 16th clause of the contract; and that a mode of settlement is provided for it, which is entirely different from the mode provided in the 4th clause, which refers only to alterations made "in the location of the line," shows most conclusively that the clause was intended to provide for the safety and

security of the Contractor, as against any extravagant whims, or unreasonable exactions that might be practised upon him by the Government Engineer.

There are several other matters, relating to changes in the alignment and gradients of the Railway ; changes in the plans of Wooden Bridges, Masonry, &c., &c., referred to in the " Remarks " of the Government Engineer, which are quite as "*superfluous*," as the one now under consideration, and which, he admits, have been decided upon since the date of the existing Government contract ; but which he claims that the Contractor is bound to execute *gratuitously*, under the provisions of " clause 1 " of the contract ; to all of which the same principles should be applied, as are herein enunciated with reference to " Foundations in deep water."

As to whether the Contractor has taken the course prescribed in the contract, in order to protect himself from such emergencies ; or whether it is the duty and intention of the Provincial Government to encourage and uphold an Engineer, whose views and opinions have already added several hundred thousand dollars of un contemplated, and entirely unnecessary cost to the work upon which he is employed, are subjects, which, although they may be considered hereafter, do not properly enter into the present discussion.

CONCLUSIONS.

The foregoing review of the differences which appear to exist between the Contractor and the Government Engineer, with reference to "Foundations in deep water," and other matters of a similar nature, would seem to justify the following conclusions:

1st. That the Contractor, in consideration of the gross sum named in the Government contract, is bound to perform only such work, and to furnish only such materials, equipments, &c., &c., upon the Main Line, as are specified and referred to in said contract as being necessary to produce and deliver to the Government a "first class Railway."

2d. That for any superfluous work performed, and materials or equipments furnished, upon the requisition of the Government, its Commissioners, Engineers, or other Representatives, which was not contemplated at the date of the contract, nor clearly provided for therein, the Contractor has a just claim for extra compensation, over and above the gross sum named in the contract.

3d. That the plans and specifications for foundations in deep water, which were in force at the date of the contract, together with such modifications and improvements as were therein provided to be made and adopted during the progress of the work, were clearly contemplated by the contract, and were quite sufficient for the purposes of a first

class Railway; and therefore, any departure from these plans and specifications, on the part of the Government, is a radical departure from the contract, and justly entitles the Contractor to extra compensation.

4th. That, during the eight months which elap between the first declaration of the Government Engineer that he considered these foundations "hazardous," and the date of the Government contract, it was clearly his duty to have pointed out their defects; and, if capable of doing so, to have substituted other plans and specifications for the approval of the Government, and for embodiment in the present contract.

5th. That, in not having done this; and not having made any provision, either in the contract, or in his revised schedule, which forms part of the contract, for any material increase in the cost of this class of work; and also, in having, since the date of the Government contract, enforced the execution of entirely different, and much more expensive plans, upon the assumption that the Contractor is bound by the contract to execute them without extra compensation, the Government Engineer has demonstrated very clearly, that, when he first cast a doubt upon the original plans, he neither understood the theory of the plans, nor their practical adaptation; also, that during the eight following months, although frequently requested to do so, he was either incapable of, or culpably negligent in not pointing out their defects, or recommending changes in, or substitutions for them; also, that he has no true conception of the real nature and binding obligations of the contract, with the execution and administration of which, he has been entrusted by the Government; and lastly, that all

these, together with other delinquencies of a similar nature, on his part, will add at least, if not more than a quarter of a million dollars of unnecessary cost to the road; which extra cost, although entirely un contemplated, and unprovided for, either in the contract, or in the law which sanctioned it, must eventually be paid out of the treasury of the Provincial Government.

