

HIGH EMBANKMENTS ON PRAIRIE.

When examining the railway, this Commission noticed that the embankments forming the roadbed were five or six feet in height at many places where the railway traverses level country, and upon inquiry it was ascertained that generally these embankments were made high to protect against the accumulation of drifting snow.

It was found from the evidence that the consensus of opinion of the engineers on this railway was that if the base of rail is three feet above the surrounding level country, or the surface of the roadbed was one and a half feet above the surface of the surrounding country, proper snow protection would thus be afforded.

To ascertain the amount of excessive grading which was done to make these excessively high embankments, the Commission caused one of their engineers to make calculations and estimates as to the amount of this additional expenditure, keeping the gradient within maximum limits so as to ensure that the efficiency of these low grades remain unimpaired. The estimate which covers Contracts Nos. 14, 15 and 16, where this feature was most apparent, shows that in this district alone \$152,356.00 was so much money wasted.

We are of the opinion, therefore, that \$152,356.00 might have been saved on this part of the line and the efficiency of the railway be maintained, if proper economy had been used in the height of embankments.

PILING FOR FOUNDATIONS.

The following list shows the prices submitted by the various contractors under Items No. 10 and 11 of the general specifications:

Contract.	Contractors.	Item 10.	Item 11.
1.	Grand Trunk Pacific	20c	20c
2.	J. W. McManus.....	20c	20c
3.	Grand Trunk Pacific.....	22c	22c
4.	Grand Trunk Pacific.....	20c	20c
5.	W. Kitchen	20c	30c
6.	Lyons & White	25c	15c
7.	M. P. & J. T. Davis.....	15c	15c
8.	M. P. Davis.....	20c	15c
9.	M. P. Davis.....	20c	40c
10.	Macdonell & O'Brien	20c	40c
11.	Grand Trunk Pacific	20c	20c
12.	Macdonell & O'Brien	25c	25c
13.	Macdonell & O'Brien	25c	25c
14.	Grand Trunk Pacific	25c	25c
15.	E. F. & G. E. Fauquier.....	25c	20c
16.	M. P. Davis	40c	20c
17.	M. P. Davis	40c	20c
18.	E. F. & G. E. Fauquier.....	20c	30c
19.	O'Brien & McDougall	25c	15c
20.	O'Brien & McDougall	25c	15c
21.	J. D. McArthur	25c	15c

The original specifications on which Contracts Nos. 9, 10 and 21 were awarded, provided for piling for foundations under Clause 153, which reads as follows:

"Piling will be paid for under the headings of 'Piling Delivered' and 'Piling Driven.' 'Piling Delivered' will include piling furnished by the contractor at bridge site as ordered by the Engineers, and will be paid for by the linear foot,

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but any lengths in excess of those ordered by the Engineer shall not be paid for.

"'Piling Driven' will be paid for at the specified rate per linear foot in the finished structure which will include all work of any kind in connection therewith."

When the specifications were revised in February, 1907, Clause No. 153 was altered to read as follows:

"Piling will be paid for under the headings of 'Piling Delivered' and 'Piling Driven.' 'Piling Delivered' will include piling furnished by the contractor at bridge site as ordered by the Engineer, and will be paid for by the linear foot, but any lengths in excess of those ordered by the Engineer will not be paid for. 'Pile Driving' will be paid for at the specified rate per net linear foot in the finished structure, and will include all work of any kind in connection therewith, but will not include material in the piles themselves."

Mr. Lumsden's intention as to how the piling should be paid for under the original specifications is expressed in his letter to District Engineer Doucet, of September 17th, 1906, in which he says:

"In case of any misunderstanding in regard to items in schedule as 'Piling Delivered' and 'Piling Driven,' the intention was, in putting it in this way, was that the contractor would be paid under 'Piling Delivered' for the full length of all piles as per Engineer's bill, less the length which had been driven at the date of the estimate, the latter being paid for at the price of 'Piles Driven'."

In November, 1906, the contractors on Contracts 9 and 10, Messrs. M. P. Davis and Macdonell & O'Brien, objected to the piling being returned in the estimates in accordance with Mr. Lumsden's ruling, and claimed that they should receive 20c a foot for the piles delivered, and also 40c a foot for driving them, making a total of 60c a foot for pile in the work.

Although the records do not show how the decision was arrived at, on December 21st, 1909, Mr. Lumsden advised Mr. Doucet:

"It has been decided that in the monthly progress estimates the rate of 20c will be continued and apply on all rates under the specifications up to and including December 31st, proximo, and that thereafter the rate of 40c will govern on Item 11 'Piling driven'" and Mr. Lumsden instructs that the alteration in the estimates on work done in the past, owing to the change in rate, can best be adjusted by the addition of a bulk sum. In his letter to the Commissioners of January 2nd, 1907, reporting the result of the meeting held at Quebec on December 14th, in connection with the train filling prices, he reported on this matter as follows:

"I also allowed the 20c per linear foot for 'Piles Delivered' as well as the 40c per foot for 'Piles Driven' having found in making a comparison of the tenders that had been so computed except where specially mentioned otherwise."

The basis of the contractors' claim on Contracts 9 and 10 was that they should be paid 20c per linear foot for providing pile, and 40c per linear foot for driving the pile, instead of 20c for providing the pile, and 20c for driving this pile, as outlined in Mr. Lumsden's letter of September 17th, 1906, in which he gave his interpretation of the clause governing these items. The only contracts awarded at this date were 9, 10, and 21, and Mr. J. D. McArthur in submitting his prices of 25c and 15c for these items, specified that the latter price applied to driving only.

Mr. Lumsden in his evidence states that he considers that all the tenderers on the McArthur contract contemplated being paid the rate for piling driven and for piling delivered for the piles in the work; that is, two prices, though this is at variance with his original instructions to Mr. Doucet with respect to this matter. A perusal of the list of prices for items 10 and 11 shows that the two contractors, Macdonell & O'Brien and M. P. Davis, in their schedule bids, never submitted a

price for piling driven within 15c of what they claimed. they should be paid for this work on Contracts 9 and 10, and their 40c price is in excess of any contractor's figure for this work.

The subcontractors who undertook the piling work for Messrs, Macdonell & O'Brien were paid at the rates from 16 to 17 1-2c for piling delivered, and from 16 to 17 1/2c for piling driven, and if Mr. Lumsden's original intention had been adhered to, the main contractors would have been paid for this work 20c for piling delivered and 20c for piling driven, instead of which the reversal of his first ruling handed to the main contractors an additional 20c per linear foot which the men who did the work never got any advantage from. According to the returns to date, this 20c amounts to, on Contract 9, \$11,595.00, and, on Contract 10, \$22,300.00, and we feel that, owing to a wrong interpretation of the specifications, and also of the contractors' intentions when tendering, they were conceded this amount of \$33,895.00.

DITCHING FOR THE PURPOSE OF DRAINING BORROW PITS.

There are many locations on the Transcontinental Railway in Northern Ontario where costly and unnecessary ditches have been dug to drain the borrow pits adjacent to the railway which have been formed by the excavation of material for the construction of embankments.

The total amount of money which has been expended on this work is \$166,920.91.

Of this sum \$104,859.60 has been spent on District C.D., and \$62,061.31 on District E. Work of this character has been confined to the clay belt of Northern Ontario through which the railway passes easterly and westerly of Cochrane.

This Commission were so impressed with the extent of this ditching and the number and length of drainage channels excavated for the purpose of borrow pit drainage that they requested Mr. Gordon Grant to supply them with the cost of this work, in the following letter dated June 22nd, 1912:

"Gordon Grant, Esq.,
Chief Engineer, N. T. Ry.,
Ottawa.

"Dear Sir:—

"Kindly supply the Commission with a statement showing the ditching done for the sole purpose of draining borrow pits. You need not include those ditches from which the material was used in making embankments, simply those that were constructed proper and simply for the drainage of borrow pits.

"Give the approximate location, yardages and cost.

"Yours truly,

"F. P. GUTELIUS."

The figures supplied by Mr. Grant in reply to this letter show the total cost of the work to have been \$166,920.91 as given above.

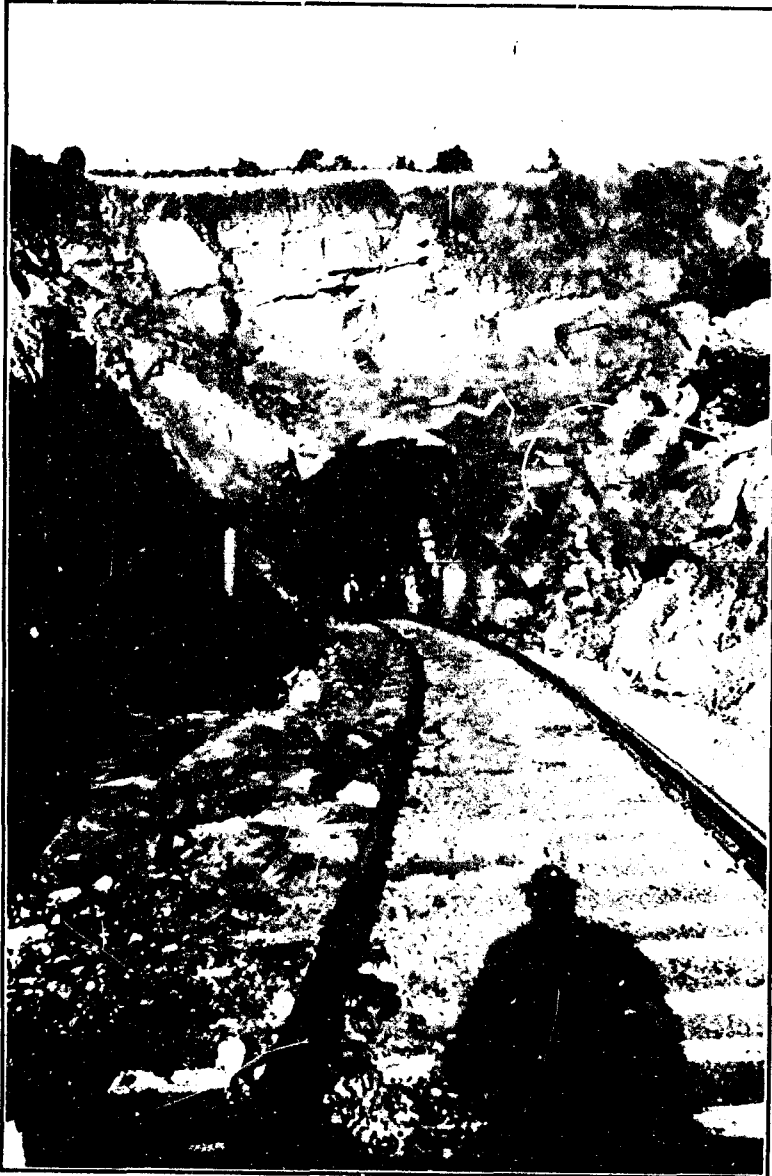
There is no doubt that these ditches, so constructed, achieved their object and assisted materially in draining the borrow pits and in keeping them drained of any surface water which otherwise might have accumulated.

This matter is referred to in the specifications under clause No. 29, which reads as follows:

"24. Borrow pits shall be located in such places as will be approved by the Engineer. They shall be regular in width, unless otherwise permit-



District A, Mileage 145.0. Waste on Top of Rock Cutting. Page 70.



District A, Mileage 178.0. West Portal of Tunnel. Page 100.

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ted by the Engineer, and, if required, shall be connected with ditches and drained to the nearest water course."

In building a railway through a new country, particularly such a country as that of Northern Ontario, the presence of surface water is very noticeable.

In the construction of the railway, the grading operations and the clearing of the right of way has a tendency to drain the portion of the land through which the road passes, and what appears when first encountered to be wet, marshy land, dries out in process of time to a very appreciable extent, and to undertake to drain all these borrow pits to the extent this work has been undertaken was a waste of time and money, for the reason that time itself would have affected the same results procured by the construction of these ditches, and at any particularly wet locations, if the engineers had properly located their borrow pits so that they would drain themselves to the necessary railway ditch alongside the embankment, no further ditching would have been required. In any event the expenditure of this \$166,920.91 for providing drainage in a virgin country before any advantage could be taken from the construction of the railway itself to affect this drainage was an unwarranted extravagance, the responsibility for which rests with the Dist. Division and Resident Engineers.

EXPENSIVE FARM CROSSINGS.

The Transcontinental Railway, about 59 miles west of Quebec, in the County of Champlain, cuts through a farm of 55 acres owned by Mr. Narcisse Delisle.

In their dealings with Mr. Delisle, the Commissioners have purchased from him 5.23 acres of right-of-way at \$100.00 per acre, have paid him for damages \$277.00, have increased the opening of the culvert, which spans the stream flowing through his farm, to a size which will permit the passage of carts, etc., at an additional cost of \$26,235.00, have expended \$182.06 in the construction of a level crossing, and have paid Mr. Delisle a further amount of \$500 in settlement of his claim for damage.

The engineers who located this portion of the railway provided for a six foot concrete arch culvert to span the stream on Mr. Delisle's farm, at an estimated cost of \$7,978.00.

In April, 1906, when railway construction had reached this point, Mr. Delisle lodged a complaint with District Engineer Doucet that "the construction works are causing considerable damage. They are completely closing up a passage to communicate from one side of my property to the other. I should like to have a culvert so as to provide for a carriage crossing and also for my cattle in order that they may have access to waters, otherwise I will have no access to thirty arpents of my land on account of the dump which is being built at present."

On September 8th, 1906, Mr. J. F. Guay, who was Land Agent for the Commissioners on District "B", reported to Mr. Doucet in connection with this matter that the "case is similar to that of 'Honore Perron'. There is a possibility of giving these two parties an acceptable crossing by enlarging the concrete culverts to be built on each of these farms. If this is not done, we will certainly have very heavy damages to pay. I have taken upon myself to ask Mr. Parrot, E. E., at St. Stanislas, not to push the building of these two culverts and wait for further instructions from Mr. McCallum". On the 10th September, 1906, Mr. Gordon Grant, at that date Assistant District Engineer, instructed Division Engineer McCallum to "put in a 14' arch with a 13' clear height inside at stations 3120 and 3147.

"These are to serve as farm crossings."

Station 3120 is on Delisle's farm, and station 3147 on that owned by Honore Perron.

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The records of the Bridge Engineer show that the construction of the 14' concrete arch culvert at Station 3120 was commenced on June 11th, 1907, the culvert being completed on July 31st, at a cost of \$25,813.00.

In the meantime, however, although Mr. Delisle had obtained the concession of a 14' culvert, he was still dissatisfied as the following reports from Land Agent Guay to Mr. Doucet indicate:

"Quebec, May 10th, 1907.

"A. E. Doucet, Esq.,
District Engineer,
Quebec, P.Q.

"Dear Sir:—

"This party, Narcisse Delisle, has his crossing through a large culvert. He claims that this will not suit and refuses to make arrangements for any consideration whatever.

"He wants a lawsuit. I will see him a little later.

"Yours truly,
"J. F. GUAY."

"Quebec, May 20th, 1907.

"A. E. Doucet, Esq.,
District Engineer,
Quebec.

"Dear Sir:—

"My assistant called on Mr. Delisle again on Friday in view of making a final effort to arrive at a satisfactory arrangement with him. Mr. Delisle stated again that for no consideration would he accept an arrangement. He is, however, willing to sell the whole farm for the sum of \$3,500.00, if agreeable to this, kindly let me know and I will close the bargain.

"Yours truly,
"J. F. GUAY."

The suggestion that the farm be purchased for the sum of \$3,500.00 was not entertained, and the construction of the 14' concrete arch culvert was proceeded with on June 11th, 1907. On June 18th, 1907, Mr. Guay submitted a further report on this matter to Mr. Doucet. The report being as follows:—

"Report No. 77.

"A. E. Doucet, Esq.,

"In regard to Narcisse Delisle, Consecutive No. 565, Parish of St. Stanislas, I beg to report as follows in reply to the letter of E. Atkinson, Esq., Law Clerk, dated June 17th.

"The land we take from this party is 651 feet in length by 350 feet in breadth, the area being 5.23 acres.

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"This land is situated in a deep gully with steep sides difficult of cultivation and for that reason of much less value than the land of his neighbors who are on the flat.

"On June 27th, 1906, I made an arrangement with him for 2.99 acres for \$59.80. At the time he did not realize, or I either, the inconvenience he would be put to by the high bank which is being built across the gully.

"He has been complaining of this all along and when more land was required he obstinately refused making any arrangement unless an under-crossing was built exactly where he had his road.

"To try and give him satisfaction I obtained from you that a large culvert be built in the brook, but the man has been protesting all along that this culvert was an imposition. The distance between the brook and the spot where he wants the crossing built is about 75 or 100 feet.

"I have repeatedly called upon this man and made him verbal offers, the last one being for \$100.00 per acre and an additional sum of \$200.00 for the damages.

"He refused, and I wrote you May 20th, 1907, that there was no possibility of making an arrangement with him but that he was willing to sell his farm for the sum of \$3,500.00.

"This sum is about \$1,500 above the full value of this farm. He has it mortgaged almost to its full value. The only difficulty in the way is the crossing which does not suit his fancies.

"The culvert which is being built is 14' by 14' and in my estimation it will be better and more convenient than the level crossings you are building for the other farms. There will be times, however, such as heavy rain-storms, when he will not be able to use it unless an elevated board walk is built near the side of the culvert. Such heavy storms are, however, of rare occurrence, and for such a short time that the level crossing which you are giving him in addition will meet this emergency.

"The case of Honore Perron, Consecutive No. 569, is exactly the same and I have experienced no difficulty with him.

"The whole respectfully submitted,

"J. F. GUAY,

"Land Agent, 'B'"

In 1911, owing to the fact that the material forming the embankment would not stand at the regular slope of $1\frac{1}{2}$ to 1, the culvert was extended at a further cost of \$8,400.00, making the total cost to that date \$34,213.00.

This extension, however, would have been necessary whether the culvert was six feet or fourteen feet in width, but the cost would have been proportionately less, and taking the figures to hand, we find that the final cost of the six feet arch would have been \$10,578.00.

If the culvert originally projected had been constructed, and Mr. Delisle's farm purchased at his price, of \$3,500.00, the total cost of the whole transaction to the Commission would have been \$14,078.

The records, however, show that Mr. Delisle has been paid \$1,300.00, the culvert has cost \$34,213, which includes the extra expense of concrete paving for roadway, and \$182.00 has been spent in grading a level crossing, or a total cost of \$35,695.00.

The difference of \$31,617.00 is what might have been saved on this one transaction alone had advantage been taken of Mr. Delisle's offer made in May, 1907, before the construction of the arch culvert had been commenced.

At mileage 59.5, a short distance west of Delisle's farm, a similar condition existed.

Here the location engineers again projected a 6' arch culvert which was increased in size to 14', at an additional cost of \$21,600.00 to serve as an undercrossing for Honore Perron, on whose farm the culvert was located, and while the records do not indicate that any offer was made by Mr. Perron to dispose of his farm, we cannot but feel that an economical purchase might have been made which would have saved the heavy expenditures for the undercrossing. The area of Mr. Perron's farm on the south side of the Transcontinental Railway right-of-way is only seventeen acres, and the amount expended on the enlarging of the culvert would have permitted the purchase of these seventeen acres at a price anywhere up to \$1,200 per acre and still effect a saving.

The following is a report from Louis Hurtubise, Resident Engineer to Mr. Doucet in connection with these arches:

"Quebec, 27th November, 1911.

"A. E. Doucet, Esq.,
District Engineer, T.C.R.,
Quebec, P.Q.

"Dear Sir:—

"*Re 13' by 14' concrete culverts at St. Stanislas.*

"Replying to your inquiries about these arches, I beg to state as follows:

"The first intention of the locating engineers was to show 6 ft. arches on Narcisse Delisle and Perron's properties; but afterwards a question arose to the effect that these arches would not be big enough on account of the great area of drainage and of the continuous opening up of the contract. At first sight it seems ridiculous to think of large openings, in fact it looks as if a 4' x 5' culvert would have been sufficient, as, during the greater part of the summer, very little water was going through these gullies. But my recollection is that during the spring time, when I was Resident Engineer at St. Stanislas, the roadway was flooded by the excess of water caused by the too small size of the openings under public road. I had myself to travel over the road and through the water to reach my destination. Kennedy and McDonald were obliged at one time to make little repairs to the road crossings in order to reach their work situated on the other side of the gullies. It was then that it was decided to build 8 feet and even ten feet arches at those two places.

"But Mr. Delisle and Mr. Perron then came into the discussion which was taking place in regard to the size of the openings on their own properties. Delisle, especially, wrote and protested again and again. I myself suggested to Delisle a level crossing by contouring the hill situated on the north side of his property; but he always refused this, pretending that we could not force him to go round and pass his neighbor's property. Mr. Guay, the right-of-way agent, had several talks with Mr. Delisle, and never could get him to accept my arrangement for a level farm crossing. In fact the construction of such crossing would have been very costly, and the damages claimed by the parties, or the necessary indemnity might have been greater than the difference in cost between a 10-ft. arch and a 13 x 14. Therefore, Mr. Guay suggested that big openings, large enough to allow cattle and carts to go through, be built at these places.

"Mr. Parrot, the former Resident Engineer, received instructions to let the matter stand until I received orders from Mr. McCallum, the then Division Engineer, to build two culverts large enough to provide for an undercrossing on each property. This was done, but later on, as the passage through the culvert became impassable during the springtime, Mr. Delisle was given a level crossing around the hill, which crossing he was to use only in case of emergency. This work, however, proved far more expensive than originally estimated, due to the clayey nature of the ground, and it was therefore abandoned, the intention being to grant a money indemnity.

"Trusting this explanation will prove satisfactory."

"Yours very truly,

"LOUIS HURTUBISE,

"Resident Engineer."

The report would indicate that the increase in the size of the culverts was partly due to the fact that the water way area had been underestimated by the locating engineers. It will be noted, however, that the instructions to increase the size of the arches to fourteen feet were issued in the fall of the year, so that the conditions as regards high water evidently had no bearing upon the change in design.

FENCING THROUGH UNSETTLED COUNTRY.

During the Commission's inspection of the Transcontinental Railway their attention was drawn to the many miles of standard railway fencing which had been built on both sides of the right of way through an unsettled country, much of which is of a wild and rugged nature and more suited for forest conservation than for settlement.

The following statement compiled from figures supplied by Mr. Gordon Grant at the request of the Commission (see letters attached) shows in detail the number of rods and the cost of the fencing constructed through unsettled country along the right of way of the Transcontinental:—

Contract No. 1, 16,142 rods at \$1.00.....	\$16,142.00
Contract No. 3, 5,627 rods at 1.20.....	6,752.40
Contract No. 4, 3,470 rods at 1.15.....	3,990.50
Contract No. 7, 11,520 rods at 1.10.....	12,672.00
Contract No. 8, 14,080 rods at 1.15.....	16,192.00
Contract No. 10, 5,120 rods at 1.10.....	5,632.00
Total..... 55,959 rods.....	\$61,380.90

and while it is contended that a portion of this fencing was necessary on account of the proximity of roadways and the fact that settlers were commencing to come into the country, this Commission has no hesitation in condemning this expenditure of \$61,380.90 as an unnecessary outlay at the present time.

The fence which has been erected through wood lands, where cultivation is a matter of conjecture will be depreciating in value and efficiency year by year and may require complete renewal before a single rod of it will have served its purpose.

QUEBEC RIGHT OF WAY.

Napoleon Martineau's Case.

Napoleon Martineau, Jr., was in the year 1911 a tenant from year to year at \$75.00 per year of a small piece of land 37 by 60 ft., entirely covered by an icehouse, built by himself on Champlain St., Quebec. He had the right to remove the icehouse during the currency of his tenancy. He had been given due notice to quit at the end of the current year, that is on the 30th April, 1912, and if he desired to remove the building he must do so before his tenancy expired, or lose it (p. 551).

In the summer of 1911, a barkeeper in Quebec named O'Neill told Martineau that the Transcontinental through Mr. Raoul R. Bergevin, a Quebec merchant, would give him \$1,500 for his lease but he must keep his mouth shut during election, referring to the then pending Dominion elections. Shortly afterwards and before the elections at a meeting with Bergevin and O'Neill he (Martineau) negotiated for a sale of his interest and eventually he sold the building with a small stable to Bergevin for \$2,000 reserving the right to keep the property until the 1st May, 1912. (Exhibit No. 32). The transaction was reduced to writing by Notary Couture who was made aware of the circumstances that the lease could not be renewed. Bergevin intimated to Martineau that he was doing him a good turn and wished him to take no part in the approaching elections against the Liberals (p. 587). Bergevin was examined and swore that he bought the icehouse and the small stable next to it to sell to the Transcontinental, which had to pass its road over the land of which Martineau was tenant. Bergevin afterwards made a bargain with Mr. Parent, the Chairman of the Commission, whereby he was paid \$3,700 for the expense to which he would be put for removing the icehouse (p. 577 and Exhibit No. 33). Mr. Parent was examined and could give no explanation of this transaction, but asserted that it was entered into in good faith. We can find no justification for this payment to Bergevin. It is quite clear when he bought this icehouse he intended to be recouped with a profit by the Commission, and it is equally clear that the Commission had no use for the icehouse, and could not be compelled had they expropriated the land, which they never did, though they intended to do so, to pay Bergevin any amount for the icehouse, that Bergevin could have no claim against them whatever, certainly not for \$3,700, which was nearly three times the value of the building. In order to fully appreciate the case it should be considered with that of Adolphe Chevalier (see page 588).

QUEBEC RIGHT OF WAY.

Adolphe Chevalier's Case.

Adolphe Chevalier, shipwright, Quebec, had a lease of a piece of land in Champlain Market, Quebec, described as Cadastral No. 2525, excepting a piece 37 by 60 let to Napoleon Martineau on which he had a movable skidway cradle sometimes spoken of in the evidence as a "gridiron" or "Bassin de Radoub". His lease was in writing and was for three years ending the 30th April, 1912, which was made by Mr. A. C. Dobell to Chevalier and Mr. Dobell had notified Chevalier that the lease could not be renewed. (See Exhibit No. 34.)

In August, 1911, having learned that Napoleon Martineau had sold his icehouse to R. R. Bergevin he went to see one O'Neill, a barkeeper, who had helped Martineau in his sale and brought him and Bergevin together. Bergevin told him that he had seen the books of the Transcontinental and that his property was valued at \$4,000, and that he (Bergevin) was working for the Transcontinental and would give him (Chevalier) \$4,000 on condition that Chevalier should help them in the election, which Chevalier agreed to do. Chevalier told Bergevin that his

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lease expired on the 30th April, 1912. Bergevin paid \$4,000 to Chevalier for the remainder of his term, stipulating in the agreement of sale that Chevalier should have the right without any consideration to occupy the land until the end of the term. (See Exhibit No. 35.)

The skidway or gridiron was not sold to Bergevin, and was removed by Chevalier in the following August. Bergevin in his evidence (p. 592) says that all that he bought from Chevalier was the lease to the 1st May, 1912, allowing Chevalier to occupy it until that date. By deed dated the 10th day of October (see Exhibit No. 36) it was agreed between Bergevin and the Transcontinental that he should be paid, and he was paid \$4,250.00 for the damages which would result to him from the demolition of the gridiron or Bassin de Radoub, and the following in his account of the transaction between him and the Transcontinental Railway resulting in its sale:

Q. You bought from Chevalier, according to the deed, all his rights and interests?—A. Yes.

Q. All his rights and interests of every description of a certain land and anse—that is cove—known and designated on the plan and book of reference for Champlain Ward as number 2525, and all the damages resulting from and caused by the expropriation by the Transcontinental Railway, save and excepting the part of the said lot now occupied by Martineau for an icehouse. Is that right? That is what you bought?—A. Yes.

Q. It also recites in your deed that the said rights and interests to the occupation of the land belonging to Adolphe Chevalier is in virtue of a lease made to him by Alfred Curzon Dobell, advocate, as attorney for the Duchess of Bassano. "It is understood," you say also, that the vendor will give possession of the land on the 1st of May next to you, Bergevin, and that he will pay up to the 1st of May, the taxes and municipal and school rates, and other public contributions affecting the property and the rent to that date, and shall occupy the property until the 1st of May"?—A. Yes.

Q. That is all you bought, what I have said to you, is it not?—A. Yes.

Q. What you sold to the Transcontinental Railway was your damages which would result to you from the demolition—that is the destruction—of the Bassin de Radoub—that is the slip?—A. Yes, everything that is required to repair the boats.

Q. You did not buy that at all?—A. No. He had to unfix this slip in the spring.

Q. But you did not buy the slip?—A. No.

Q. But why did the Transcontinental give you \$4,250 for what you had no right to sell to them?—A. Well, I did not sell them any property.

Q. You sold them your damages for removing that Bassin de Radoub?—A. Yes.

Q. You did not own it?—A. But on the 1st of May I had nothing to do with it no more.

Q. And you had nothing to do with that machinery?—A. The slip?

Q. Yes?—A. No, I did not buy the slip.

Q. What did they give you \$4,250 for?—A. For what I bought there.

Q. Your deed says that was for damages for removing the slip?—A. Yes.

Q. So that you got \$4,250 for nothing?—A. Why?

Q. Because you did not own the slip?—A. No, but I bought the right from the 1st September till the 1st of May; that is what I sold them; I could not have sold them anything that did not belong to me.

Q. But you did not sell them anything?—A. No.

Q. According to your own deed you sold something which you did not own?—A. No, I did not sell them anything which did not belong to me.

Q. Did you own that Bassin de Radoub?—A. No, I owned only the right, as I explained.

Q. You did not own the Bassin de Radoub?—A. No, only the right to the 1st of May.

Q. You knew quite well you did not own that Bassin de Radoub?—A. Yes, I did not buy no property.

Q. Why did you sign a deed, and say in that deed that you owned it? (Deed shown to witness). Now, be honest about this thing. Did you not give that man that money, and then find yourself in trouble after the election, and come down here and get this money back on his deed?—A. No, sir.

Q. Yes, you did; you got it on the 16th October?—A. Yes, but that transaction was made before the election.

Q. The transaction with whom?—A. With the Transcontinental.

Q. With whom did you make it?—A. Mr. Parent.

Q. He is a lawyer?—A. Yes.

Q. And a very distinguished lawyer?—A. I had to pass that before the Notary Taschereau.

Q. And you made the bargain with Mr. Parent himself?—A. Yes.

Q. And he agreed to give you \$4,250 of Transcontinental money for destroying the Bassin de Radoub?—A. Yes.

Q. And you knew you did not own it?—A. For the right I had there.

Q. For the Bassin de Radoub?—A. No, they say for the demolition of it.

Q. What was your bargain with Mr. Parent?—A. \$4,250, the way the deed says there.

Q. For the demolition of the Bassin de Radoub?—A. No.

Q. Tell me the bargain: what did you say to Mr. Parent?—A. I told him "I will sell what I have there made with Chevalier, and that is all"; I produced my contract with Chevalier, and that was the arrangement. I would get \$4,250 for this thing.

Q. Did he read it?—A. Yes, and the notary too.

Q. Did Mr. Parent go to the Notary with you?—A. No, Mr. Tremblay went, not before me, but I gave them the papers and they went to the notary with it.

Q. But Mr. Parent gave Tremblay the instructions?—A. Yes.

Q. In your presence?—A. Yes, to send the papers to Taschereau.

Q. Did Mr. Parent give Tremblay your deed from Chevalier?—A. Yes, he must have given it to him, because he had it in his hand.

Q. When did you make that bargain with you and Mr. Parent?—A. I cannot tell you, but it was a week or so before the election.

Q. And he put the transaction through after the election and gave you this money?—A. No, this was with the notary, just the next day after I made the transaction with him.

Q. With whom, Mr. Parent?—A. Yes.

The agreement between Bergevin and the Transcontinental is in part as follows: "Considering that it is necessary for the Transcontinental Railway to demolish, for purposes of their line of railway, the graving-dock belonging to the said Bergevin, situated on Lot 2525, and considering that Bergevin is ready, in consideration of a certain indemnity, to give up the said graving-dock, therefore, Bergevin accepts \$4,250 in full and final discharge of all damages resulting to

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him from the demolition of the said graving-dock". It will be seen that the form of the agreement between the Transcontinental and Bergevin was for the sale of the graving-dock, but it is clear both from the deed from Chevalier to Bergevin and from Bergevin's evidence that Bergevin did not own the graving-dock or skidway. Indeed as Chevalier says he removed it in the summer of 1912 to Saint-Laurent (p. 592).

Mr. Parent whose evidence on this point appears at p. 639 and following pages says that he understood that Chevalier could renew his lease; that he thinks the graving-dock was used by the Commission during the whole summer; that he himself put through the transaction, and although he put through the transaction he relied on Mr. Tremblay, because Mr. Tremblay, the Secretary to the Transcontinental land valuers at Quebec, had certified to its correctness. Mr. Tremblay whom Mr. Parent declared to be a most conscientious man was examined, and he stated that the agreements were made between the Chairman and the owners, and that his certifying vouchers correct only meant that the vouchers corresponded with the amount agreed on as the purchase money. When this transaction was made Mr. Parent had in his possession the agreement between Bergevin and Chevalier which clearly showed that Bergevin received no value from Chevalier for the \$4,000 which he (Bergevin) paid to Chevalier, and had nothing to sell to the Commission, and Parent must have known that Bergevin had nothing to sell to the Commission.

We find that the agreement of sale between Bergevin and the Commission was designedly drawn in form to make it appear that Bergevin was being paid for the demolition of the skidway or graving-dock, while all parties were quite aware that such was not the fact.

The Chairman of the Commission is alone responsible for this misapplication of \$4,250.

CROSSING OF CREEK A'SHEA AND RIVER DU SUD.

At Creek A'Shea, on Residency No. 29, District B, a 30-foot concrete arch has been constructed, which together with the embankment at this point has cost \$187,478.94.

Mr. R. F. Uniacke, Engineer of Bridges, N.T.R., has supplied the Commission with figures showing that a steel viaduct, which would take the place of the concrete arch and fill, might have been erected for \$103,000.00.

At River du Sud, Residency 11, District B, a 40-foot concrete arch and fill have been made, at a total cost of \$246,551.03, and Mr. Uniacke's figures for a steel viaduct at this point are \$96,910.00.

As will be seen, if these two streams had been crossed by means of steel viaducts, a saving of \$234,000.00 would have been effected. These are mountain streams which in time of extraordinary flood might exceed the capacity of the arches, whereas steel viaducts would have given unlimited capacity for large volumes of water, so that on this account the use of these arches may prove an engineering failure, and we criticise this method of crossing these streams both on account of the limiting capacity of the arches, and on account of their excessive cost.

TRANSCONA SHOPS.

Are the shops at Transcona to be regarded as a portion of the Eastern Division within the intent and meaning of the Agreement of July 29th, 1903, and of February 18th, 1904, and Acts confirming same?

A general description of the shops is appended hereto and shows that they are designed and furnished for building and repairing railway equipment generally and are of a capacity which suggests that they are expected to construct and repair for the Western and Eastern Divisions of the railway, and cost, including equipment, about \$4,500,000.00.

The Government contracted to build "a line of railway" between Moncton and Winnipeg, and the company undertook to maintain the railway and the rolling stock at its, the Company's, own sole cost for fifty years, the term of the lease.

It is submitted that the "line of railway" which the Government had agreed to supply may be fairly defined as that part of the Company's undertaking on which the company operates its rolling stock, and would reasonably include permanent way, siding and railway yards, stations, freight sheds, and roundhouses along the line.

In this case the "line of railway" does not include terminals because they are spoken of as being apart from the railway. For example, in clause 15 "expenditure for right of way and other lands required for the purposes of the railway and for terminal facilities" is spoken of, and it would not include telegraph and telephone lines, because they are also treated separately.

In other words, the Government is to supply the permanent way, that is the facilities for using the company's rolling stock, but it is not to supply the facilities for repairing, maintaining, or replacing that rolling stock or the permanent way, and clearly the shops and machinery are facilities for repairing or replacing rolling stock, and are of no use to the Company in the operation of the rolling stock, if the rolling stock is in good repair, which is the condition which the Company has agreed at its own cost to keep the rolling stock.

Shops are not part of a line of railway. There are many railways which have none. For example, lines which were built and leased like this is to be to other companies.

Machinery is certainly no part of a line of railway. It is not even equipment of the railway, as is the furniture of a railway station for example. It is the equipment of a building, which the railway company may or may not for economical reasons deem it good business to acquire or not to acquire, so that neither are necessary for the operation of the road.

Premising the above conclusions, it is now proposed to point out from the agreement and statute, the grounds on which they are founded. In this statement "clauses" refers to the agreements, schedule to the Acts, 1903 and 1904, made between the Government and Sir Charles Rivers Wilson, et al., acting for the Railway Company.

This Commission asserts:

(a) There are no words in the agreement imposing on the Commission any liability to build shops or to furnish them with machinery, but, on the contrary, the Company have agreed to equip the railway with rolling stock and to keep the railway and rolling stock in repair, and to make all renewals at its own expense; that agreement involves the supply, by the Company, of shops and machinery for the building and repair of rolling stock unless the Company contracts that work out to somebody else.

(b) The Government did not agree to build and fully equip this line of railway with everything required to operate it, excepting rolling stock.

(c) The Company agreed to equip the railway with rolling stock and to keep it and the rolling stock in repair at its sole expense. Not only does this agreement impose no liability on the Government in this regard, but it can be gathered from the contracts with certainty that the Company has undertaken this obligation.

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(d) There are words used in the agreement which clearly indicate that the company is to supply these shops and machinery. If it was intended that the Government should supply these shops and machinery, the agreement by the Company to repair its rolling stock would have stated that the same was to be repaired with the machinery to be supplied by the Government.

(e) Shops and machinery may be equipment of the undertaking of a railway company, but are not equipment of a "line of railway".

(f) It is a clearly established rule of law that where in an agreement certain things are enumerated to be done, that all others are excluded from the agreement unless additional words are used showing that it was intended to include something else and then only such are included as are of the same class as are enumerated.

We will now deal with each of the above propositions separately:

(a) There are no words in the agreement imposing on the Commission any liability to build shops or to furnish them with machinery, but on the contrary the company having agreed to equip the railway with rolling stock and to keep the railway and rolling stock in repair and to make all renewals at its own expense, that agreement involves the supply by the Company of shops and machinery for the building and repair of rolling stock unless the Company contracts that work out to somebody else.

Clause 2. That a through "line of railway" of the gauge of 4 feet 8½ inches, comprising two divisions to be built, called the Eastern and the Western Division, respectively, shall be constructed in the manner hereinafter mentioned between the City of Moncton and the Pacific Ocean. The Eastern Division shall comprise that portion of the railway to be constructed from Moncton to Winnipeg.

This clause proceeds to describe the location of the railway and stops. The declaration is that a line of railway of the gauge of 4 feet 8½ inches, to be called the Eastern Division, shall be constructed as hereinafter mentioned. So far nothing more is described than the roadbed and steel.

Clause 5. "The said Eastern Division shall be constructed by and at the expense of the Government upon such location and according to such plans and specifications as it shall determine, having due regard to directness, easy gradients, and favourable curves." In this clause, the Government agree to construct the Eastern Division; up to this time we have no wider description than is contained in Clause 2.

Clause 15. "The expression 'cost of construction' in the case of the Eastern Division, shall mean and include all the cost of material, supplies, wages, services, and transportation required for or entering into the construction of the said Eastern Division, and all expenditure for right-of-way and other lands required for the purposes of the railway and for the terminal facilities, accommodation works and damages and compensation for injuries to lands, and for accidents and casualties; cost of engineering, maintenance, replacement of works and material during construction, and superintendence, book-keeping, legal expenses, and general cost and expenses, occasioned by the construction of the said Division, whether of the same kind as, or differing in kind, from the classes of expenditure specially mentioned, including interest upon the money expended; the interest upon such outlay in each year shall be capitalized at the end of such year, and interest charged thereon at three per cent per annum, until the completion of the work, and until the lessees enter into possession under the terms of the said lease, and for the purposes of this agreement, the amount of such cost of construction including the principal and all additions for interest, to be ascertained in manner aforesaid, shall on completion be finally determined and settled by the Government upon the report of such auditor, accountants, or other officers, as may be appointed by the Government for that purpose."

This clause deals with the expenditure to be made by the Government, and in this must be found all heads of expenditure on which the Government may charge interest against the Company, and it is quite clear that if the Government made any expenditure which does not come within the "cost of construction" as defined by this clause, the Government cannot charge interest thereon against the railway, because it is agreed that the rents shall be three per cent per annum on the "cost of construction" as defined by this clause.

Clause 15 covers (1) "material, supplies, wages, and transportation required for or entering into the construction of the said Eastern Division". So far there is no wider definition of the Eastern Division than in Clause 2.

(2) "All expenditure for right of way, and other lands, required for the purposes of the railway, and for terminal facilities". This deals with land alone, but throws light on the question because it indicates clearly that the expression "lands required for right of way and other purposes" does not include lands required for terminal facilities, showing that even they were additional lands. So if the Government were bound to find land for shops, it would have been so stated, as was done in the case of terminal facilities. "Other purposes" covers lands for stations, freight sheds, sidings, turnouts, etc.

(3) "Accommodation works". This is a legal expression, well understood to mean works for the accommodation of landowners. The following quotation from Sweet's Law Dictionary, page 8, shows what it means:

"Where a railway company takes land compulsorily it is bound under the 68th section of the Railway Clauses Act of 1845 to construct all gates, bridges, roads, fences, etc., necessary to make good any interruption caused by the railway passing through the land. These are called accommodation works."

The words are found in the English Railway Clauses Act, Chapter 20 of the Statutes of 1845, sections Nos. 68, 71, 72, and 73.

This and the expressions in the remainder of the clause could not in any way refer to shops and machinery and so they will not be further discussed.

In the above clauses, we have all the contract which imposes liability on the Government, and there is not one word that even remotely implies that the Government is to be put to the cost of shops or machinery or tools of any kind.

Surely it cannot be easily argued that an expenditure of many millions for shops, machinery and tools was contemplated by either party to be made by the Government, and no mention made of it.

(b) The Government did not agree to build and fully equip this line of railway with everything required to operate it except rolling stock.

It may be argued that the railway is to be complete in every particular except as to rolling stock, an error fallen into by not carefully considering the terms of the contract.

Where the Eastern Division is spoken of as "when completed" (clause 20), and when the words "after completion" (clause 16), and where the words "pending the completion of the Eastern Division" are used in Clause 3 of the second agreement, Schedule to Chapter 24 of the Statutes of 1904, the meaning is that when the Government has completed the work it has undertaken by the agreement to perform and no more.

This appears absolutely clear from the fact that the Government is not required to provide telegraph and telephone lines. No railway is complete without these. There is quite as much reason for arguing that the Government is bound by the agreement to provide telegraph and telephone lines as there is that it is to provide shops and machinery and tools.

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The agreement is clear on this point at least because by section 27 of the Statutes of 1903, the Commissioners are authorized (but not required) if the Governor-in-Council consents, to build as part of the Eastern Division telegraph and telephone lines. This provision would have been unnecessary if the agreement covered it.

It must not be forgotten that the agreement and statutes were drawn at the same time, and because it is mentioned in the statutes it follows that the parties did not consider that the agreement covered telegraph or telephone lines, or, in other words, a completed railway, but thought that the agreement only covered what was mentioned, and recognized that unless authorized by the statute the Government would have no power under that agreement to build these telegraph and telephone lines, and it is submitted that each party realized that at Winnipeg the Grand Trunk Pacific would, for its Western Division, naturally have its own shops, and that there was no necessity to even authorize the Government to build the Transcona Shops.

(c) The Company agreed to equip the railway with rolling stock and to keep it and the rolling stock in repair at its sole expense. Not only does this agreement impose no liability on the Government in this regard, but it can be gathered from the contract with certainty that the Company has undertaken this obligation.

Clause 22. "The Company shall equip both divisions of the said line of railway with modern and complete rolling stock, suitable and amply sufficient for efficient operation and the handling of all classes of traffic to the satisfaction of the Government, and the first equipment for the completed road shall be of the value of at least \$20,000,000.00, of which not less than \$5,000,000.00 worth shall be supplied for the operation of the Eastern Division of the said railway, and the said \$5,000,000.00 worth of rolling stock together with all renewals thereof, and additions thereto, shall be marked as assigned to the said Eastern Division, and shall be held to be and form a part of the equipment of the Eastern Division of the railway, during the said period of fifty years, and shall be used as the equipment appertaining thereto according to the ordinary practice of railways during the said period of fifty years."

Here it is clearly provided that the Company shall supply the rolling stock for the railway.

Clause 23. "The lease of the said Eastern Division shall contain all necessary and proper provisions required by the Government for securing during the entire term of the said lease the efficient maintenance and operation of the said division, including all repairs and renewals and the maintenance and renewals of its rolling stock and equipment, so as to keep the said division in all respects up to the standard of modern and efficient railway practice and operation, as the same shall be advanced and improved from time to time, during the whole term of said lease, it being the intention of this agreement that the said lease shall provide in all respects for the upkeep of the said Eastern Division, and of the equipment thereof (otherwise than by expenditure upon construction account, under paragraph 16 hereof), to the satisfaction of the Government, at the expense of the Company, after the same shall be completed and handed over by the Government to the Company for operation". The Company here agree to enter into a lease which shall provide that it shall repair and renew and maintain rolling stock and all other equipment of the road, and shall keep up the road at its own expense.

Now if the Government is to provide shops, machinery and tools for the repair and renewal of rolling stock, it means that the Government must provide not only repair shops but also shops and machinery and tools for building engines and cars, and because for the first seven years of the lease no interest is to be charged "on the cost of construction", the Government is actually to pay part of the cost of

renewals and repairs which contradicts and nullifies the agreement in that respect. These shops, costing several millions, that contribution by the Government would amount in seven years to more than a million dollars.

Clause 6. "The Company agrees to construct, maintain and operate the said Western Division, and to take a lease of, maintain and operate the said Eastern Division, upon the terms and conditions and in the manner hereinafter set forth."

By this and Clause 23, the Company agrees to maintain and keep in repair the Eastern Division. Now if the Government is required to provide shops and machinery and tools to repair and build renewals of rolling stock, why is it not bound to provide all the appliances and machinery to be used by the Railway Company in keeping up the road, generally? It is as reasonable to infer one as the other from this agreement. There is as much provision made in the agreement for one as the other, and that is none.

(d) There are words used in the agreement which clearly indicate that the Company is to supply these shops and machinery. If it was intended that the Government should supply these shops and machinery, the agreement by the Company to repair its rolling stock would have stated that the same was to be repaired with the machinery to be supplied by the Government.

Clause 14, which defines working expenditure, includes in it "property leased to or held by the Company in respect of the said Eastern Division." Apart from the rent of any other leased line "also all rent charges or interest on the purchase money of lands belonging to the Company, purchased for the use of the said Eastern Division."

If the Government must furnish the whole undertaking, excepting rolling stock, why should clause 14 deal with property leased to or lands belonging to the Company for the Eastern Division? It cannot be successfully contended by the Company that the lands thus spoken of might be leased, purchased, or used by them for some collateral business, because clause 14 is limited to property held in respect of the Eastern Division, and to lands purchased for the use of the Eastern Division, and if it were not for the Eastern Division, there would be no use for including them in the agreements.

By Section 14 of the Statute, the Governor-in-Council may set apart for the purposes of the Eastern Division so much of any public lands of Canada as is shown in the report of the Chief Engineer to be required for the roadbed thereof, or for the convenience or necessary sidings, yards, stations, and other purposes for use in connection therewith. Notice that there is no mention made of shops or land for shops. These words describe the railway simply as it lies between Moncton and Winnipeg.

Now compare this section with clause 45 of the Agreement, where the Government agrees to grant public lands for the right of way of the Western Division, and for all stations, station grounds, workshops, buildings, yards, and appurtenances required for the construction and the working thereof. Can it be reasonably argued that the Government has not agreed in respect of the Western Division to supply land for more purposes than it does by section 14 of the Act in respect to the Eastern Division. The railway owned the Western Division and must work it and must renew and repair its rolling stock, and will require workshops for that purpose, and therefore workshops are mentioned in Clause 45. The Company agrees at its own cost to supply rolling stock for the Eastern Division and to keep it up and renew it in its own workshops, and therefore the Government by section 14 of the Statute does not agree to supply lands for workshops in the Eastern Division. The fact that shops are not mentioned, in the Statute or in the Agreements, where they refer to the Eastern Division and are mentioned in connection

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with the Western Division is very significant of what the intention of the parties was. The agreement to supply land for workshops or for working the Western Division means something more than is agreed in Section 14, respecting the Eastern Division.

(e) Shops and machinery may be equipment of the undertaking of a railway company, but are not equipment of a line of railway.

The word "undertaking" covers the whole of the corporation facilities for all its activities, whether those are or are not used for one or more than one business, for example, the undertaking of the C. P. R. includes all its hotels, but in speaking of the line of railway one would not be understood to include the hotels, so that the workshops and machinery, although they are part of the undertaking, once they are acquired by the Company, are not part of the line of railway. The facilities to be supplied by the Government must necessarily come under and be legitimately included in the line of railway, these being the words used in the statute.

The Government contemplated spending on the construction of this 1,800 miles of railway, less than \$60,000,000.00. Mr. Fielding declared that for the building of this class of railway in adding twenty-five per cent to Mr. Collingwood Schreiber's estimate, bringing the cost to \$81,250.00 per mile from Quebec to Moncton, and to \$35,000.00 per mile from Quebec to Winnipeg, he had received assurance that his estimate was a liberal one, and that the railway could be constructed well within these figures. Now if this were the contemplated expenditure, how can it be said that the parties ever dreamed of spending the huge amount of at least \$4,000,000.00 on shops. Surely both the Railway Company and the Government, for this expenditure, would have at least mentioned this in the Statute or in the agreement.

Again we refer to the telegraph and telephone. The Government would not bind itself, unconditionally, to erect this plant, and the leaving of it optional with the Government to make this very much smaller expenditure for facilities which were absolutely necessary for working the line should be conclusive evidence in the absence of any provision in the agreement to the contrary, that the Government was not bound to make this expenditure on shops.

It may be argued that the fact that the Commissioners built the Transcona shops, that it was always intended that the Government should undertake this work.

What the Commissioners did afterwards cannot be used as evidence of what the agreement meant. The Commissioners apparently did not consider the question at all, and even if they did the fact that the Commissioners built the shops does not compel the Government to lease them to the Railway Company as part of the Eastern Division, and there is no evidence that the Government intended to lease them as part of the Eastern Division. If the Government had contemplated building these great shops at Transcona, at the cost to the public of millions of dollars, would there not have been a clause in the agreement limiting the use which the Railway Company might make of these shops to the wants of the Eastern Division, which has not been done, or would it not have stipulated that if the shops were used for the benefit of the Western Division an additional rent should be paid.

It is inconceivable that the Government would hand over this great property to be used by the railway for any purposes which it chose without having made provision for extra rent if used for any other purposes than those of the Transcontinental.

As has been said, telegraph and telephone lines are not part of a line of railway, but are, like rolling stock, facilities for operating a line of railway, so because the railway company had undertaken to operate the railway, it would have been to the expense of providing these facilities had not the Government, by a special clause in the statute, given the Commissioners power, with the consent of the Governor in Council, to provide them. In other words, every facility for operating the railway, and every facility for keeping up the operating facilities, are under the contract to be supplied by the railway.

We think that as this is our opinion, we should reproduce the opinion of Mr. E. L. Newcombe, K.C., Deputy Minister of Justice, in which he disagrees with the above views and the same is herewith attached.

March 5th, 1913.

1374—1911.

Sir,—

I have the honour by direction to write to you in reply to the letter of the 4th December last addressed by the Minister of your Department to the Minister of Justice. Enclosed with that letter was one dated 1st December last from Mr. R. W. Leonard, the Chairman of the Transcontinental Railway Commission, raising certain questions with reference to the construction of shops and provision of equipment for the Railway.

Mr. Leonard says in the conclusion of his letter; "I require to have definite instructions from the Government as to their intention in framing the contract". I do not suppose it is possible to ascertain the intention of the late Government in framing the contract nor do I think it would be of much use if it could be known. In cases of doubt the contract has to be interpreted by the parties to it, by agreement if possible and if not by the Courts.

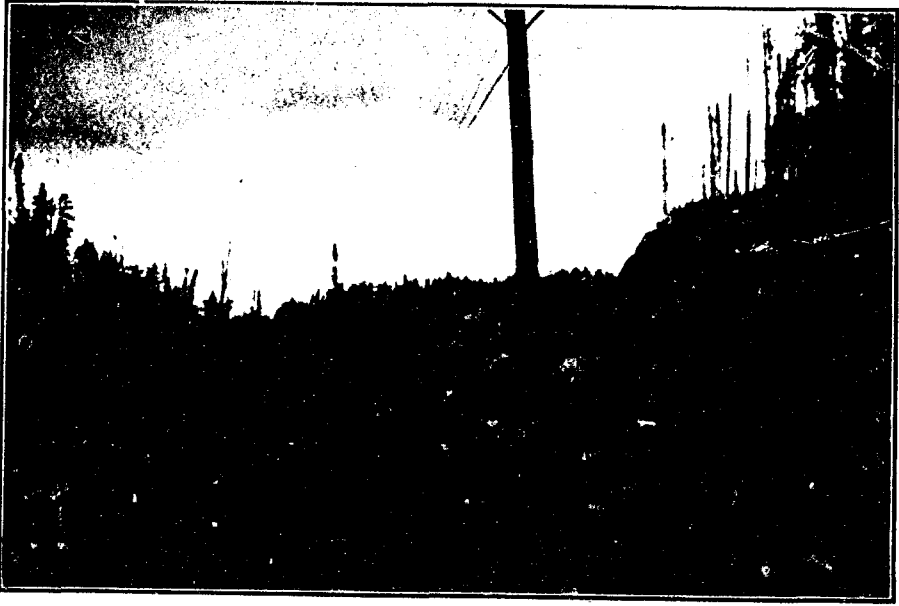
There are several points arising on Mr. Leonard's letter which I shall have to discuss but in large part the questions involved are, I think, for the decision of railway experts rather than lawyers.

The Government contracted to construct the Eastern Division of the National Transcontinental Railway extending from Moncton to Winnipeg. I should suppose that it was impossible to complete the construction of a railway of that length without providing shops of some kind. I will presently consider further the question of what shops should be provided but for the moment will suppose that it is only a question of repair shops. It seems to be a question for railway men to say whether repair shops are or are not a necessity for such railway.

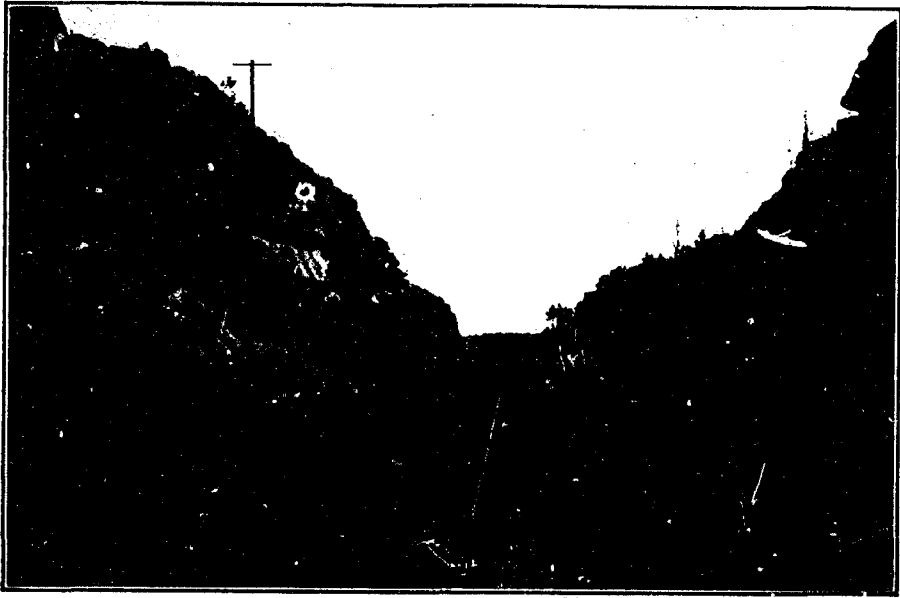
If they are a necessary part of the Railway they have to be built either by the Government or by the Company which is to operate the Railway. If as Mr. Leonard says there is nothing express in the Act or the Agreement showing that the Government contemplated constructing shops, there is certainly less to show that the Company intended to do so.

Let me refer particularly to certain provisions of the Agreement. Clause 2 provides for the construction of a through line of railway between the City of Moncton and the navigable waters of the Pacific Ocean, and Clauses 5 and 16 that the Company shall construct, maintain and operate the Western Division, that the Government shall construct the Eastern Division and the Company shall maintain and operate it. These three terms construction, maintenance and operation include the whole of the provisions made for the entire railway. Working expenditure as applied to the Eastern Division is defined by clause 14 and includes "all expenses of maintenance"; and, after mentioning many expenses of operation and special expenses, the clause concludes with "all such charges, if any, not above otherwise specified as in all cases of English railway companies are usually carried to the debit of revenue as distinguished from capital account". The cost of construction as defined in Clause 15 includes "accommodation works". By clause 18 the cost of construction of the Western Division shall include the like classes of expenditure as in the case of the Eastern Division.

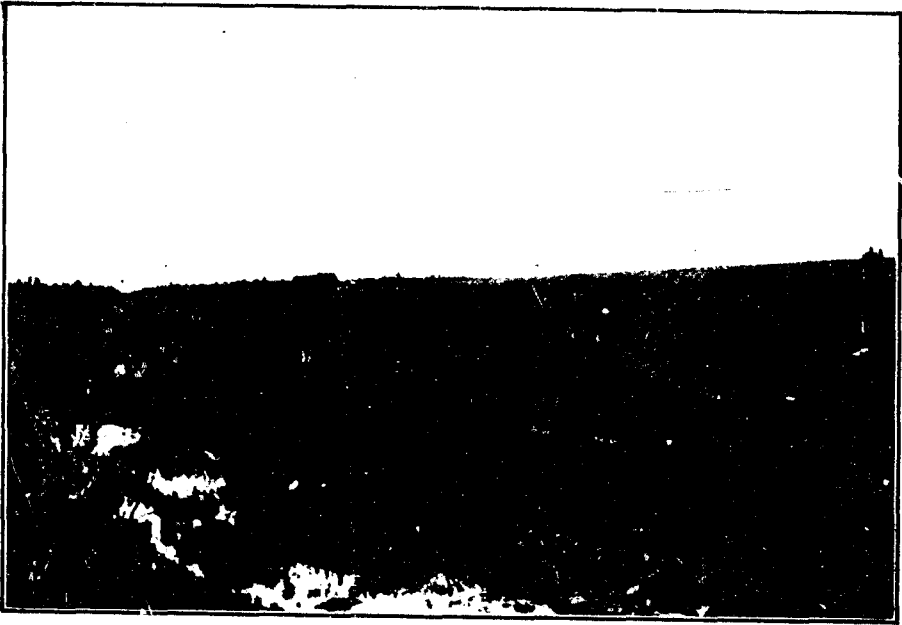
If the construction of shops is not construction of the railway within the meaning of Clause 5 of the Agreement neither is it within Clause 6. But if this is not construction it cannot be either maintenance or operation and it does not fall within any of the expenses detailed as working expenditure, yet as I have said before, I apprehend it is not possible for even one Division and still less the whole Railway to be complete without repair shops.



District F, Residency 21, Mileage 24.6. Waste. Page 60.



District F, Residency 31. Rock Cutting at Mileage 39.0. Note width of excavation where men are Standing. Page 70.



District A, Mileage 48.0. Portion of Coal Creek Fill. Page 92.

5



District B, Residency 11. Mileage 60.7. 40 Foot Concrete Arch over Riviere du Sud. Page 120.

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Clause 20 provides that when completed the Eastern Division shall be leased to and operated by the Company. I think this must mean that it must be in a condition to be operated so far as concerns all work of construction reasonably necessary.

Upon the question of equipment it is to be noticed that there is one important item of equipment specially mentioned and provided to be furnished by the Company, the "rolling stock suitable and amply sufficient for efficient operation".

Again Clause 23 stipulates that the lease shall contain provisions for maintenance of the Eastern Division including all repairs and renewals and the maintenance and renewal of its rolling stock and equipment.

That we have the Government undertaking to complete the Eastern Division and the Company agreeing to operate it, a special provision for the Company to furnish one particular part of the equipment, and a covenant to be inserted in the lease for the maintenance of the equipment.

Finally I would call attention to the words in Clause 23 "it being the intention of this Agreement that the said Lease shall provide in all respects for the up-keeping of the said Eastern Division and of the equipment thereof otherwise than etc., at the expense of the Company after the same shall be completed for operation". The exception in the above is the cost that may be incurred under Clause 16, after the Company is in possession for the improvement of the Division, the replacement of structures by others more modern or otherwise upon capital account for betterments and not being working expenditures.

It is to be noted on the other hand that Section 27 of the Act specially authorized the construction by the Commission of such telegraph lines as are reasonably required for the operation of the Eastern Division. It must have been assumed therefore that the telegraph lines were not a necessary part of the construction, and possibly they are not essential to the equipment of a railway, but I should doubt if the latter contention could be maintained.

I have said that the necessity of providing shops at all might be one for the decision of railway men, though it seemed reasonably clear that some such accommodation would be necessary. Again, the question of what shops are necessary may involve technical knowledge, but there are some sorts which it would seem cannot be necessary. I cannot understand that it can be necessary for a railway company, in the words of the General Manager of the Company, "to have capacity to do a certain amount of building new locomotives, freight cars and passenger cars." That I would apprehend is no more part of the business of a railway company than would be the purchase and working of a coal mine to obtain their own supplies of coal instead of purchasing them.

I point out this particular class of shops which it seems to me cannot be considered necessary for the completed railway, but I think it will be for the Commissioners to decide what shops are necessary in view of my previous remarks as to the necessity of the Government completing the Eastern Division of the railway so that it can be operated by the Company when leased.

As to the location of the shops that so far as the Winnipeg site is concerned appears to be settled beyond possibility of alteration, but as to the Quebec or any other site I apprehend it is still open to the Commissioners to determine any and what shops are required at these places.

With reference to the Winnipeg site, the Company say, and I think not unreasonably, that inasmuch as the Commission decided to buy land for terminals east of Winnipeg and proceeded without consultation with them and as the shops will be built on the land of the Eastern Division, they do not contemplate contributing to their cost. I think they are right in so far as any advantage accrues to them from the fact of the shops being at the terminus of the Eastern Division, which is also the terminus of the Western Division. I do not think they are entitled to have the shops constructed at an increased cost in order to meet the requirements of the Western Division.

The facts as regards the works carried out at Transcona are not altogether clear to me. On March 14th, 1908, the Secretary of the Commission wrote to Mr. Morse: "The Commissioners will arrange for the preparation of plans of such shops as will meet the requirements of the Eastern Division and complete the terminal facilities at Winnipeg. Estimates and plans were prepared and approved by the Commission and the Company, presumably to fulfil this purpose, the cost not to exceed \$1,500,000. An Order-in-Council was passed on the 27th May, 1908, authorizing the invitation of tenders for the work.

The sum of \$1,500,000 would appear to have been spent without any reference to the purposes for which the expenditure was authorized, the whole sum, according to Mr. Leonard (page 7), having been used for locomotive shops. Mr. Leonard makes no mention of any further authority having been given in connection with these works, but says (page 10): "In 1911, apparently as the result of verbal negotiations, it was decided to increase the plant at Transcona until the

Expenditure to date has been.....	\$2,080,949.87
The estimated expenditure to complete is.....	1,727,616.00
	<hr/>
Making a total sum of.....	\$3,809,565.37

I am, however, informed by the Law Clerk of the Commission that Orders-in-Council were passed sanctioning the contracts for the work done.

I have no information as to the reasons for the departure from the original estimates and plans for the greatly increased expenditure. If these are for the benefit of the Western Division, I do not think they are proper charges to be included in the cost of the Eastern Division. Mr. Leonard suggests that the verbal negotiations in 1911 "included a bargain regarding expenditures in the city of Quebec". I am unable to see what place there is for any such bargain under the contract.

Mr. Leonard concluding his letter says, "I require to have definite instructions from the Government as to what items of machinery, if any, shall be supplied by the Commission for the lines east of Winnipeg and for the lines west of that point". It follows from what I have before said that so far as the lines east of Winnipeg are concerned I think such machinery must be supplied, as is necessary to make the railway ready for operation. I am disposed to think, moreover, that the construction and completion of the Eastern Division, for which the Government is responsible, would not involve expenditures for machinery, works or services not included in "cost of construction", as defined by Clause 15 of the agreement.

There can, I think, be no doubt that no machinery should be supplied for the lines west of Winnipeg.

I have dealt with this matter at length, not only because of its importance and the large sums of money involved, but also because Mr. Leonard has set forth his views very fully and seems to have arrived at conclusions with which I am not able to entirely agree.

I return Mr. Leonard's letter.

I have the honour to be,

Sir,

Your obedient servant,

E. L. NEWCOMBE.

DESCRIPTION OF THE TRANSCONA SHOPS.

LOCOMOTIVE SHOPS.

The Transcona Shops of the Transcontinental Railway are equipped with 147 machines, and are capable of handling repairs to the extent of three hundred locomotives per year.

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This shop also, with its present equipment, could build fifty locomotives per year. This, however, would decrease the output of repairs from three hundred locomotives to approximately two hundred and twenty-five, but with an additional expenditure of about \$75,000.00 the output of new engines could be increased to one hundred and fifty.

Assuming that the requirements of the Eastern Division of the road would be 300 engines, the output of the shops would be 25 engines per month, which would mean that the entire equipment could go through the shops once a year. The output of the proposed Quebec shops being 150 engines per year, would mean 450 engines could be repaired at these two points in one year. This shows that the Transcona shops would be capable of doing 100 per cent more than is required of them for the Eastern portion of the road, and this when the traffic has become systematized and on the assumption that the business done be 75 per cent of that done by the C. P. R.

For the next five years the Transcona and Quebec Shops and the Terminal Machine shops at the roundhouses, including Rivers, Man., on the western section, could fully take care of repairs for the entire system east and west.

PASSENGER AND FREIGHT CAR SHOPS.

Practically the same conditions prevail in these Departments as exist in the Locomotive Department, as these shops are designed to take care of an equipment proportionate to the locomotive requirements.

GREY IRON AND BRASS FOUNDRY.

This Shop is thoroughly equipped and has 26 machines and appliances, and is capable of casting any spare part of an engine from a cylinder with saddle complete to the smallest item required on a locomotive or car.

The Brass Foundry in the same building is also equipped for casting anything required in connection with a locomotive or car.

FORGE SHOP.

This Shop is thoroughly equipped and has 47 machines and appliances, including a 5,000 lb. hammer, which, with the large furnace, is capable of locomotive frame making, and these are also able to handle scrap and work it up into good quality blooms from which these frames are made.

BOILER SHOP.

The Boiler Shop is equipped with 35 machines of the latest and most modern type, and is practically second to none on the American continent, having larger and more up-to-date machines than the C. P. R. Angus shops have.

FROG AND TRACK SHOP.

This Shop contains 25 machines and with the addition of a setting-out shed and one more Frog and Switch Planer, would be sufficiently large enough to take care of all track material, both east and west.

CARPENTER AND PATTERN SHOP.

There are 25 machines in this Shop, and it is capable of making all the patterns required in connection with the building and repairing of locomotives and cars.

This shop is also equipped with machinery for repairs to engine cabs or any work required on engines.

POWER HOUSE.

The power house is capable of developing 3,400 H.P., which is sufficient for the Locomotive and Car shops, including lighting for whole plant.

STORES DEPARTMENT.

The Stores Department is adequate for the handling and storage of material for locomotives and cars, and provision has been made for the necessary clerical staff.

STEEL AND WOODEN FREIGHT SHOPS.

In these Shops there will be approximately 36 machines, and have a capacity for 75 cars, and in addition to the equipment necessary for the building and repairing of all classes of wooden cars, this shop can take care of the building and repairing of steel cars.

WHEEL AND MACHINE SHOPS.

There will be approximately 36 machines in this Shop, which will do all the necessary machine work in connection with the repairs and building of steel or wooden cars and coaches.

CAR FORGE SHOP.

This shop will contain approximately 20 machines, capable of doing all the necessary work in connection with Forge Shop details.

SAW MILL AND CARPENTER SHOP.

This shop will have approximately 42 machines equipped for doing all the necessary sawmill work in connection with the repairs and building of freight and passenger cars. This shop will also be of sufficient capacity to handle station equipment, and all sorts of woodwork for outside requirements, such as semaphore posts, platforms, planks, etc.

COACH SHOP.

This shop will contain approximately 24 appliances. It will hold 18 coaches undergoing repairs, and provides nickel-plating, brass finishing and upholstering departments thoroughly equipped for heavy repairs to coaches and the building of new ones.

COACH PAINT SHOP.

This shop has a capacity of 16 cars and is large enough to handle all coach painting required.

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LUMBER STORAGE.

Lumber storage is also provided for.

DRY KILN.

A Dry Kiln is provided for the drying of timber in connection with coaches.

OFFICE BUILDINGS.

The Office Buildings for both the Motive Power Department and the Car Department have accommodation for the officers and staff, and each has, also, a drawing office and material testing room in the basement.

RESERVOIR.

There are two water reservoirs at the plant, one of two million gallons capacity, the other a 100,000 gallon tank.

SEWERAGE SYSTEM.

The Sewerage system is equipped with two rotary motor driven pumps, which discharge the sewage from the plant at a distance of six miles.

PUMPING PLANT.

The St. Vital pumping plant is six miles away, and supplies water from the Red River.

COST.

Total Cost of the Locomotive and Car Shop buildings, and equipment, including sewage pipe line, water pipe line, land and track-laying in connection with the shops, \$4,535,372.00.

December 14, 1912.

NATIONAL TRANSCONTINENTAL RAILWAY.

Statement Showing Gross Expenditure to September 30th, 1911,
on Transcona Shops Plant and Estimated Cost of Same.

Contract No.	Nature of work.	Gross expenditure to Sept. 30, 1911.	Estimated amount.
Buildings (Loco. Shops Plant).—			
22.	Locomotive Shops	\$1,088,031.00	\$1,167,140.00
23A.	Reservoir	81,933.00	83,982.00
27.	Red River Pump House	12,861.00	13,031.00
Total for Loco. Shops.....		\$1,182,825.00	\$1,264,103.00
Buildings (Car Shops Plant).—			
23F.	Car Shops	\$ 72,519.00	\$ 823,384.00
Total for all buildings.....		\$1,255,344.00	\$2,087,487.00

Miscell. Work (Loco. Shops Plant).—			
21A.	Levelling shop site	\$ 21,826.00	\$ 95,000.00
23C.	Air, steam, water, piping, etc.....	49,820.00	104,820.00
23D.	Pipe tunnels and wiring ducts.....	14,694.00	35,727.00
23E.	Miscellaneous equipment	122,266.00	158,521.00
28.	Yard water system	23,188.00	31,139.00
30.	Wiring system	14,760.00	78,396.00
69.	Pipe covering		8,335.00
25.	Water main pipe line (excav. and backfill).		
26.	Water main pipe line (laying & distribution)	18,689.00	18,689.00
26A.	Sewer line (pump ho. to Seine Riv).....	135,713.00	135,713.00
52.	Replacing damaged sewer		13,968.00
21D.	Roadway	5,296.00	5,296.00
77.	Sewer connection		25,000.00
	Total for Loco. Shops.....	\$ 406,102.00	\$ 710,604.00
Miscell. Work (Car Shops Plant).—			
	Piping systems		\$ 101,000.00
	Wiring systems		45,000.00
21A.	Levelling shop site		95,000.00
	Gravel fill (Interior Car Shops)		30,000.00
	Total for Car Shops.....		271,000.00
	Total for all miscell. work.....	\$ 406,102.00	\$ 981,604.00
Machinery and Equipment (Loco. Shops)—			
	Machine tools equipment	\$ 553,825.00	\$ 807,120.00
29.	Pump house equipment	17,061.00	17,881.00
48.	Shafting, etc.	18,891.00	32,073.00
	Total for Loco. Shops.....	\$ 589,780.00	\$ 857,074.00
Machinery and equipment (Car Shops).—			
	Industrial tracks		\$ 1,000.00
	Machine tools		183,700.00
	Cranes, motors, shafting hangers, transfer table and miscell. equip.....		106,800.00
	Structural steel Car Shop machinery.....		40,000.00
	Total for Car Shops.....		331,500.00
	Total for all machinery and equipment	589,780.00	1,188,574.00
	Grand total	\$2,251,226.00	\$4,257,665.00

THE HISTORY OF THE WINNIPEG TERMINALS AND ENTRANCE INTO WINNIPEG.

The Transcontinental Railway and the Grand Trunk Pacific Railway Company made an agreement with the Canadian Northern Railway Company for joint passenger terminals and city freight terminals, the joint property extending from Water Street to the Assiniboine River, whereby the Grand Trunk Pacific Railway Company and the Transcontinental Railway should each pay one per cent interest on the value of the property, as well as any improvements which the three parties might decide to make.

To reach these terminals from the East required the construction of a bridge over the Red River as well as an expensive viaduct from the proposed Red River Bridge to and across Water Street for the operation of both Canadian Northern and Transcontinental Railway trains approaching the terminal from the East. The necessity for this expensive construction was known by all of the parties in connection with the agreement.

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The lands on which this Eastern approach to the terminals must be constructed were owned or controlled by Canadian Northern Railway or MacKenzie and Mann interests at the time that the agreement was made.

The agreement makes no provision for the joint use of the Red River Bridge, viaduct or the approaches to the bridge, nor do we find that any understanding or agreement was made with the Canadian Northern Railway interests for the right of way between Water Street and the Seine River which was then owned and controlled by them. We do find, however, that the Transcontinental Railway Commission undertook the construction of the viaduct and Red River Bridge and that these structures were 75 per cent completed before the Commission filed its plans or took legal possession of this property on September 27, 1910.

The agreement did not provide for a track connection between the Transcontinental Railway main line and the Canadian Northern Railway main line.

As early as 1906 the Transcontinental Railway had constructed its main line from Dundee Junction eastward. Dundee Junction is located on the Dundee Branch of the Canadian Northern Railway at a point about one-quarter of a mile from the main line of the Canadian Northern Railway, which runs from Winnipeg to Port Arthur and distant about two and a half miles east of the Canadian Northern Railway Company's Winnipeg passenger station, and it was through this Dundee Junction that the Transcontinental Railway connected with the Canadian Northern Railway, the City of Winnipeg and the Grand Trunk Pacific Railway during the years of construction of the Transcontinental Railway, and it would appear that the original intention was that this connection, or some slight modification of it, was to be the permanent route for entering Winnipeg, and it could easily have been arranged had the terminal agreement with the Canadian Northern Railway covered the territory from Dundee Junction to the Assiniboine River instead of ending abruptly at Water Street in the City of Winnipeg.

Numerous suggestions were made to connect the Transcontinental Railway at Dundee Junction with the new Red River Bridge to which they were committed under the agreement, which included running rights for the Canadian Northern Railway paralleling a portion of the Canadian Pacific Railway, as well as an independent line from the Transcona Shops direct to the Red River Bridge. The latter suggestion was finally adopted and a new line of double track railway, 4.9 miles in length, was constructed.

The principal promoter of this direct line was Chief Engineer Grant, who proposed that it should cross the Canadian Pacific Railway Emerson Branch and the streets in the vicinity on the level, and application was made to the Board of Railway Commissioners of Canada for authority to make these crossings. The Board of Railway Commissioners ordered that the Transcontinental Railway should cross this Railway and these streets overhead, which involved the construction of a large quantity of additional embankment, and the Commissioners of the Transcontinental Railway, without reference to the original promoter, accepted the ruling of the Board of Railway Commissioners and ordered the construction of the line to be proceeded with. The estimated cost of this line is \$2,500,000, to which should be added whatever amount the Mackenzie and Mann interests secure for their right of way over and above the amount offered them in the Exchequer Court proceedings. They are claiming about \$2,500,000 more than was offered.

On August 22, 1911, after the construction of the direct line from Transcona shops to the Red River Bridge was well under way, the Canadian Northern Railway Company, the Grand Trunk Pacific Railway Company and the Commissioners of the Transcontinental Railway entered into a tentative agreement covered by an initialled document known as "Heads of Proposed Agreement", in which the Transcontinental Railway were given running rights from Dundee Junction to the Joint Winnipeg Terminals in return for running rights over the tracks of the

Transcontinental Railway from the Canadian Northern Railway main line across the Red River and into the Winnipeg Terminals, thus giving the Transcontinental Railway two separate and distinct entrances to the Winnipeg Terminals.

The fact that this later "Heads of Agreement" was prepared and partially executed indicates that a similar agreement might have been made in the beginning which would have provided ample facilities for the entrance into Winnipeg and saved the expenditure of two and a half to three millions of dollars. The failure to take advantage of this economy rests, first, with the Commissioners of the Transcontinental Railway, who should have arranged that the Winnipeg Terminals extend east to Dundee Junction before completing any deal with the Canadian Northern Railway Company, and second, with the Grand Trunk Pacific Railway Company who were parties to these agreements for not giving the Commissioners the advantage of their knowledge in affairs of this character and insisting on the Commissioners securing a reasonable arrangement with the Canadian Northern Railway, and thirdly, MacKenzie and Mann interests should have dealt openly with the Commissioners in connection with the right of way which they controlled at that time. The Board of Railway Commissioners of Canada might have been applied to to secure running rights from Dundee Junction to the Winnipeg Terminals over the Canadian Northern Railway, instead of authorizing the overhead construction which cost the country so much money.

DRAINAGE OF ROAD CROSSINGS.

The line of the Transcontinental Railway, westerly from the Quebec Bridge, passes through an agricultural country, fenced and cultivated, and the number of farms intersected by the railway necessitates a large number of farm crossings in addition to the regular road crossings.

In grading a level crossing of a railway, provision has to be made for carrying the water which drains into the ordinary railway ditch from one side of the road crossing to the other. This is ordinarily effected by building a small wooden culvert, or by laying a cheap drainage pipe, of either tile or concrete, in the bed of the ditch, and under the grading for the crossing.

The Investigation Commission, during their inspection of the portion of the line immediately west of Quebec, were surprised to note that expensive, heavy cast-iron pipe was used for this purpose in stead of the ordinary tile or concrete pipe, or small wooden culverts.

We find that the practice of using cast-iron pipe for this purpose was confined almost entirely to District "B", though small quantities were used on District "A".

The following statement shows the amount of this pipe used, with the total cost, and further figures showing that if tile and concrete pipe had been substituted at the contractor's prices for this material, a saving might have been effected of \$12,072.15.

Statement showing cost of cast-iron pipe used for Drainage of Road and Farm Crossings.

District "A," Contract 2, 24"-	84 lin. ft. at \$5.00—	\$420.00	
Contract 3, 24"-	48 lin. ft. at 6.00—	288.00	
			\$ 708.00
District "B," Contract 9, 18"-	2128 lin. ft. at 3.75—	15,480.00	
	24"-	595 lin. ft. at 5.00—	2,975.00
	36"-	65 lin. ft. at 7.50—	487.50
			\$18,942.50
			\$19,650.50

(Note—"None on other districts".)

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Average cost per lin. ft..... \$1.00

For this cast-iron pipe the following items might have been substituted with the savings as shown:—

District "A," Contract 2, concrete pipe, 24"- 84' at \$2.80—	\$285.20	
Contract 3, concrete pipe, 24"- 48' at 2.00—	144.00	
		\$ 379.20
District "B," Contract 9, tile pipe, 18"-4128' at \$1.30—	5,362.40	
Concrete pipe, 24"- 595' at 2.65—	1,567.75	
Concrete, 36"- 65' at 4.00—	260.00	
		7,199.15
		\$7,578.35

Average cost per lin. ft..... \$1.54
 Total saving \$12,072.15

District Engineer Foss, in the following letter to the Chief Engineer, explains how it occurred that the pipe was used for this purpose on District "A":—

No. 22-F.

St. John, N.B., October 7, 1912.

Gordon Grant, Esq.,
 Chief Engineer "N. T. R."
 Ottawa.

Dear Sir,—

"Replying to yours of the 4th inst., File 12,144, I beg to say that the pipe referred to was purchased for use under the main line, but, later it was decided that a larger structure would have to be built, so the contractor was allowed to use this at Road Crossings.

Yours very truly,

C. O. FOSS,
 District Engineer.

and Mr. Doucet's letter, reproduced herewith, confirms our contention that the use of this pipe was an unjustifiable expenditure.—

No. 1286.

Quebec, 7 October, 1912.

Gordon Grant, Esq.,
 Chief Engineer,
 Ottawa.

Dear Sir:—

"Replying to your letter of October 4, file 12144, the cast iron pipe ordered for drainage road crossings, was ordered by ex-Division Engineer Russell without my knowledge. Cedar culverts, or, better still, open waterways should have been used, and the order is to be ascribed to an error of judgment.

Yours truly,

A. E. DOUCET,
 District Engineer."

That the Division Engineer could order the Contractor to supply and install items as extravagant as these C. I. pipe without authority of the District Engineer discloses the incapability of the Division Engineer and a laxity of proper organization and supervision in the District, to which this \$12,000 loss is directly chargeable.

WATER SUPPLIES.

Gravity Supplies.

On the Transcontinental Railway the engineers were permitted to expend up to \$25,000 in order to obtain gravity supplies for way station tanks. This license as regards expenditure resulted in four gravity supplies being installed on District "A" at an excessive cost, and where we find cheaper water could be procured by the installation of pumping plants and at the same time a construction saving of \$68,200 been effected. At way side stations where the amount of water required by locomotives is moderate, particularly when water stations are located as close together as they are on District "A", a large expenditure to obtain a gravity supply results in the water used costing per gallon greatly in excess of what it would cost had a pumping plant been installed.

A statement has been prepared covering all gravity supplies on the railway which shows the cost of those above referred to and full details in connection with pumping, etc. (See Exhibit No. 40.)

Pumping Stations.

The standard pumping plant adopted by the Transcontinental Railway at the instigation of the Grand Trunk Pacific Railway is a gasoline pump which is being supplied by the contractors at an average cost of \$1,400 each. From figures which we have gathered as regards the cost of operating the pumps both from the contractors who are using them in their water service for work trains, and from the manufacturers who supply them, we find that the cost of pumping water with this equipment is about five cents a thousand gallons, which may be taken as an average figure for which the work can be done by a steam pump.

The price being paid for the gasoline pumps is about \$800 in excess of what a steam pump and boiler might have been provided for, and we find that the installation of this expensive equipment has unnecessarily increased the cost of this feature of the railway by \$45,600.

CONSTRUCTION OF THE NATIONAL TRANSCONTINENTAL RAILWAY
EAST OF LEVIS, QUE.

This Commission does not think that the National Transcontinental Railway should have been constructed East of Levis, which was done at a cost of \$35,000,000, first,—because the Government at that time had a railway in operation between Levis and Moncton, the Intercolonial; second,—because the National Transcontinental Railway would only be 33 miles shorter; third,—because the gradients on the National Transcontinental Railway are greater than those on the Intercolonial Railway; and fourth,—because the grades on the Intercolonial Railway can be reduced to four-tenths per cent Eastbound and six-tenths per cent Westbound, whereas it is practically impossible, according to the construction of the National Transcontinental Railway, to reduce the 1.10 per cent grade at 146 miles West of Moncton and the 1.10 per cent grade at Lake Pohenagamook.

The traffic on the Intercolonial Railway is such that it will in a short time be a business proposition to reduce its gradients which when completed will make it the low grade line between Levis and Halifax, rather than by way of the National Transcontinental Railway, and it is inconceivable that the grade revisions on the Intercolonial Railway above referred to will cost more than half of the amount of money expended in the construction of this portion of the National Transcontinental Railway.

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While there may be some reason for the construction of a railway through the timber districts in the Eastern portion of the Province of Quebec, the construction of the Railway from Edmundston to Moncton was not justifiable because of the lack of local business along this line which two years of operation has already proved.

EVIDENCE

(N.T.R. INVESTIGATING COMMISSION: EVIDENCE TAKEN ON TRAIN, NEAR MILEAGE 40, JULY 13th, 1912.)

WALTER YOUNGMAN, sworn:

By the Chairman:

Q. What is your Residency?—A. I am on number seven.

Q. Did you make the classification of all those cuttings?—A. I did, in conjunction with Mr. Bell.

Q. You were engaged in them?—A. Yes.

Q. You heard what Mr. Bell said about the classification on mile 1625?—A. Yes.

Q. That you and he had made it during the progress of the work; you concluded that it was 60 per cent solid and the rest loose?—A. Yes.

Q. And that, under the direction of Mr. Poulin, it was afterwards changed?—A. That is right.

Q. Had you any reason to change your own judgment, or did you defer to your superior?—A. Just deferred to my superior.

Q. You agree with Mr. Bell that all the material on this Residency is either stone, gravel or sand?—A. Yes.

Q. There is no clay in this territory?—A. No, there is no clay that I know of.

Q. Was there, in your opinion, more sand in some of these cuts than you have allowed as common?—A. Not sand. I know about my own section: I do not know about further along.

Q. Is there not more sand, and, perhaps, I should add, stones under a foot than you have allowed as common?—A. I hardly think so.

Q. This place is out of your territory?—A. Yes.

Q. Does it not present the appearance of having more, to one passing over?—

A. It does to one passing over, after it is trimmed down.

Q. And you yourself would conclude, from a casual examination of it, that there was not enough common allowed, would you not—as it now appears?—A. Yes, as it now appears the sand washes over the stones, and you cannot see the same as you would when the work was being taken out.

Q. Then you can say definitely that the appearance that we get from a surface examination is not indicative of the true condition of the excavation?—A. No, not in most cases.

Q. Will the examination by sinking pits back from the top of the cutting disclose the true condition?—A. Yes, in some cases it would, if you take the pits far enough and long enough.

Q. Does it vary? The appearance on the face of it is that it is pretty uniform. Surely one or two pits on the bank would show fairly what it is?—A. Well, I should think probably it would; in some cases it may not.

Q. Of course that is quite evident, but one may reasonably expect to arrive at a fair conclusion as to the contents of that bank by sinking one or two pits, but if it happened that you went down into a pocket of sand, you would have to dig another pit to get a fair view?—A. You certainly would.

Q. In all probability it would disclose the condition?—A. Oh, yes, under most circumstances.

(N.T.R. INVESTIGATION COMMISSION: EVIDENCE TAKEN ON TRAIN
AT PARENT STATION, JUNE 15th, 1912.)

WILLIAM G. BROWN, sworn:

By the Chairman:

Q. How old are you?—A. I will be twenty-nine in the fall.

Q. Where did you obtain your professional education?—A. McGill University.

Q. Are you a graduate?—A. I am.

Q. What year?—A. 1907.

Q. Where did you obtain your first job as an engineer?—A. With the Quebec Bridge company.

Q. You had not any classification of excavation out on that job, had you?—A. No, I was not in charge.

Q. When did you first become engaged in classification?—A. On the Transcontinental Railway.

Q. What was your office then?—A. I was instrument man.

Q. As an instrument man you would not classify, would you?—A. No, I would not be really engaged in classification: I would be measuring cuts.

Q. You saw classification going on during that time?—A. Yes, on the grade.

Q. Whom were you under?—A. The Resident Engineer, J. O. Montreuil.

Q. Where?—A. Residency 17, Cap Rouge.

Q. Did you get a Residency yourself at any time?—A. Yes.

Q. Did you succeed him?—A. No. I did not succeed him: that was in 1906, and I went back to college that year and finished.

Q. After you graduated did you get a Residency?—A. No, I was on level, and transitman on location.

Q. After you finished being leveller and transitman, what did you do?—A. Went on Residency 33, as Resident Engineer.

Q. Then you commenced classifying on your own account?—A. Yes.

Q. What did you do when you quit that Residency?—A. I came up on Residency 40 as Resident Engineer.

Q. How long did you remain there?—A. On Residency 33 I was from January, 1909, to November, 1910, and on Residency 40 I was from November, 1910, till July, 1912.

Q. And then?—A. Then I took over Mr. Black's division this year.

Q. As Divisional Engineer?—A. Yes.

Q. That is your experience then?—A. Well, I was working on one railroad in Gaspé about six months.

Q. What did you do there?—A. Leveller and transitman on location.

Q. You have given me all your experience now?—A. Practically all, except that when I was engaged with the Quebec Bridge Company in a minor position, I was testing cement, but I had nothing to do with classification.

Q. During all the time that you have been classifying and supervising classification, I suppose you have classified all rock found in ledges as solid rock excavation which required to be removed by blasting?—A. Ledges of more than one cubic yard.

Q. What do you understand the meaning of the words in paragraph 34 of the general specifications "All rock found in masses of more than one cubic yard, which, in the judgment of the engineer, may be best removed by blasting?"—A. I would consider those words "masses of rock" as masses of boulders occurring in quantities of more than one cubic yard.

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Q. Would you not include in that a fragment that was not a boulder, which was more than one cubic yard?—A. Yes.

Q. Try and give me your interpretation of these words "All rock found in masses of more than one cubic yard"?—A. That is boulders, or a single fragment of one cubic yard, measuring one cubic yard or more.

Q. Am I correct in deducing from your answer that it must be rock alone—the mass?—A. No, sir.

Q. Then you have not given me a full definition yet; try again?—A. That masses of rock might occur with cementing material, making up the total mass, measuring a yard or more.

Q. Why do you include the cementing material?—A. Because if it were not cemented, it could be removed by pick or bar.

Q. A mass of boulders of more than a cubic yard?—A. Well, you take several boulders piled one on top of the other—

Q. Could a mass of more than a cubic yard be removed by hand, pick or bar?—A. No, it could not.

Q. At all events, you say that you interpret that to mean a mass of rock of more than one cubic yard, which may be either a fragment or a boulder, and also a mass of rocks cemented together, including the matrix?—A. Yes, exactly.

Q. Where do you find that in the paragraph?—A. Well, we had a special blue print sent up.

Q. I am taking that by itself?—A. Well, it is pretty hard to explain one clause without referring to the clause regarding loose rock.

Q. When you interpreted it, you took into consideration something which was in the following clause?—A. Yes, exactly.

Q. And after adding the two together, and considering the blue print you have spoken of, you came to the conclusion that it included the matrix, or cementing material?—A. Yes, exactly.

Q. Whether you are right or wrong in that, that is the way you interpreted it?—A. That was my idea.

Q. Did you find in your experience that you were called upon to classify rock in masses?—A. Yes, sir.

Q. And what did you classify as solid rock excavation which was rock in masses?—A. I classified as solid rock—

Q. But you classified some cementing material, I inferred, did you not?—A. Yes.

Q. What kind of cementing material did you find?—A. As a rule, it was hard clay, indurated clay, between the boulders.

Q. Then if you came on a mass of material which was made up of indurated clay and rock of one kind or another, did you always put that in as solid rock excavation?—A. No.

Q. What did you put in of that description as solid rock excavation?—A. Well, our usual rule was to have at least above fifty per cent of boulders in the form before we classified it as solid rock.

Q. Boulders or fragments of rock?—A. Yes.

Q. Were you influenced by the size of the fragments or boulders?—A. Yes.

Q. How big would the fragments or boulders necessarily be in the cementing material before you would classify the mass as solid rock excavation?—A. They would have to be over a cubic foot.

Q. What per cent of these cubic foot pieces of rock would you require in that mass?—A. At least half.

Q. So you would not classify a yard mass that only had a cubic foot in it as solid excavation, would you?—A. No, I do not think I would.

Q. You say it would have fifty per cent of rock in it?—A. Yes.

Q. And has that been the rule that you have followed from the beginning to the present time in respect of rock masses?—A. Returned as 100 per cent solid, yes.

Q. Can you tell me of all the rock masses which you have returned as 100 per cent solid, whether there was, as a matter of fact, fifty per cent of rock in it?—A. Well, to the best of my knowledge there was.

Q. What would you think the average of rock in all that you have returned would amount to, if you had to separate them now?—A. All the stuff returned as solid rock.

Q. Massed material as solid rock?—A. You want figures for it?

Q. Would it be about fifty per cent? Of all the massed material you have returned as 100 per cent solid rock excavation, what do you think the percentage of rock in those returns amounted to?—A. At least the fifty per cent.

Q. Would you like to swear there was 55 per cent?—A. No, I could not swear that, because I have to go by my boulder man's measurement.

Q. Taking his measurements to be true?—A. Yes.

Q. We are not including boulders in that over a yard. Leaving out the boulders of over a yard, and, taking into consideration in this calculation or estimate the percentage of rock which would be left in the massed material, would it be 59 per cent?—A. Well, there would be no rock left. This cementing material, as a rule, is clay surrounding the boulders, and the boulders in clay make up the massed material, so if all the boulders were taken out—

Q. I say all the boulders of a yard or over; what would all the rest amount to, in all the returns? Would they amount to 50 per cent?—A. I could not give you an answer till I looked at my figures.

Q. What did you find was the percentage of rock in the massed material that you returned of all kinds, big and little? Would you say there was about 50 per cent?—A. Yes, I would.

Q. Under the heading of massed material, you returned all boulders and fragments of rock of over a yard, each over a yard, did you not?—A. Yes.

Q. And you returned them in such form that you could separate the boulders and fragments of over a yard from the other portion of the massed material?—A. Not on Residency 33; on this one I can.

Q. On Residency 33, how did you do it?—A. I had to keep track of all the boulders myself. I had no boulder measurer, and I had to approximate them.

Q. You professed to make a separate return of the boulders and fragments of over a yard to the best of your ability?—A. Yes.

Q. So that there is a return which, if one takes that return to be correct, will show how many boulders and fragments of rock of over a yard you returned?—A. Exactly.

Q. You mean you cannot state accurately what that amounted to in the other Residency?—A. No. I could give a very good idea, though, if I had the papers.

Q. It is put down there in separate heading, is it not?—A. On that sheet of mine, yes.

Q. Then the rest of the massed material consisted of smaller boulders than a yard, which were more than a cubic foot, and smaller fragments than a yard, which were over a cubic foot, and cementing material; is that right?—A. Yes.

Q. Do you really and truly say that you did not make a practice of returning as solid rock excavation massed material which contained stones which were less than a cubic foot?—A. By massed material, you mean material classified as 100 per cent solid?

Q. Yes?—A. No.

Q. I have this from your evidence; first of all, the boulders and fragments of over a yard, which you returned as 100 per cent solid, are set down separately in your returns; as to those returned when you were on Residency 33, you would

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not like to vouch for their complete accuracy. As to those returned in Residency 40, you profess to have returned them fairly correctly, and they appear separately in your sheets?—A. On my office sheets, not on the returns to Quebec.

Q. And you can make up for me a statement showing them in both Residencies from your sheets?—A. I can. I have one sheet for Residency 40 here. You want a list of the boulders on Residency 33?

Q. Yes, and fragments of rock of over a yard on both Residencies and take them from your records?—A. Yes.

Q. Give me the cubic contents?—A. All the notes were burned at Residency 40.

Q. Write out a statement, to the best of your knowledge, over the whole thing, and state the facts in connection with it?—A. Yes.

Q. And I also deduce from your evidence that you returned as 100 per cent solid rock excavation masses of material made up of stones of one kind or another, each of which was a cubic foot or more in size, of which 50 per cent was cementing material?—A. Yes.

Q. And that you think that, on the whole, it would be fair to say that your massed material, which was not boulders and fragments of more than a cubic yard in size, was about 50 per cent cementing material; is that right?—A. In a great many cases there would be less than 50 per cent.

Q. And in a great many cases perhaps more; it is the average?—A. Well, there could not be more than 50 per cent of cementing material, if you had 50 per cent boulders.

Q. Would you always have 50 per cent boulders? You are only estimating it. What would the cementing material amount to on the average, in your judgment?—A. I think, from my notes on 40 here, that the cementing material would run less than 50 per cent.

Q. Well, about what?—A. I should say between 30 and 40.

Q. Will you tell me where I can find a large quantity, where there would be this large percentage of rocks in the cementing material?—A. The best example is that cut that you said looked like a pavement.

Q. But I only saw two of those in 200 miles?—A. And that is not classified at 100 per cent.

Q. But there is no cementing material in that?—A. Not in this end; there is in the east end.

Q. There is no cementing material in what I pointed out to you that looked like a pavement at all?—A. That was yesterday's work; yes, there was some cementing material in that.

Q. But the part I speak about was near the west end; was it not just after we left the cut and you could see it at this west end?—A. Yes.

Q. And it was a whole mass of boulders lying there?—A. Yes.

Q. Nothing between them?—A. No.

Q. So that you would not call that a cemented mass?—A. No.

Q. I am talking altogether of a cement mass, and I want you to tell me where there is a single place where I can find this large percentage of rock in the cementing material?—A. Yes, I can give you a cut up above.

Q. Where is that?—A. Station 3428 to 3432. I do not claim that that goes all through the cut?—A. The cut is not classified at 100 per cent; there are only patches of it.

Q. But I want what is classified at 100 per cent. Don't you think you are putting it high in saying it would be more than 50 per cent?—A. That cut there?

Q. No, generally?—A. Generally, oh, yes.

Q. Generally would it average more than 50 to 55 per cent of rock in the cementing material?—A. No.

Q. As I recollect it, Timbrell placed it from 50 to 55 per cent; would you agree with that?—A. I think that is a very good average.

Q. When you made this first answer you had in mind this pavement that we were speaking of?—A. Yes; that was an exceptional case.

Q. And am I not correct in saying that that was just a mass of boulders?—A. Yes.

Q. It was not a cemented material case at all, as I recollect it?—A. Not where you pointed out; it is not classified 100 per cent solid.

Q. It was just a blaze of white rock that seemed to be all sticking out, like my two fists, all through the place?—A. Yes. What you have spoken of as massed material being returned to-day, we have been speaking of it as mixed material.

Q. Either word will do, I understand. You want to say, then, that it may appear in your return either as mixed or massed material. The words "massed material" are not always used, but they mean the same thing?—A. I have returned it a mixed material, classified so much solid, so much loose, and so much common.

Q. I am only speaking of the solid. I understand you have returned as 100 per cent solid some of the mixed or massed material?—A. Yes, exactly.

Q. I also understand that you have returned as loose rock, and perhaps as common excavation, quantities of mixed or massed material?—A. Yes.

Q. I do not understand you to testify that all the massed material you returned was solid rock?—A. No.

Q. We will go now to loose rock. What large stones and boulders measuring more than one cubic foot and less than one cubic yard did you return as loose rock? I suppose that you returned all large stones and boulders measuring more than one cubic foot and less than one cubic yard, which were not cemented together, as loose rock?—A. Yes.

Q. And if you found among that mass of boulders a quantity of uncemented material which you thought should be returned, then you returned that as common excavation?—A. No, I cannot say that I did.

Q. What did you do with it?—A. Well, if these boulders were packed together, and there was sand in between them, and you could not plough the material, it was all returned as loose rock.

Q. For instance, if you found in a cut 1,000 yards of such boulders or fragments as you considered should be classified as loose rock, and in the same mass 2,000 yards of sand, you would return the whole thing as loose rock, if it could not be ploughed on account of the boulders?—A. Yes.

Q. Do you think that is right?—A. I think so. We are dealing with material in large quantities, not individually between the boulders.

Q. Have you done that in many cases?—A. A great many cases; that is, the material as a whole, if it could not be ploughed by reason of the boulders obstructing the plough.

Q. Does that amount to a very large quantity of material?—A. Yes, it amounts to considerable.

Q. What justification had you for doing that?—A. Well, I considered I was dealing with the material as a whole.

Q. Then you just returned it the same way as if it cemented the rocks together?—A. Well, if the material, as a whole, could not be ploughed, it is bound to be loose rock.

Q. And you did return it as such?—A. Yes, any material like that, that could not be ploughed.

Q. Don't you, as an engineer, think that the fair interpretation of that clause is that the material must be too hard to plough?—A. You mean the material between the boulders?

Q. Yes?—A. No, it means taking the whole mass.

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Q. Supposing it was lying on a side hill, and the side of the hill was too steep for horses to climb up and down, you would put it all in as loose rock?—
A. No, not in cases like that.

Q. Why would you not? You could not plough it? It is not the obstruction you are considering; it is the material?—A. Yes, but the material is taken as a whole.

Q. Why so? This classification, as I take it, separates the material, and does not take it as a whole?—A. But how are you going to get a plough in between the boulders?

Q. How are you going to get a plough up a hill that you cannot drive horses up?—A. Well, the reasonable interpretation of the specification is that if you have a cut you are supposed to loosen it up by ploughing for shovelling, for loading.

Q. That is your interpretation?—A. For common excavation.

Q. Supposing the sand was so soft that the horses sank to their bellies?—
A. Well, they could not, if there were enough boulders in it.

Q. But if there were no boulders in it, and you found the sand so soft they could not get through it, you would put it in as loose?—A. No, common excavation.

Q. But they could not plough it. Don't you think you are making a rule for yourself?—A. No, I do not.

By Mr. Gutelius:

Q. Supposing you had a sand cut with a bunch of boulders, loose rock size, that amounted to a tenth of the cut in cubic yards, how would you classify it?—
A. Ten per cent distributed all round?

Q. No, in a bunch?—A. I do not think I would classify it as 100 per cent loose rock.

Q. Take a 1,000 yard cut, with 100 yards of boulders in the centre, how would you classify it?—A. I would classify it as ten per cent loose and 90 per cent common.

Q. How would you arrive at it?—A. You said there was 100 yards of loose rock in the centre.

Q. Supposing there was 1,000 yards in the cut and 100 yards boulders, how would you classify?—A. I would determine as to the hardness of it; ten per cent might not be enough to obstruct ploughing.

Q. I do not care whether it obstructs ploughing?—A. If you had free shovelling it would be common excavation.

By the Chairman:

Q. It is the hardness of the stuff, is it not? If you have been classifying that way, you have been classifying wrongly, in your opinion?—A. I do not think I have been classifying wrongly practically. I may misunderstand your question.

By Mr. Gutelius:

Q. What is the difference, whether it is in a bunch or scattered, one pile or forty? (No answer.)

By the Chairman:

Q. Is not the question whether you could shovel it or plough it?—A. Yes.

Q. Then you should not classify it as loose rock, should you?—A. If you can plough it?

Q. If the material itself is not too hard to plough or shovel, you should not classify it as loose rock?—A. No.

Q. When you speak of loose rock in situ, by loose rock do you not mean small fragments, broken off, perhaps, at the side of a precipice, have dropped down

and gathered in a mass, of what you and I would call to-day broken stone?—
A. Well, that is a part of the specification I do not understand. Loose rock comes under loose rock.

Q. That heading is no part of the paragraph at all. Can you not make any meaning out of it?—A. I suppose that is what it means, fragments.

Q. You come along beside a cliff, and you see at the bottom of it a whole lot of broken pieces of real rock which have fallen off the top or along the side; you constantly meet with that?—A. Yes.

Q. If that loose rock that we have been trying to describe was such that it might be removed by hand, pick or bar, would you not classify it as loose rock, irrespective of its size?—A. Yes.

Q. I am not speaking now of small boulders or of coarse gravel, but simply of loose rock, as you and I have defined it in the preceding questions; you understand that?—A. Yes, I understand that.

Q. Would you classify all cemented gravel as loose rock, whether it could be ploughed or not?—A. If it could be ploughed, I would not classify it as loose rock.

Q. Would you classify as loose rock indurated clay that could be ploughed?—
A. No.

Q. Would you classify indurated clay that required only occasional blasting as loose rock?—A. What would be the other means of removal?

Q. Would you classify as loose rock indurated clay that could be ploughed by occasionally blasting it?—A. Oh, that would be loose rock.

Q. For instance, if you had a cut of 500 feet in length, and you found that in one or two places you had to put in a shot?—A. Yes, necessary to put in a shot.

Q. Before you could plough the whole mass, would you put the whole mass as loose rock?—A. No, just the central part that you are speaking of.

Q. Why would you put any of it in as loose rock, because it tells you here, if you find a mass of indurated clay which you can plough after you have put in a shot or two, it shall not be loose rock? That means that, to make it loose, it is so hard that it has all to be blasted. You have not so interpreted it?—A. That it has to be all blasted?

Q. Yes?—A. I do not quite understand it.

Q. Down here, along the line, we found a big hill of sand, and I do not know whether it was you—I think it was—at any rate, one of the engineers told us that the way that was removed was this: the contractor with a shovel made a hole under it, and just put in a charge of black powder, and he shook up the whole place and brought it down, just as people do all over the country in sand pits, would you put that in as loose rock?—A. If the original material could not have been ploughed before shooting, I would.

Q. Although he just put in a charge of black powder, and perhaps brought down 1,000 yards of it, you would put that in as loose rock?—A. I think so, considering the specification and the ploughing clause.

Q. That clause says that you shall include in loose rock all material which cannot be ploughed without the necessity of blasting, does it not?—A. Yes, sir.

Q. It also says, as I take it, that you shall not include that material in which blasting is only occasionally resorted to?—A. Oh, an occasional blasting resorted to—it would be common excavation in that case.

Q. The case I give you is where a man took a shovel and made a long hole with a shovel: it was so soft he could shovel out the hole, and, for his own convenience, and not of necessity, he shoveled in some black powder, to bring it all down; do you think it would be fair to put that in as loose rock?—A. No; if he could shovel the hole he could shovel the cut.

Q. The cut should be common, should it not?—A. I do not know what you are referring to.

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Q. The cut where that process was gone through should be common?—A. Yes, that you can shovel.

Q. Where you could shovel the hole?—A. Sometimes these shots are put in to loosen it.

Q. But where you can shovel the *hole*, you can shovel the *whole*?—A. Yes.

By Mr. Gutelius:

Q. Is it not a fact that, in all your classification, wherever there has been any shooting you call it loose rock?—A. No, there are the cases of frost shooting.

Q. We are not talking of frost shooting?—A. Except frost shooting.

Q. As a fact, the shooting has actually told you whether it was loose rock or not?—A. No, not in my case, I do not think so, that the fact of shooting it—

Q. Can you name a case where a cut was shot that you called it common excavation?—A. No, I do not think so. I usually went by the material, by the appearance and the hardness, and testing it by a pick. I do not think the fact of them shooting altered my judgment.

Q. Was there a cut on any of your Residencies where blasting occurred that was classified as common excavation?—A. No.

Q. You never made common of anything that was shot?—A. No.

Q. So that, so far as that end of the specification was concerned, it did not apply to your work?—A. Yes.

Q. Have you studied this specification very much?—A. Yes, sir, I have gone over it.

Q. Have you thought of the word "masses"; are you a graduate of McGill?—A. Yes.

Q. "All rock found in masses of more than a cubic yard"; you notice that rock is singular? Paragraph 34?—A. Yes, it is singular there.

Q. Do you not have to read that in the plural in order to make masses contain more than one piece?—A. Yes.

Q. So that when you look at it that way, from the grammar of it, there is some question in your mind as to whether those rock masses are not individual pieces?—A. Yes, sir.

Q. What do you understand by cemented material?—A. My idea of cemented material was not exactly a concrete matrix, but a material that would hold the boulders well together.

Q. What would be ideal cemented material?—A. Indurated clay, I should say, and that red iron stone.

Q. Get away from rock cuts entirely; what is the idea of cementing material that you know of in building work; what effect has that cement mortar on the masses, bricks or stones adjoining it?—A. Binds them together.

Q. If they are bound together, when you lift one the other will come with it?—A. Yes.

Q. In the work we have been over to-day, was there any of the rock that you classified as loose rock that one rock would hold to another?—A. By rock, you mean anything over a cubic foot?

Q. Yes; supposing there were two pieces, each of a cubic foot, with the hardest cementing material we saw to-day, could you bring them out without taking them apart? Could you lift one without the other?—A. I do not think I could demonstrate a cut like that.

Q. Do you think you could pick out one rock a cubic foot that would hold another rock as big as your hand?—A. I think I could.

Q. Would that be about the limit?—A. No, there might be a few individual cases, but, generally speaking, I could not find you a place where I could bring out two big rocks and they would hold together for any length of time.

Q. Could you bring out one big piece and another just the size of my hand that would hold on the side while you were carrying it?—A. Yes, I think so.

Q. In the material we saw?—A. You mean that you examined?

Q. Yes?—A. No. There is one cut you did not examine that I think would hold.

Q. Where is that one?—A. That little long cut you spoke of being taken out at rock slopes.

Q. You think they would stick together?—A. Yes.

Q. Are there any more? The one right next to it?—A. The one right next to it is much the same material, only the boulders are smaller.

Q. Any others?—A. Yes, there are a few down on this end of the work; there is one I know of, with the matrix of the red stuff.

Q. That makes three?—A. Yes.

Q. Can you think of any more?—A. I consider that cut we went into this afternoon, in the place where you were speaking of the rock hanging out, that in that cut, in certain spots, that the boulders would hang together.

Q. Only in a few places?—A. Yes, there are only a few places classified 100 per cent.

Q. Generally speaking, 90 per cent of the massed material today, that we went over, would not hold up a rock as big as your hand on another?—A. Ninety per cent of the material we have examined to-day—you mean between common excavation and cuts and everything.

Q. I want to get your idea of the percentage of these mixed material cuts that had cementing material in them that you could say contained a cementing element, or cementing property, sufficient to hold a piece as big as your hand? Is there more than ten per cent of them?—A. No.

Q. Who taught you how to classify?—A. My first experience was on Residency 17.

Q. Who taught you how to classify?—A. Well, he did not exactly teach me, but I had to get it up for myself by measuring rock cuts and stripping, and that kind of thing.

Q. What men talked to you in a way that would instruct you in classification?—A. Mr. Doucet.

Q. Who else?—A. Mr. Ferguson.

Q. And the specification and the blue print covered your information?—

A. Yes, and I was with Mr. Black.

Q. So that your whole experience as a classifier came from the specifications, your superior officers, and those instructions?—A. Yes.

Q. These blue print instructions?—A. Yes.

Q. Did you ever see a letter that went with the Lumsden blue print?—

A. Yes.

Q. What did that say, roughly?—A. I remember the beginning of it, that it went into the details of this, and I think at the end it mentioned that in some cases where it was not practicable for the engineer to measure the stuff, that it could be estimated.

Q. What was said about percentages in item 5 in the letter?—A. It does not state anything about percentages here.

Q. But what was said in the letter?—A. The letter, so far as I understood, said that where it was not practicable for the engineer—

Q. Did it say anything about 50 per cent of rocks in the material?—A. No, it did not.

Q. You never saw Mr. Doucet's letter?—A. No. I have had it on general information from my superiors that that was the usual way.

By the Chairman:

Q. Were you ever directed to raise your classification throughout your experience above what you had put it at?—A. In individual cuts?

Q. Generally?—A. Yes, individually, in a few cases.

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- Q. Had you any general instructions to raise your percentages?—A. None whatever.
- Q. Were you ever instructed to lower your classification?—A. Yes.
- Q. Were you given general instructions to lower what you had been doing?—
- A. No. Mr. Doucet's instructions were to give fair classification.
- Q. I am not speaking of that?—A. But never generally.
- Q. Sometimes you were told you had under-classified and sometimes you were told you had over-classified?—A. Yes.

(N.T.R. INVESTIGATING COMMISSION: EVIDENCE TAKEN AT THE TRANSCONTINENTAL OFFICES, QUEBEC, AUGUST 17th, 1912.)

ALFRED A. PARADIS, sworn:

By the Chairman:

- Q. How old are you?—A. Thirty-nine.
- Q. You are a Civil Engineer?—A. Yes.
- Q. Are you a graduate of any college?—A. No.
- Q. Educated where?—A. National Business College and private tutor, and then I followed the course of the International Correspondence School, of Pennsylvania.
- Q. You are employed by the Transcontinental as what?—A. Resident Engineer.
- Q. For what Residencies?—A. At present 8, 9 and 10.
- Q. And, prior to that, Resident Engineer where?—A. Residence No. 9.
- Q. What district?—A. East of Quebec.
- Q. In whose contract?—A. M. P. and J. T. Davis.
- Q. Your Residencies are in their contracts?—A. Yes.
- Q. Before you became Resident Engineer, what were you employed at?—
- A. Different positions on the Location party of the Transcontinental.
- Q. Before you were engaged on the Transcontinental, had you any other experience as a railway construction engineer?—A. No, sir.
- Q. You commenced classifying as Resident Engineer when?—A. November or December, 1907.
- Q. And you have been at it ever since?—A. Yes.
- Q. From whom did you get your instructions as to how to classify material?—A. Well, from the Division Engineers.
- Q. You had not classified before that on any other road?—A. No.
- Q. You went in the first morning for the purpose of classifying the material to make your estimate?—A. Yes.
- Q. Did anybody go with you the first time?—A. The first estimate, I believe so.
- Q. Don't say "believe": do you recollect?—A. Yes, as far as I know, yes.
- Q. Do you recall now about it: surely you remember the first time you commenced to do this important work?—A. Yes.
- Q. Do you recall that any person went with you?—A. Yes, I can say that.
- Q. Who was it?—A. C. Garnet.
- Q. Garnet was what?—A. Division Engineer.
- Q. Had he been classifying, to your knowledge, material before that on this road?—A. Yes, sir.
- Q. Where is he now?—A. I do not know.
- Q. Not in the employment of the Transcontinental?—A. Not that I know of.
- Q. Where was it you did your first classifying, about what mileage?—A. About mileage 85: approximately 85.6.

Q. Have you your notes?—A. What notes?

Q. Your notes taken in the field, showing that classification?—A. No.

Q. Where are they?—A. I have not them here.

Q. Where are they?—A. In camp.

Q. You should have brought them with you?—A. I have these notes here.
(Producing notes.)

Q. That is a compilation, showing the results?—A. Yes.

Q. Can you recall what it was that you examined there? Can you recall that cut?—A. Yes, I think I can.

Q. Describe it, and see if your memory is any use?—A. That cut up there was boulders, clay and hardpan, a little common excavation in pockets—very little.

Q. Anything else?—A. No, not that I remember of.

Q. This is a ledge rock cutting: there was ledge rock in that cutting?—A. Not in the first cut.

Q. What would it be?—A. 85.2½ approximately; 85.5 is ledge rock.

Q. That is right. Now, 85.4: do you recall that?—A. Yes.

Q. In that you have 1423 mixed material, classified as solid rock, 721 loose rock and 245 common. What was the mixed material in that cutting?—A. It consisted specially of big boulders.

Q. Was it measured boulders?—A. Yes, sir, they were measured boulders, excepting for the first two months—two or three months.

Q. Then did you return it as mixed material?—A. Yes.

Q. Why did you, if it was boulders?—A. On a percentage basis.

Q. But I am asking you why you returned boulders as mixed material?—A. It was boulders mixed with clay and other material.

Q. You did not say that before. I asked you before what that 1423 cubic yards of mixed material consisted of, and you said boulders, did you not?—A. Yes.

Q. Was it boulders?—A. Yes.

Q. And anything else?—A. I do not think it.

Q. Why on earth did you return it as mixed material? Why did you not return it as boulders?—A. Did I not return it as solid rock?

Q. No, you returned it as solid rock mixed. What I want to find is this: when you had boulders pure and simple, did you return them under mixed material? This profile I have before me just puts it in as solid 1423.—A. Yes.

Q. But Mr. Gutelius has taken it down S.R.M., and I think it is so on the blue print, is it not? Can we get the returns from that?—A. Yes. I say "M.M."—mixed material—in cross-sections. There is approximately 2500 yards, or whatever there is, the quantity in this cut. Well, this cut, as a whole, is mixed material, out of which there is 1423 yards of solid rock.

Q. Do you swear there was in that boulders a yard or over?—A. Yes.

Q. 1423 yards?—A. I swear I believe so.

Q. You saw it, and I want your definite statement about it?—A. I cannot give it.

Q. Why?—A. I cannot swear there was 1423 yards there of boulders: I cannot do that, nor any other man.

Q. I want your evidence?—A. I can swear I believe the returns were right.

Q. You know whether they were right or not, don't you?—A. As far as my knowledge goes.

Q. You made the return?—A. Yes.

Q. And the examination?—A. Yes.

Q. And when you said the boulders were there, people were supposed to believe it?—A. Yes.

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- Q. What is the necessity of adding "believe" to it? Can you not say whether it is so or not?—A. I can say I believe, but I cannot say that it is so.
- Q. Why not?—A. Because it might vary: it might be a little bit more or less.
- Q. I ask you, approximately: did you put in a boulder which was half a yard?—A. No, I did not.
- Q. Will you swear that all the boulders that were put in there by you were about a yard at least?—A. Yes, I can swear that—in my judgment.
- Q. You did not knowingly put in boulders that were not, perhaps, 25 or 26 cubic feet?—A. No.
- Q. You can swear that?—A. Yes.
- Q. Then there is no mixed material returned in that cut as solid rock?—A. No.
- Q. Did you measure, count, or estimate your boulders?—A. Yes, sir.
- Q. Which did you do?—A. I measured a few of the boulders myself: a few others were measured by subordinates: the boulders were measured by contractor's foremen.
- Q. By the contractor's foremen?—A. Yes.
- Q. Did you take their word for it?—A. No, not always.
- Q. Did you ever take their word for it?—A. Sometimes I did, and sometimes I did not.
- Q. Did you take their word for the measurement in many cases?—A. Yes, I did.
- Q. Is that part of your duty, to let the contractor do your measuring?—A. No: as far as doing the measuring all the time myself, I could not do it.
- Q. Had you boulder measurers?—A. No, sir, I did not.
- Q. Who had you to assist you?—A. I had rodmen and tapemen.
- Q. How long was your Residency?—A. 11 miles.
- Q. Could you not be over that Residency every day or so?—A. No.
- Q. Why?—A. Because in making the estimates, returns, or plans, we had to do, and things like that, I could not tramp over the work every day.
- Q. But every two or three days?—A. I generally used to go over the work about twice a week.
- Q. Did you return any mixed material at all as solid rock? That is a plain question—A. Yes: I am trying to think if I have or not.
- Q. Did you return mixed material as solid rock in many cases? It is a common practice to return mixed material as solid rock, and I want to know if you did that, because I have here what I thought was a return showing that you did, and I want to find out as a fact whether you did or not. Do you know what mixed material is—A. Yes.
- Q. Tell me what it is?—A. Is it not a rock you can mix—
- Q. Tell me what it is?—A. Is it not rock mixed with other stuff, or any other material, such as clay and boulders? Is that not it?
- Q. I am asking you?—A. That is what I understand it is.
- Q. Did you return any mixed material as solid rock?—A. As a whole, no.
- Q. Then you did not count anything but rock as solid rock?—A. No.
- Q. Then you looked upon solid rock excavation, and so classified the cuts as to exclude anything but solid rock?—A. Yes.
- Q. You did not tell me so when you were out there on the field?—A. I did not, eh?
- Q. No?—A. Well, I think this question of mixed material—you see there is so much solid rock as mixed material.
- Q. You did not so tell me on the field?—A. Probably not.
- Q. Would you probably tell me something that was not true?—A. No, sir, I did not mean to tell you anything which was not true.

Q. Perhaps you do not appreciate it. I am asking you whether or not you excluded all other material than solid rock from your estimates, and you say you did?—A. Do you mean on the whole Residency, or on the cuts we are just talking about?

Q. No, on the Residency?—A. Yes, sir, I did.

Q. Did what?—A. I did return some mixed material.

Q. Then in your answers that you have given me, you thought I was referring to two cuts?—A. Yes.

Q. I was not referring to two cuts, but I was referring generally to your practice in making out your estimates, and in your practice in making up your estimates did you include any material excepting solid rock?—A. Yes.

Q. What did you include?—A. Rock in masses.

Q. That does not, to my mind, convey nothing more than solid rock. I ask you what you returned?—A. If you want to take that rock in masses, solid rock—

Q. I do not want to take anything: I want you to tell me what you returned as solid rock?—A. I have returned solid rock, sir.

Q. I am going to leave you there, if you will not answer the question?—

A. Is that not answering it?

Q. Do you understand the question?—A. Yes, I do now.

Q. Then you have answered it that you returned as solid rock only solid rock?—A. Yes.

Q. You know that is not correct: are you answering these questions at random, without any idea of the consequences of them?—A. No, sir.

Q. I tried several times to make you understand what I meant, and if I am to rely on your evidence, I want you to answer me correctly?—A. That is what I mean.

Q. Excuse me, you do not mean that, because, in the same breath, you have already told me you returned other material as solid rock. What did you return as solid rock excavation?—A. Anything in boulders measuring a yard or more, ledge rock and assembled rock.

Q. What is assembled rock?—A. Assembled rock in masses cemented together.

Q. Are the boulders a yard or over, or the masses?—A. The masses.

Q. Then I am wrong and you are right. You mean that that mass, taken as a whole, is a yard or over?—A. Yes.

Q. How big were the stones in that mass?—A. I do not know, sir: I did not measure everyone of them.

Q. Were they as big as my fist?—A. No, as a rule, they were big boulders.

Q. How big?—A. Well, ranging from three or four feet up to a yard or more.

Q. Did you return in every cut boulders which were a yard or more, separately from the other material?—A. From the other material which was not solid rock, yes, sir.

Q. I do not think you appreciate the English language well enough to see what I mean?—A. I would have no objection if you would sooner question me in French.

Q. Have you anything which shows the quantity of boulders which measured more than a yard in your Residency?—A. Yes, approximately.

Q. Let me see that return which you have before you?—A. Here it is.

Q. I notice in your return of quantities and classification in cuts, borrow-pits and ditches, which you have produced here, you have a heading called "Boulders by measurement"?—A. Yes.

Q. Have you grouped under that heading all the boulders of over a yard?—
A. Yes, sir.

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Q. So that, either at the time, or since, you have made up the yardage, or by estimate of all the boulders of a yard or over in your Residency?—A. Yes.

Q. Have you here returns which cover all your Residencies?—A. Yes, sir.

Q. Will you tell me how much the total yardage of boulders of a yard or over is in your three Residencies?—A. Yes.

Q. What is it?—A. Residency number 10 in cuts, 50,774, Residency number 9 in cuts 37,229, Residency number 9 again in catchwater ditches, river and road diversion, 17,156, Residency number 8 in cuts 22,399; Residency number 8 again, in catchwater ditches, 10,957.

Q. Now, you have also, under your return of quantities and classification in cuts, borrow pits and ditches, a heading called "Assembled rock"?—A. Yes.

Q. That is an addition to the boulders by measurement, is it not?—A. Yes.

Q. Will you tell me the amount of assembled rock in each of your Residencies? That can be got by adding the quantities under those headings in this document?—A. Yes.

Q. The boulders by measurement are not included in the assembled rock?—A. No, sir.

Q. And by measurement you mean all the boulders of a yard or over?—

A. Yes, and some assembled rock in the boulders, too.

Q. Some assembled rock in the boulders?—A. Yes.

Q. Then boulders by measurement includes something else?—A. Yes.

Q. It may include boulders of less than a yard?—A. If they are in masses, yes.

Q. So that is not reliable as showing only the boulders of a yard or over?—

A. No, sir.

Q. Why did you put it under that heading? Why did you not put it under the Assembled Rock heading, because it is misleading? It is assembled rock, is it not?—A. Yes.

Q. Part of these which are classified as boulders by measurement are not boulders by measurement?—A. No, sir, for this simple reason; that in measuring boulders in the cut you may find a place where there is ten or fifteen feet square, which are boulders in masses cemented together. These boulders were taken by measurement as boulders.

Q. As a mass of boulders?—A. Yes.

Q. But they were under a yard in a great many cases?—A. Yes, when massed together.

Q. So that the return is not illuminating in any way: it is not to be relied upon as showing the boulders of a yard?—A. No, sir, I cannot say that.

Q. What proportion of what you have classified as boulders by measurement was boulders of a smaller size in masses?—A. I did not separate them in every case: I do not know.

Q. Can you give me a rough idea?—A. In cases there might be ten to twenty-five per cent.

Q. Would it average 25 per cent over all your Residencies?—A. No, I hardly think so.

Q. What would it average?—A. Approximately 20 per cent.

Q. What did you make a column of assembled rock for?—A. When it was a distinct line, to say when there was a distinct place that we could show exactly the situation, the place.

Q. Under assembled rock you have not put in boulders of a yard or over?—

A. No, sir.

Q. Assembled rock is made up of smaller boulders and other material?—

A. Yes.

Q. I am speaking of what appears under the heading "Assembled Rock": that is made of smaller boulders and other material?—A. No, in the assembled rock there might be big boulders as well.

Q. How could that be?—A. Because in assembled rock you will find small boulders and big boulders as well: as a rule they are not assorted.

Q. But you have just told me that where you found big boulders in masses you put them in the boulder measurement?—A. I told you in places where they were as practically an individual boulder, but where there was a distinct line, say right across the cut, or something similar, then they were calculated by showing the difference by the line—calculation.

Q. Explain by a sketch, so that I will understand it, because I really cannot understand it at all?—(Witness makes sketch and explains.)

Q. You have shown me a sketch here which shows a cross-section of a cut?—A. Yes.

Q. And in that cross-section you show a quantity of small stones, and two or three large stones: I am not speaking of their size now: and some material between them?—A. Yes.

Q. What size are those stones in that sketch?—A. They might vary from six inches to five feet in diameter, or ten feet in diameter.

Q. Do you mean to tell me that you would take a great big boulder like that and not measure it—five or ten feet in diameter?—A. No, sir, if it assembled, I did not.

Q. We will go through that cut which you show me the cross-section of. The contractor first shoots the cut, does he not?—A. Yes.

Q. With powder or with dynamite?—A. Yes.

Q. After he shoots it, what appearance would such a cut as you have pictured here have?—A. Until you come to the face again where it is not shot, it will be all broken to pieces.

Q. The big boulders would not be broken up in that case?—A. Not in every case, no.

Q. Would they in any case?—A. Yes, some of them might be broken up.

Q. Would the big boulders of eight or ten yards be broken up?—A. Some of the times it might, and some not.

Q. Although it had not been drilled?—A. No, sir.

Q. You mean it would not?—A. That it would not be.

Q. After that was done, when the mass was all loosened up, what would the contractor proceed to do?—A. Put it in cars: if there were any boulders not broken up, they would finish them, break them in pieces, so that they could handle them.

Q. He would first take out the material that was small enough to be moved?—A. No, he would proceed by digging everything out as he went along.

Q. Would he stop to break up the big boulders before he took the other material out?—A. If he came to a big boulder, yes, he would, as a rule.

Q. Could you see the big boulders, then?—A. The ones that are broken up, yes.

Q. I have seen when they were taking out cuts that they would take out all the loose material, and then bulldoze the big boulder?—A. I do not know what that means.

Q. That is putting a shot on top?—A. Yes, they have done that in cases.

Q. How did you know those big boulders were in there?—A. I think that sketch gives you a pretty good impression of my idea.

Q. No. I can see the boulders before the shot has gone in, and I can count them as they appear on the face, and there would be no necessity to return them as mixed material—the big boulders?—A. No.

Q. You can see them and count them and measure them, according to the sketch?—A. Yes.

Q. Why did you not put the big boulders in separately?—A. Because they were in masses.

Q. But they were big boulders?—A. Yes.

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Q. Why did you not put them in separately?—A. Because they were in masses, what we call assembled rock.

Q. You did that, as a matter of fact, but you could have returned them separately, could you not?—A. Yes, I could have returned them in any way at all, I suppose; that is the way I did do it.

Q. And then, to make an end of it, that column of boulders by measurement is not accurate: it shows something else than boulders by measurement?—A. Yes, it shows boulders in masses.

Q. Now, is there anything else that you have put in, in this detailed column, that includes something else than it says it includes?—A. No, sir, not that I know of.

Q. Then you are right under that "Boulders by measurement and in masses?"—A. I should say yes.

Q. When you saw a quantity of material in masses which you proposed to classify as solid rock, how did you make up your mind whether it was to be classified as solid rock, or as loose rock excavation?—A. When the boulders were in masses, the masses were over a cubic yard, and they had to be removed by blasting.

Q. Say that wall in front of us is a cross-section of a cut, and there is one big boulder on that side and one big boulder over here, and there is one down in the centre, three big boulders, and it is all, you think, cemented together?—

A. Yes.

Q. Would that go as solid rock?—A. Yes.

Q. Although the proportion of boulders was only perhaps 15 per cent.?

A. No, sir.

Q. Why did you say yes sir?—A. If the percentage is only 15 per cent, I hardly think it is solid rock.

Q. Why does the per cent. make the thing solid rock?—A. Because if you take the boulders and put them too far apart, I hardly think the material between unless it is a special case, would be called solid rock.

Q. Why not?—A. Because there would not be enough rock in it.

Q. Then the same material in one case would be solid rock and in another case would be loose rock?—A. Between, yes.

Q. Then the material you put in as solid rock, if it is all by itself, is not solid rock?—A. If there is no rock amongst it, yes.

Q. Am I right in saying that 50 per cent. of your assembled rock, taken over all your Residencies, would be the cementing material?—A. Over Residency 9, yes.

Q. Over Residency 10?—A. I do not know.

Q. Over Residency 8?—A. I do not know.

Q. How did you not know as to the classification in the last two Residencies?—A. Because I was not the engineer in charge when the classification was made.

Q. Had you any cases of overbreak in your Residency where you did the classifying?—A. No, sir; I had outside slopes, but did not have overbreak.

Q. Do you remember mileage 85.5?—A. Yes.

Q. I have a note here that you told me at Merchant Point, or that somebody told me, that there were 500 yards of avoidable overbreak in that cut?—A. Yes, sir, I think there is approximately.

Q. That is overbreak?—A. Which was not allowed.

Q. But you said you had no overbreak in your place at all; what do you mean by that?—A. What I meant by having no overbreak is in that particular place that you mentioned, there was approximately 500 yards which was not counted, being outside the regular roadbed, which, in my place, was wasted.

Q. Was it overbreak?—A. Overbreak is rock which was broken up more than necessary.

Q. That is avoidable overbreak?—A. Yes.

Q. Well, there was overbreak in your Residency?—A. Yes, approximately 500 yards.

Q. I asked you if there was any overbreak—I mean avoidable overbreak—in your Residency?—A. Yes, if I said that I take it back: I made a mistake.

Q. Do you remember 86.1?—A. Yes.

Q. The common was wasted?—A. Yes.

Q. And you did not pay for the waste; is that right?—A. Yes.

Q. It was wasted because it was wet?—A. Yes.

Q. In 93.3 the material is wasted at the east end, is it not?—A. I believe so.

Q. It was required in the fill, because part of that fill was train haul?—A. Well, I am not very sure of that; I am not positive.

Q. Take a look at it? (Witness refers to book).—A. Yes, as far as I remember, there was some material wasted there.

Q. Did you allow it?—A. I was not the Resident Engineer.

Q. Do you know whether it was allowed or not?—A. I think it was.

Q. Where is the mileage of which you were Resident Engineer?—A. I was always Resident Engineer from mile 79.2 to mile 90, and have been for perhaps two years, and a year and a half from mile 68 to 103.

Q. Take 79; were you at 79?—A. 79.2.

Q. Was any wasted at 79?—A. I think so.

Q. Was it allowed?—A. No, sir, it was allowed, but it is going to be covered by train haul filling, and deducted from the contractors. I have orders to do that, sir.

Q. 82; do you remember we walked over that?—A. Yes.

Q. My note is that we walked over it, and could see no evidence to satisfy us that there was half of the amount of solid rock and boulders which is allowed. It is a very low cut, and we walked through the ditches and could find no evidence to satisfy us that there was the quantity of boulders allowed. Fotheringham saw this and made a complaint. Do you remember what his complaint was?—A. As far as I know, Mr. Fotheringham never made any complaints.

Q. I do not know where I got that information, but I have it here in my note. Don't you think you have overclassified that cut?—A. No.

Q. You could not show us in the ditch the boulders, could you?—A. No, sir.

Q. Apparently wherever there was a big boulder it was not taken out?—A. It was not taken out in every case.

Q. It was not taken out in dozens of cases?—A. Perhaps so.

Q. So apparently they did not take out the big boulders out of the ditches?—A. In some cases they evidently did not.

Q. What did they leave them there for?—A. Because they did not take them away.

Q. It looks to me as if they had left all the big boulders, and taken out all the little boulders they could move?—A. I do not think it is the case. I think in many cases they did take them out, and in a few cases they left them in.

Q. Why did you allow them to leave them in?—A. Well, in cases they should be taken out, and in other cases they do not hurt.

Q. They block the ditch?—A. Yes, in places,

Q. Why did you not make them take them out? Do you remember about that ditch? Is it not a matter of fact that they did not take the big boulders out of the ditch?—A. In places they did not.

Q. But in all places?—A. I think they have in places.

Q. Was there any evidence of one boulder along that ditch having been broken up?—A. I think so, sir.

Q. Did you point that out to us?—A. I think I did.

Q. To whom? To Major Leonard and me?—A. Yes.

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- Q. Did we not say to you half a dozen times "Can you not show us where there were some taken out?"—A. You did, sir.
- Q. Did Major Leonard not say he could not see any?—A. I guess he did.
- Q. Do you swear you showed us broken boulders in that ditch?—A. I swear I believe I did down below, just at the beginning of the cut.
- Q. In the ditch?—A. In the ditch.
- Q. Have you the return of that cut there?—A. Yes, here it is.
- Q. This is a very low cut, is it not?—A. For about 1,000 feet, yes.
- Q. And a boulder which was a yard in this ditch would come to the top, would it not?—A. In the ditches, yes.
- Q. And in most places they would come to the top in the cut?—A. About 1,000 feet, and at 1,200 in the cut they would not.
- Q. About how many feet are there in that cut?—A. About 2,400.
- Q. For about half the distance they would come to the top?—A. Yes.
- Q. And you only showed 34 in the whole cut?—A. Over the cross-section lines, yes.
- Q. Surface boulders?—A. Yes, above cross-section lines.
- Q. Do you say there were 5,170 yards that were measured boulders in that cut?—A. And assembled rock, yes.
- Q. You have not any assembled rock in that cut at all?—A. No, it is this item.
- Q. How much assembled rock was there in that cut?—A. I have not it separately.
- Q. What do you think there was? What proportion?—A. Approximately 25 per cent.
- Q. May I say that in all your boulder measurement there is 25 per cent. of assembled rock?—A. In the averages of the whole Residency I hardly think it would go over 20 per cent.
- Q. You apparently have only one place in your whole Residency where there is any assembled rock?—A. Distinct, yes.
- Q. Where is that?—A. At mile 83.1.
- Q. You pointed out the material that you called cementing material at 83.6, did you not?—A. Yes, sir.
- Q. And that was simply a hard clay, was it not?—A. No, sir, I cannot say that.
- Q. What do you swear it was now, because it is there and we can have it looked at? What do you say it was, if it was anything more than hard clay?—A. It was big rocks—
- Q. No, I am referring to the cementing material. You pointed out to me the cementing material at 83.6?—A. I pointed out to you some material, yes.
- Q. Which you said was cementing material, did you not?—A. No, sir, you asked me to find some, and I looked in one special place, and in that special place I hardly think the material was solid rock.
- Q. You told me it was, and now you say you do not think it was. I have this down, and I did not write this down without your telling me; "The cementing material was simply hard clay; Mr. Paradis showed it to me?"—A. Perhaps in the special place where we dug.
- Q. You showed me that, and said that was the cementing material?—A. I do not remember telling you it was cemented material.
- Q. What did you tell me it was? I said cementing material, not cemented material; you know what I mean?—A. I know what you mean now; I did not at first.
- Q. The material that held the boulders together?—A. Yes.
- Q. You pointed it out to me, did you not?—A. Yes.
- Q. That was only clay?—A. Hard pan.

- Q. Clay?—A. Clay and boulders.
- Q. Not boulders: I am asking only about the cementing material. That material was only clay, was it not, of one kind or another?—A. Yes, sir.
- Q. What other kind of material did you have in your Residency which you called cementing material, which cemented boulders together?—A. Clay and small boulders.
- Q. No, not the boulders; what was the stuff that held the boulders together?—A. You might call it clay, if you like.
- Q. You say it was clay, do you?—A. Yes.
- Q. All through your Residency?—A. Yes.
- Q. At 84.2 my note is that there is a foot of common along here and you have not allowed any?—A. Oh, yes, we have.
- Q. Is there any common there?—A. Yes, 450 yards.
- Q. How much would there be if there was a foot over it all?—A. I cannot tell you.
- Q. Can you not tell me?—A. If I took a pencil and worked it out, I could. (Witness makes calculation.) Approximately 1065 yards.
- Q. You have 450 yards?—A. Yes, because I think there was not a foot over the whole thing.
- Q. Along the cuts it showed a foot over it all at the least?—A. No, sir, I do not think it.
- Q. Look at the cross-section, what does it show?—A. It shows two quantities.
- Q. Of what?—A. Of material.
- Q. What does it show in common?—A. 450 yards.
- Q. Where is it shown on the section?—A. It is not figured independently on the section.
- Q. Why not?—A. Because it is not.
- Q. Why is it not?—A. Because it was not.
- Q. Well, why was it not? It was your duty to do it. Because it is not is no reason: is it because you guessed it: is that not the truth?—A. No.
- Q. You did not figure it?—A. Yes.
- Q. Where?—A. As we went along in this cut, supposing it was four or five hundred feet where there was no excavation—
- Q. Do not suppose at all: I want the facts?—A. I cannot tell you the exact fact on this cross-section.
- Q. Can you tell me what there was in loose on that section?—A. No: according to the sections independently.
- Q. Can you tell me what there was of solid?—A. Independently, no.
- Q. What is the good of the cross-sections?—A. The cross-sections show the quantity as a whole.
- Q. Only that?—A. Yes.
- Q. There is no cross-section to show anything more than the contents of the section?—A. No.
- Q. Without dividing it in any way at all?—A. No.
- Q. Why is that?—A. Because, if I remember, I did not think it necessary to make it on this section: it was for the office cross-sections.
- Q. Show me the other sections?—A. I have no other sections—I mean the sections in the office: I did not think it was necessary to show the differences for here.
- Q. You mean to say you made a cross-section in your own offices showing the different materials, but you only returned to this office the outline of the section: is that right?—A. Yes, that is right.
- Q. That is what you mean?—A. Yes, sir, that is what I mean.

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Q. Then the last one shows the outline of the section in one place, and next above it where it rises larger in another place, and next above it larger, and so on, till you get the whole section?—A. Yes, sir.

Q. This cross-section is of no use to any person in ascertaining the quantities, is it?—A. Independently?

Q. To ascertain the quantities independently, it is not worth the snap of your finger?—A. No, sir.

Q. Is that the way they all are?—A.—Yes.

Q. Did you never return anything at all that gave any more information than this in cross-sections?—A. No, sir.

Q. Has not your Division Engineer gone over the cross-sections?—A. Oh, yes, he has seen all these things himself.

Q. He has seen your office cross-sections?—A. Yes, he has seen all that, I think.

Q. When did he see them?—A. I do not know.

Q. Then you do not know whether he has or not?—A. Yes, I think he has.

Q. Why do you think so?—A. Because I think it is so.

Q. That is not an answer?—A. Because I think he has seen them.

Q. What makes you think he has seen them?—A. I cannot say positively he has seen every one of them.

Q. Have you ever seen him looking at any of your cross-sections in your office?—A. Yes, I think he has.

Q. You saw him looking at them?—A. Yes, as far as I remember, he has.

Q. Who is the present Division Engineer?—A. Mr. Dick.

Q. Has he looked over your cross-sections?—A. As far as I remember, he has.

Q. You remember at one place where you and I took a shovel. You did some digging, and while you were digging Mr. Gutelius came over and took the shovel in his hand and took out some material and showed it to you?—A. Yes.

Q. Where was that?—A. As far as I can remember, it was at mile 100.5.

Q. Was it not 97?—A. It may have been, but as far as I remember, I think it was 100.5.

Q. What were we doing there?—A. We were trying to find some common excavation, I think.

Q. What did you think that material was that we dug up there? What did you say it was?—A. As far as I remember, I said I thought it was loose rock.

Q. Did not Mr. Gutelius take a shovel full and say to you "You know that is not loose rock" and you admitted it was not? You ought to remember: it was only last week?—A. Well, I said—

Q. Do not qualify everything; just say what you did?—A. I said "If this stuff is separate from the boulders, it is common excavation."

Q. But yet you thought that when that was with boulders it made it solid rock?—A. No, loose rock.

Q. Did you not first say that the earth was loose rock?—A. No, sir.

Q. You did not?—A. I did not say that the earth was loose rock.

Q. You did not?—A. No; if I did, I made a mistake.

Q. You did not make a mistake about it, at all. You showed it to me and you said it was loose rock, and Mr. Gutelius said "Do you mean to say it is loose rock?" and took a shovel full, and you said it was not?—A. Well, my meaning was that if the earth was mixed in with boulders it was loose rock.

Q. It was not with boulders at all: it was up on the bank and it was a post hole that we were digging out?—A. Yes, I think there were boulders.

By Mr. Gutelius:

Q. What reply did you make to me when I said "Is not that shovel full common excavation"?—A. I think I said yes. I think I said it was common excavation.

Q. You only think?—A. In the shovel full you gave me.

Q. Why did you not say right off "I said that was common excavation," and not convey the idea that I was trying to get you to say something you did not actually say on the cut?—A. I am trying to say exactly what I did say.

Q. Why don't you answer yes?—A. Yea, all right.

Q. And you previously told me it was loose rock?—A. Before Mr. Gutelius came up, yes, I did.

Q. Do you, as a matter of fact, put in as loose rock material of that description in your estimates?—A. Yes, as the material stands there.

(N. T. R. INVESTIGATING COMMISSION: EVIDENCE TAKEN AT QUEBEC, AUG. 19, 1912, AT THE OFFICES OF THE N. T. R.)

N. R. BEAUDETTE, SWORN:

Q. What is your position on the Transcontinental?—A. Resident Engineer.

Q. In Residency 16?—A. Yes.

Q. What mileage?—A. 1 to 12; zero to 12.

Q. On which side of the river?—A. South side of the river.

Q. How long have you been Resident on that division?—A. Five years: since 1907: this will be the sixth year.

Q. Ever since the work commenced?—A. Yes.

Q. So that you have made all the classification in your Residency?—A. Yes, sir; of course with the approval of the Divisional Engineer.

Q. What experience had you before you went into this railway?—A. I was on the location of the work for about two or three years before that, I think, and I was on land survey before for two years.

Q. Where were you educated?—A. In a college at Rigaud, between Montreal and Ottawa.

Q. This is your first experience on the Transcontinental?—A. Yes.

Q. You have gained all your knowledge of classification while in the service of the Commission?—A. Yes. I was on construction on the north shore on another residency.

Q. You have gained all your experience while you were in the employ of the Commission?—A. Yes.

Q. The first place where you have classification on your Residency is just before you cross the Chaudiere, is it not?—A. Yea.

Q. That is a cut?—A. Yes.

Q. A rock cut?—A. Rock and other material.

Q. The first is a big cut. After you cross the Chaudiere River, coming away from the Bridge?—A. Yes.

Q. You classified that as 29,114 ledge, 29,570 of massed material and 216,603 of loose, and 47,833 common: is that your classification?—A. Yes. But you remember when you came to the cut the classification I gave you of that assembled rock, and that the assembled rock, although shown and marked as assembled rock, mostly would be ledge rock, if you remember my explanations about it, so there would not be any massed rock or assembled rock in that material.

Q. Yes, I remember you pointed that out. Where is your book?—A. I have my cross-sections here.

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Q. I want to see your book?—A. I did not know I was supposed to bring the book. These cross-sections have been plotted every month.

Q. I want to see the notes you made as you went along about the work?—A. The only notes were the elevations on top of each of these demarcations of classification.

Q. I would like to see what you wrote in that book?—A. I have not the book here.

Q. Where is it?—A. It is at the Chaudiere.

Q. Could you have it for to-morrow morning?—A. Yes.

Q. I want you to produce whatever books, whether you think they are of any value or not, that you kept, either on the work or in your office, respecting that cut; you understand?—A. Yes. You want me to produce any books in which there are notes in reference to this cut?

Q. Yes, no matter where they were made?—A. All right.

By Mr. Gutelius:

Q. We are now looking at cross-section at station 104. What does the top line represent?—A. Surface of the ground.

Q. What does the line about four feet further down represent?—A. The top of the loose rock or bottom of common excavation.

Q. So that the material between those two lines is common excavation?—A. Exactly.

Q. The distance from the line showing the bottom of the common excavation and the sub grade is practically ten feet?—A. Yes.

Q. What is the material between the sub grade?—A. It is loose rock.

Q. What are these pencil lines which I see in place of the red line slopes?—A. It shows the way the cut has been actually taken out.

Q. Was the cut taken out according to these dotted lines upon your instructions?—A. From the District Office, I think.

Q. So far as the contractor is concerned, he received definite instructions to remove this extra material?—A. Yes.

Q. Was that extra material wasted?—A. No, sir.

Q. Where was it used?—A. To make the fill—the previous fill.

Q. To make the fill just west of the cutting?—A. Yes.

Q. In classifying the extra material that was taken from the north side, where an extra width of 15 feet was taken, did the contractor receive classification for the material below the four foot line?—A. There was no classification at all in that extra width.

Q. What was the extra width classified as?—A. There was no classification at all there.

Q. How was it paid for?—A. Train haul material.

Q. At what rate was train haul material?—A. 45 cents.

Q. What rate was common excavation?—A. 27.

Q. What was loose rock?—A. 65.

Q. Did train haul material from this cut carry any overhaul with it?—A. No, sir, none at all.

Q. Refer now to the cross-section taken at station 124?—A. You tested this material.

Q. On this section I notice two dotted lines in ink, one located about eight feet four above sub grade, which is drawn practically level across the cutting; what does that line represent?—A. Well, it represented the top of my ledge rock here.

Q. What is the dotted line that we see at 13 feet 3 above sub grade?—A. This would be a line representing the fair average of what would be really the top of the ledge rock.

Q. The material between these two lines you classified in your return as assembled rock?—A. Yes.

Q. And now you say that the upper line would be a fair average for the top of the ledge, had there been no assembled rock classification?—A. Exactly.

Q. The material from 12.3 elevation to 31.2 was classified as loose rock?—A. Yes.

Q. If there was no such term as assembled rock, your classification would be the same as you have now put in?—A. Yes.

By the Chairman:

Q. The correctness of your return, then, of solid rock depends upon whether or not you have correctly measured the ledge in that cut?—A. Yes.

Q. Show me the cross-section of the cutting at 7.8 near the farm crossing, station 415, I believe?—A. Here it is.

Q. By reference to the cross-section at station 415, which we have before us, I note the line of demarcation between the common excavation and the loose rock to be 1.2?—A. Yes.

Q. You remember when we visited this cut we dug into the side of it?—A. Yes.

Q. Near the road crossing?—A. Yes.

Q. My memorandum is that there was 3.1 feet of common at the crossing. We opened the north side and found that the loan extended one foot only from the surface of the ground to clay?—A. Yes.

Q. What I want to question you about now is the degree of hardness of that clay: could that clay, in your opinion, have been ploughed, broken up by a plough, hauled by six horses?—A. By what I know of this clay, which is about the same as in the next cut also, it could hardly be ploughed that way, unless it was all shot before.

Q. Was this clay shot?—A. No, but I mean in order to be ploughed by a team of six horses, or whatever it is, it would need to be shot first, broken up by a shot here and there, and it was tried.

Q. You tried to plough it?—A. Not in this cut. This was taken out by a steam shovel, but the second one was tried, and this is what they had to do all the time.

By the Chairman:

Q. They had to shoot it occasionally?—A. All the time: they had to shoot all the time before ploughing it.

By Mr. Gutelius:

Q. Where did you spend your earlier life before you went to college?—A. Well, I was in college nearly all my early life.

Q. Were any of your summers spent on the farm?—A. Very little. My college was in the country.

Q. Where you would see ploughing?—A. Yes.

Q. I would like to go into the mechanics of ploughing with you for a minute, and compare the point of a plough with one of the teeth of a steam shovel. You are familiar with the teeth of a shovel?—A. Yes.

Q. And you are familiar with plough points?—A. Not as much. I have not used them myself.

Q. Never saw a plough point?—A. I have seen them, yes.

Q. Suppose I said to you that it was ten times as hard to force one tooth of a steam shovel into certain material as it would be to force the point of a plough into that same material, what does your judgment as an engineer tell you?—A.

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It is not exactly the same thing; one is pushed into it, while the other is drawn into it; it has some of the edge over it that cuts all the time, while the teeth of a steam shovel just dig in and afterwards lift.

Q. Are you familiar with the term "work" in mechanics—resistance overcome?—A. More or less.

Q. What I am driving at is the mechanical work forcing one big four by four steam shovel point, four inches in width, into a material, as compared with forcing the point of a plough, probably an inch and a quarter, or may be less, with a less taper, into that same material? What ratio do you say would be fair as to the amount of work—that is, resistance overcome—in the movement of these two tools through a given material?—A. I should judge it would be harder on the steam shovel than it would in the case of the plough. It is not exactly the same work: it would not be the same work at all.

Q. I am trying to get the comparative scale reading in the two cases?—A. It would be harder on the steam shovel.

Q. How many teeth are in the steam shovel?—A. Four, I think.

Q. So that it is fair for us to say at least that each tooth would be equal to one plough?—A. Oh, yes, easily.

Q. Now, did the lift of the steam shovel appear to you to be as great as the 24 horses would pull, when taking that material?—A. I have not looked at that. I did not examine it in that light: I believe so, the way the steam shovel acted there, compared to the other work done.

Q. What steam pressure do they use in the steam shovel?—A. I could hardly tell you.

Q. Did you ever study much mechanical engineering?—A. Not very much.

Q. It would be useless, then, to go into the steam engine or the steam shovel with you?—A. Probably.

Q. Does it not strike you that twenty-four horses pulling on a wire cable over a sheave at the top of a cut would easily pull up that shovel, assuming that that sheave above is properly rigged, and we just hook that on the steam shovel to haul it, to put the bucket up—just to give the bucket a yank?—A. Drag the bucket through the ground?

Q. Yes, drag it right through and make a shovel full? It is only power I am at?—A. Yes, I understand. They would do it very easily, I think.

Q. Then it is fair for me to deduce from that, that one team of six horses would pull a single plough through this material?—A. Yes, this argument would so indicate, but it is not exactly the same point of view for me. Of course, I did not catch it exactly at the beginning. Now, I see your point, but to me the teeth of the steam shovel and the point of the plough is not exactly the same thing. It would not stand the same resistance in being drawn through or pushed into the ground. In another case, you see the tooth of a steam shovel would lift or break some solid rock sometimes, while I do not think any plough would do it: so that it would not be the same thing at all, and I never tried to compare and find out how horses would do it on the line.

Q. Do you feel like backing off from those statements that we have used in leading up to this?—A. Yes. Well, I said at first it was not, in my opinion, the same case. It is hard to compare the two.

Q. Would a steam shovel ever lift rock, one tooth in the rock, that 24 horses would not lift?—A. Well, as a rule, we have always worked four—

Q. I said 24 horses?—A. It is not the same comparison.

Q. One tooth does all the work when they cut in a rock, probably?—A. Sometimes.

Q. And they have the whole power of the steam shovel on that one tooth?—A. Yes.

Q. Supposing we put the 24 horses on one tooth or one plough?—A. Yes, it would. The one tooth of the steam shovel would lift some rock.

Q. And so would 24 horses lift it?—A. Yes.

Q. In your own engineering judgment you think that the power of a steam shovel is not any greater than 24 horses could pull?—A. Oh, yes.

By the Chairman:

Q. It looks bigger?—A. And I believe it is bigger.

By Mr. Gutelius:

Q. That the steam shovel is bigger?—A. No, but I think that the horse power would be more than that.

Q. But you do not want to divide the steam shovel up and put it back into the earth and plough it?—A. No.

Q. Tell me about the place you tried ploughing in that character of clay?—How many horses were on the team?—A. Well, they had four horses. Sometimes, when it was well broken, when they could succeed in breaking it well, they only put in two horses, and, of course, being well broken, they succeeded in working it; but sometimes they could succeed just as well without blasting; as a rule, they would have to put in four horses, and, as a rule, the four horses would not work.

Q. It is cheaper to use powder than to put on four horses?—A. Yes, because they could not work it; besides, owing to the width of the cut, and all that, they could never take it out.

Q. Supposing we take that clay, and, just for a test, we put six horses on the plough to tear one furrow through, and we take that one furrow through, breaking it up, and the contractor said—and you agreed with him—that ploughing won't pay: "we will have to shoot that cut"—is that about the way?—A. No, no, it was not on account of whether it was paying or not; they had to do it.

Q. There are clays on your district that six horses would break up with a plough, that had better be removed by blasting, are there?—A. Well, besides clay, there is also boulders in that clay.

Q. I am thinking of that clear, clean, sedimentary clay that we encountered at that crossing?—A. Well, as I said that day, it was not exactly the condition of the clay as it was at the time it was taken out; the clay was far harder than it was then.

Q. As a test, could six horses have dragged a plough through it?—A. Not successfully.

Q. By successfully, you mean get the plough through?—A. Yes, get the plough through and remove some of the material.

Q. Not the removal of the material, simply the plough test. Could the plough have been dragged through and broken up the material with six horses?—A. It might have taken some material here and there, at odd places.

Q. Do you think you could have gotten a fairly decent furrow some places half-way through the cut?—A. I do not think so.

Q. One furrow?—A. You see they would not have taken very much material out of it some places, and they would have to come up on top of it, or the thing would break; that part of it was shot very often; the plough would break.

Q. You were on the work?—A. Yes.

Q. And saw all this thing going on?—A. Yes.

Q. You are under oath now?—A. Yes.

Q. And we must assume you are giving us the facts as you think—A. Yes, from my knowledge and experience.

Q. And that is your idea of that clay?—A. Yes, because, as I say, there were also boulders in it.

By the Chairman:

Q. I want you to describe to me what sort of plough they used?—A. Well, it is a regular grading plough.

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Q. I want you to describe it to me: was it a plough you would plough a field with?—A. No, there is a great difference between the two.

Q. What is the difference?—A. I do not know how to describe it, although, if I would see it, I could tell you exactly which was which. It is not the same. It is iron. The fore part of it is not the same as in the other case.

Q. It is just a sharp piece coming down?—A. Yes.

Q. Do you know what a share is?—A. No.

Q. It is the thing that turns the furrow over?—A.—I believe in the ordinary field plough they have something round like this, while the other one is straighter.

Q. That is the round plough that turns the furrow all the time?—A. Yes.

Q. That is the share?—A. Yes.

Q. They have no share on this?—A. No.

Q. And it was simply a plough with a piece of steel coming down that entered the ground and broke it up?—A. Yes.

Q. There were how many horses attached to it?—A. They tried it different times with four horses.

Q. They never tried it with six?—A. No.

Q. Then they had not a plough that would stand the pressure that six horses would put on it, without breaking?—A. No, with four horses it broke several times.

Q. So the plough was no good?—A. Well, the plough was good, because they always had repairs made and had new ones.

Q. Four horses would break the plough before it would go through the material?—A. Yes.

Q. What would six do to it?—Six horses, if the plough were strong enough, might quite easily draw the plough through the material, if the plough would not break, but if you have a plough that will break, you cannot plough any material?—A. No.

Q. This was a grading plough fitted for four horses and not for six?—A. I do not know if it was fit for four or six.

Q. I mean designed for four horses; could they have hitched six horses to that plough?—A. I do not know what you mean.

Q. Did you ever see six horses hitched to a plough?—A. Yes.

Q. How are they; put on tandem?—A. No, I have not seen six horses with that kind of plough.

Q. Did the horses go four abreast? Or two and two?—A. They were two and two.

Q. So that two horses were ahead of the plough and two horses were hitched on in front?—A. Yes.

Q. What did they do? How did the front horses, the leaders, exert their force on the plough?—A. I do not remember exactly how they were hitched up; this was five years ago.

Q. You say they were put tandem?—A. Yes, they were put tandem.

Q. And they may have been hitched up, so that really it was only a two-horse pull?—A. No, they had chains.

Q. Was there a chain through from the plough to the leaders?—A. I do not remember how they were fixed.

Q. Why were those horses brought on the work at all with that plough? They brought them there, did they not, because they thought they could plough the ground?—A. Yes.

Q. They already had the experience of the big cut?—A. No, they never worked in the big cut.

Q. But the contractor had already taken out part of the big cut?—A. No; the work was done in that other part by sub-contractors, and just about the time they were starting the big cut—

Q. This work was done by a sub-contractor who did not take out the big cut?
—A. No, he did not.

Q. And the sub-contractor went on the ground, and did he try to plough the surface?—A. Yes, they started to plough on the surface.

Q. And did he plough the surface?—A. Yes, that was easy to do; part of it was two feet—

Q. That country is a farming country?—A. Yes.

Q. And is farmed all the way along your Residence?—A. Nearly, yes.

Q. It is an old settled country?—A. Yes.

Q. And this right-of-way runs through farms which have been cultivated for years?—A. Yes.

Q. And the surface, therefore, has probably been ploughed many times?—A. Yes.

Q. So he had no trouble to plough the surface?—A. No.

Q. How deep would his plough go?—A. Oh, six or seven inches; eight inches at the most.

Q. How many lifts did he take off of six or seven inches by ploughing?—A. After they first took out six or seven inches, he had to shoe before he could remove the material.

Q. You do not want us to believe you cannot plough that ground out there after you get down six or seven inches in the soil?—A. But it is not only clay there.

Q. I am speaking of the ground. You do not mean us to understand that you cannot plough that ground after you get down six or seven inches?—A. I do not think so.

Q. You do not think you could plough it?—A. No; that is, the way it was there you could not do it.

Q. It was ploughed on the top?—A. All the stones and boulders were removed from the top.

Q. Is the ground too hard, after you get down six or seven inches, to plough it?—A. Yes.

Q. You know that at station 124 there is a road crossing?—A. Yes.

Q. And you saw them making excavation for abutments for a new bridge?—A. Yes.

Q. That excavation was down about ten feet on each side of the railway? And it had been taken out last fall?—A. Yes.

Q. And the contractors or workmen are now taking out material which had fallen into the cut last fall?—A. Exactly.

Q. Did you see these holes taken out when it was originally done?—A. Yes.

Q. How did they do it?—A. Mostly pick and shovel.

Q. It was a pick and shovel proposition from beginning to end?—A. Pretty nearly.

Q. They did not use any powder on it?—A. Not all the time.

Q. They did not use any that you saw?—A. I do not recollect it.

Q. I am asking you for your knowledge? So far as you know they did not use any powder on it?—A. No, sir, not that I know of.

Q. And it went down ten feet into the ground?—A. Yes.

Q. And the ground in that is the same as the ground you are speaking of?—A. No, sir, it is not.

Q. The ground in that is the same as the ground in the big cut?—A. Yes.

Q. So that they could take out with pick and shovel the ground in the big cut for ten feet down?—A. Yes.

Q. The place you are speaking of where the plough test was is the cut where?
—A. Oh, it is past the place where you stopped the other day.

Q. I am asking the mileage?—Here it is on the profile. It is ten feet deep in places.

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Q. Take it all through, it is not more than four or five feet deep?—A. About six feet deep.

Q. We stopped and went into that, did we not?—A. No.

Q. Did we not stop there?—A. No.

Q. You returned this solid rock as part massed rock and part ledge in the big cut?—A. Yes.

Q. And how long were they taking out the big cut called the Chaudiere cut?—A. They started in 1907 and finished last year.

Q. Did you return it all the time as part ledge and part massed material? Did your estimates show, during all that time, that it was part ledge and part massed material?—A. No, sir.

Q. When did you stop returning it as massed material?—A. It was always returned as solid rock.

Q. You did put it in as massed material?—A. Not in my estimate, only in my cross-sections. It was just for my own information.

Q. Does this show the Chaudiere cut?—A. Yes, sir.

Q. In the Chaudiere cut you show massed material or assembled rock 20,570 yards?—A. Yes.

Q. Where did you get that figure?—A. From my cross-sections here.

Q. You seemed to think it was massed material when you made up this return in April, 1912, did you not?—A. Yes.

Q. What made you change your mind about it?—A. I just drew those two lines—

Q. Here you have put this down here this spring as a correct return for this Commission?—A. Yes.

Q. And you have called it there massed material?—A. I was always under that impression. I have worked it on my sheets that way.

Q. You say that in your cross-section you show it as massed material, and you say that in your estimates you do not show it as massed material. Now, in your books did you put it down as massed material?—A. No. Everything is worked on those forms on these sections.

Q. You have reduced it to an exact number of yards. Where did you get the 20,570 yards, when you put it down in this return on the 25th April, 1912?—A. Well, that was between the two lines.

Q. Do you mean to say you made up this return for us without looking at anything except the cross-sections?—A. Yes.

Q. What good is it?—A. I just told you at the beginning that I made a mistake in doing it that way, because it should not be.

Q. As a matter of fact, your returns would not agree exactly with your cross-sections for all sorts of material, would they? For example, if you had surface boulders, you would have to go into some other record?—A. Oh, yes.

Q. Well, then, you would look into those records?—A. Yes.

Q. In those records you show the quantities that you returned from time to time?—A. Yes.

Q. Why did you not look into these records to see what quantities you had when you made up this return?—A. I do not understand very well your question.

Q. You sat down in your office, or some place, to make out this statement for this commission, did you not?—A. Yes.

Q. What did you have before you when you made out that statement?—A. Just my cross section sheets and my estimates.

Q. Your estimates brought to your mind the fact that you had no massed material in this section?—A. Yes.

Q. Why did you put down massed material in this return?—A. Because when I made out that statement I also checked my sheets, in order to find if my

total return was correct, and so forth, and the total of my estimates was made out of these two amounts, ledge rock as shown on my sheet as being ledge rock, and also as shown on my sheet as being assembled rock.

Q. You mean your cross-section sheets?—A. Yes.

Q. You know that was incorrect?—A. Well, at the time I did not pay special attention to it, because, as it is shown on my section, the upper line represents the fair average, and that is why, on account of that—

Q. When you sat down and made out your cross-section, you made out the cross-section in the office, did you not?—A. Yes.

Q. What did you have to make out your cross-section from? What information did you have in writing?—A. Well, I had levels taken by my instrument man, and also special notes I had.

Q. Your instrument man thought there was assembled rock in there?—A. No, he just took the elevations of the cut as it was at the time, and from his notes I figured exactly how much there was of ledge rock.

Q. Why did you place that line on that sheet showing that there was four feet of massed material in that cut?—A. From my own notes and observations.

Q. Your own notes and observations led you to the conclusion that there was 20,000 yards of massed material?—A. I would like to refer back to the explanation I have given.

Q. Is that right?—A. There is no assembled rock in the cut: it could not lead me to believe there was massed material.

Q. Why did you carry that all through those sheets?—A. As I said before, it was all the way the cut was taken out.

Q. You know what ledge rock is?—A. Yes.

Q. You saw that for a mile or two miles there was not any assembled rock, but you show it in this sheet of yours in 13 places?—A. I said I made a mistake in returning that.

Q. That was your first experience?—A. It was not only done by me: it was also done by the Divisional Engineer.

Q. You put down on your cross-section a great quantity of assembled rock?—A. Yes.

Q. You had a superior that went over it?—A. Yes.

Q. Did he examine the cross-sections?—A. Yes.

Q. Did he look at the cut?—A. Yes.

Q. What did he say about that assembled rock?—A. That is just the thing.

Q. What did he say, if anything, about the correctness of the cross-section?—A. Well, I was supposed to take the levels—

Q. I did not ask what you were supposed to do?—A. I was instructed—

Q. Tell me what your superior said when he saw that you had made a cross-section showing assembled rock?—A. He approved of it, because it was done under his advice.

Q. Did he look at the open cut?—A. Yes, sir.

Q. Did he say there was in that open cut some massed material?—A. No, sir.

Q. Did you look at the open cut?—A. Yes.

Q. Did you see massed material?—A. Yes.

Q. I mean before you made your cross-section?—A. No.

Q. How did you find out the depth of the alleged rock in there?—A. By levels.

Q. You cannot take levels of ledge rock that is buried before it is uncovered, can you?—A. Well, no, we take them after it is uncovered.

Q. After it is uncovered you know how much material there is about the ledge rock?—A. Yes.

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- Q. You are sure of it?—A. Yes.
- Q. No mistake about that?—A. No.
- Q. You knew at that time where your sub grade came?—A. Yes.
- Q. And you knew that your sub grade came at a given number of feet above the top?—A. Yes.
- Q. And you had taken all the top off down to solid rock?—A. Yes.
- Q. You knew how many feet of solid rock there was under you, if you went to sub grade?—A. Yes.
- Q. Your superior officer was with you?—A. No, he was not with me every day when I took those lines, or when my men did.
- Q. He was on the line when the solid rock was uncovered?—A. Yes.
- Q. How could you and he make any mistake about the depth of the solid rock when you had the cut open, and knew how much material was above?—A. When we first struck the top, it was a flat surface from one end to the other: so when we first struck it, we took it by points, probably a foot or two, probably more: the steam shovel would make a rock cut, and she would take part of those tops off, and, in order afterwards to be able to work the steam drills, they had to take out another two or three feet of a cut, in order to get to the flat surface of solid rock which they could drill with a steam drill, and, in order to find out exactly how it was standing, the steam shovel would come and make the rock cut, taking out the juttings, and we took the level on top of that. There were points of two or three feet that were taken out at the time, and I took that line, showing the top of my assembled rock, and after a while the steam shovel would come back, and after she would shoot two or three feet, she was able to take that out to a depth of two or three feet sometimes, and make another rock cut, all of top of solid rock, no pockets or juttings: it would be flat surface, and that flat surface is shown by my second line, and my top line shows the average of what could be the ledge rock.
- Q. You took out the clay first?—A. Yes.
- Q. Did they take the clay clean through the cut at first?—A. Well, half the cut.
- Q. And did you make this section showing the solid rock after that took the clay out?—A. Yes.
- Q. How could you make any mistake about it?—A. Well, there is no mistake.
- Q. How could you get that idea in your head if all the ledge rock was taken out? How could you get it into your head there was any assembled rock?—A. The first elevation was taken a foot or so, or perhaps three feet.
- Q. But you did not make your cross-section until the dirt was all off the rock?—A. When we took that elevation part of the rock was uncovered, and there was some clay or boulders, or loose rock, mixed together, lying below that line, but we wanted to find out exactly where that line should be located, and in the meantime we called it assembled rock, because it was juttings of rock and pockets of loose rock.
- Q. You have no boulders returned in this at all?—A. No.
- Q. Were there any boulders in that cut?—A. Yes, but I never could get any measurements of them.
- Q. Why?—A. I had no rock inspector.
- Q. Could you not estimate them? What did you return them as?—A. I did not return them.
- Q. They did not get any money for them?—A. No.
- Q. Any person who goes through and takes the trouble can measure that ledge?—A. Yes.
- Q. Because it goes across the cut?—A. Yes.

Q. Has that cut ever been remeasured?—A. Well, I may say it was measured two or three times nearly every spring. It was measured every month, as the steam shovel would go down deeper.

Q. I understand that in your whole division there is no massed material?—

A. No, sir.

Q. Also that in your Residency you have put in as solid rock only ledge?—

A. Ledge and boulders.

Q. There is no boulder measurement here?—A. It is in the other cuts. I had no line for boulder measurement in that.

Q. You have nothing in as solid that is not either ledge or boulders?—A. No, sir.

Q. You have no mixed material?—A. Yes, I have some mixed material.

Q. Where is that?—A. In the far cut.

By Mr. Gutelius:

Q. Mileage 9?—A. Yes.

Q. 2,564 yards of mixed material?—A. Yes. You remember the place in the cut where we stopped. You remember there was 12 feet of rock.

By the Chairman:

Q. Where is this mixed material?—A. Mileage 9.

Q. What depth of common excavation have you given generally over your whole Residency?—A. Well, in some places I have as much as six or seven feet, and other places three feet and other places none.

Q. At 6.5 those are boulders, are they not? "This solid rock is all boulders?"—A. Yes.

Q. Where is that shown on your sheet?—A. I have no column for boulders, and they are all shown together on the same line.

Q. Is it shown in assembled rock?—A. Yes.

Q. In that column what is not boulders?—A. This would be ledge rock and this boulders: 913 is boulders, 110 is boulders, 951, 596, 20, 117, and 124 all boulders. The 2564 is boulders and mixed material. 215, 14, and 411 are boulders.

Q. There is a very small quantity of boulders in your Residency?—A. Very small.

Q. Would there be much trouble to measure that quantity in two or three years?—A. Well, that was all taken out in the one year.

Q. Did you measure none of them?—A. Yes, it was measured by a rock inspector.

Q. They were all measured?—A. Except in that last cut there, which was finished only last year and that is returned as mixed material.

Q. What is that?—A. 2564.

Q. Were the boulders measured?—A. Yes.

Q. Did they go a yard or over?—A. Yes, in my judgment, they were all a yard, or very nearly a yard: according to the notes I have, they are all over a yard.

Q. Were they honestly a yard or over?—A. I think they were all a yard or over.

Q. Were they approximately a yard or over?—A. Yes.

Q. You have not given in any boulders in that measurement that are loose rock size?—A. No, sir, not in those measurements.

Q. You say there was 500 yards of mixed material?—A. Yes.

Q. Is this mixed material made up of clay and loose rock size boulders?—A. No, over loose rock size, by the yard.

Q. If they were over loose rock size, why did you put them in as mixed

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material?—A. At that place the boulders were not measured: so we had all the percentage of them.

Q. Why did you now allow them as boulders?—A. This rock and mixed material, of this amount of 2564 there is about 500 yards of boulders and mixed material.

Q. How much mixed material without the boulders is there in there?—A. Of this 500 yards there would be about eight per cent of the mixed material.

Q. Why did you not put it in as boulders then?—A. Well, they were boulders, but I cannot say they are boulder measurement. All the others I have measurements for.

Q. I cannot understand why a man who thought there was only this small percentage of mixed material should not put them in as boulders, because there seems to have been very little material in between them?—A. They are all in as boulders.

Q. No.—A. Those 2,500 yards are all boulders, including the 500 yards I am speaking of.

Q. According to you, practically there is, in your Residency, put in as solid rock nothing but boulders of approximately a yard or over, and ledge rock?—A. Yes.

(N.T.R. INVESTIGATING COMMISSION: EVIDENCE TAKEN AT TRANS-CONTINENTAL OFFICES, QUEBEC, AUG. 19th, 1912.)

STANLEY HAWKINS, sworn:

Q. How old are you?—A. Twenty-seven.

Q. Where were you educated?—A. Shrewsbury, England.

Q. What experience in engineering work did you have before you came on this work?—A. Three years pupil at Litchfield, in England, and one year with a London firm, Griffiths Bros., general contractors.

Q. Your first railway experience was out here?—A. Steam railway, yes.

Q. What position did you first occupy in the employment of the Trans-continental?—A. Topographer.

Q. And you grew from topographer to what?—A. To Transit man, and from Transitman to Resident Engineer.

Q. You were Resident Engineer on Residency 7 during its construction?—A. Well, not entirely. I was on Residency 5 for two years, and most of the grading, excepting the yard, was done when I came there.

Q. Most of the grading, excepting the yard, was done on Residency 7 before you took charge of it?—A. Yes.

Q. Can you tell me what the 242 yards of solid rock consisted of in the cut at mileage 102.5?—A. I think of measured boulders. I simply find those cuts on notes that I took over when I took the Residency.

Q. So that from your actual experience you do not know?—A. No. That work had been graded a year when I came up there.

Q. What cuts in this list are you familiar with—the work which has been performed?—A. 105.

Q. Monk yard?—A. Yes, and 107.5. I think that is all the cuts that were taken out while I was there. These others were all finished.

Q. 105 refers to the grading at Monk yard?—A. Yes.

Q. It extended from mile 104 to mile 106?—A. Yes, almost to mile 106: about mile 105.7.

Q. The quantities I find on your profile are for the east end of this excavation?—A. Solid rock ledge 5596, solid rock 27,544, loose rock 30,500.

Q. And at the west end?—A. At the west end solid rock 48,284, loose rock 45,966.

Q. The item of 27,544 yards shown as solid rock consisted of what kind of material?—A. Boulders by measurement.

Q. Boulders about a cubic yard and over?—A. Yes.

Q. And contained no other material?—A. Oh, no, solid rock only.—How do you mean contained no other material?

Q. This measurement contained nothing but boulders?—A. No.

Q. The solid rock at the west end of the cut, which consisted of 48,284 yards was all measured boulders about a yard or over?—A. Yes.

Q. And the solid rock was ledge rock?—A. Yes.

Q. In the cutting at 107.5 we have solid rock—A. 2,525, loose rock 13,200.

Q. What did that solid rock consist of?—A. Boulder measurement.

Q. I have a memorandum here that there should have been a quantity of common excavation in that cutting. Were there not some pockets of common excavation?—A. Well, there was a good deal of earth on the top, but the boulders protrude all over. I do not think you could take any place extending 50 feet where you would not find a boulder protruding above the ground, and, of course, many more within a foot of the ground.

Q. How was that cutting removed?—A. With a steam shovel.

Q. In removing a cut of that character with a steam shovel, would it not be fair and proper to classify loose material, even in pockets, as common excavation?—A. Well, I think depending on the size of the pocket. This cut at the most two feet below the ground would be classified at the least loose rock, apart from the boulders projecting above.

Q. In the top two feet there was some common excavation, if the boulders could, by some means, have been removed?—A. Oh, undoubtedly.

Q. Would it not have been fair to show some common excavation in that?—A. No, sir, I do not think it would.

Q. You told me it was removed by steam shovel, so that the boulders and the loose material would fill the shovel just in the same way; the shovel would be filled easier as the quantity of loose material increased?—A. Yes.

Q. Still you think it would not be fair to give him any common for that?—A. No, I do not think we could have done it.

Q. Would not the boulders that you refer to roll into the shovel?—A. No, not more than a foot below the surface, because the material down there was pretty stiff hardpan.

Q. If the stiff hardpan extended to the surface, your argument would appear to be right, but this top two feet—A. I did not say two feet. I say a maximum of two feet.

Q. Well, the top foot to two feet, where it has been loosened up each year by the frost, makes easier work?—A. Yes, undoubtedly.

Q. Don't you think that if you had been classifying by the book closely that you would have been compelled to put some common in that?—A. Well, I certainly would not have classified, even the top of that, as straight common—I mean if the whole cut consisted of that—because in many parts it did consist of straight loose rock.

Q. If the whole cutting had consisted of the same material as the top one foot, how would you have classified it?—A. Without any boulders.

Q. The same as it is now, supposing it extended down to sub grade?—A. Well, I would have classified it with a large percentage of common.

Q. Then to be consistent you should classify a small percentage of common in that one foot?—A. Well, I think in usual practice it would not be done.

Q. But, to how close to the line, you would have to give some common?—A. Yes. I think if that top foot had been sheered off from the rest of the cut that it would have been classed as common excavation, to a great extent.

Q. So that in classifying that top as all loose rock, you were liberal to the contractor?—A. Yes, I am willing to admit that, although I do not think liberal beyond ordinary—

Q. That memorandum shows 500 to 100 yards as my guess, as I went through there, in a cut of 13,000 yards: one per cent or less. Would that have been unfair?—A. No, I think not.

Q. Would you not like, before you finally decide not to put some common in there, to look over the ground again?—A. No, sir I would not, and I do not think you would be of the same opinion as you are if you were to note that material back from the face, where it has not been under the effect of the weather for two years.

Q. That statement does not coincide with what you have just told me?—A. No. I was willing to admit there was a certain amount of common excavation on the top, but I would not like to say exactly.

Q. When I offer you an opportunity to look it over and correct it if you find necessary, you say no?—A. My feeling is that if I were classifying this cut again on this specification, either on a Government, or any other road, that I would turn it in the same method.

Q. In the face of what you told me a moment ago?—A. Yes, I am willing to admit there is common excavation in pockets, and a very thin layer of common excavation extending over the whole surface.

Q. And still you do not give any?—A. Well, I think it would be measuring very very closely, a good deal closer than the general practice.

Q. I conceived a very good idea of you as an engineer on the work, and I do not want to spoil this by passing judgment in advance. I am going to ask you, in view of what you have said, and what I think is consistent, to go over that cut again with Mr. Goodwin?—A. Yes, and I am quite willing to go over it with any man who has the experience Mr. Goodwin has.

Q. And, between you, come to some conclusion in connection with it. Remember when you are doing that, that you have committed yourself to a principle: that is all?—A. Exactly.

By the Chairman:

Q. In the Monk yard you are now excavating, on the north side of the yard the water tank is situated?—A. Yes.

Q. I went along that ditch?—A. Yes.

Q. Were you with me?—A. Yes.

Q. Did we see any boulders of a yard in size up there in that ditch?—A. No.

Q. Have you classified any of that yet?—A. In that ditch, yes.

Q. What have you classified it as? Can you tell me your classification for that ditch?—A. I have not the figures here.

Q. Is there any solid in it?—A. Yes.

Q. How do you make any solid?—A. Boulders.

Q. There were none a yard?—A. No, we did not see any, but we saw remnants of boulders that had been shot.

Q. I think we saw two?—A. I think we saw more than that.

Q. Did you show me more than two?—A. Well, it is a question I would not like to answer.

Q. I want you to answer it?—A. I think I did.

Q. How many shots were put into boulders in that ditch?—A. That I could not say.

Q. How long ago is it since it was done?—A. Within the last six weeks.

Q. Have you a record of the powder used in that ditch?—A. No.

Q. Will you on your oath say there was more than two boulders that were blasted in that ditch?—A. Oh, I am quite sure of that.

Q. I suppose if they were blasted there are remnants of them there now?—A. Well, the remainder is embedded in the side of the ditch, but not the rest of the rock, because that has been crushed.

Q. The ditch is open?—A. Yes.

Q. And a boulder must necessarily extend in that ditch more than across it, because it is only a foot and a half or two feet?—A. Yes.

Q. So there must be some remnant of boulders there now?—A. Yes.

Q. How much of that ditch did you put in as solid?—A. 15 per cent.

Q. And you arrived at it how?—A. By the classification of the part of the cut adjoining it.

Q. Did you arrive at it by classifying anything more than boulders as solid?—A. No, on boulders alone.

Q. It would have been a very easy matter to have made an accurate classification of the ditch, would it not, so far as solid was concerned?—A. It would if one had a man on the ditch all the time.

Q. You were there all the time?—A. I was on the Residency.

Q. You were there, or there was somebody representing you all the time that ditch was taken out?—A. Not all the time. I was down there three or four times a week.

Q. Did you ask them how many boulders they shot?—A. No.

Q. Why did you not? Was it not their duty?—A. Who could I ask? The foreman?

Q. Yes.—A. The foreman's answers are usually not of much consequence.

Q. They are not reliable?—A. No.

Q. Was there anybody else there?—A. Yes, an inspector, the only man I had representing me at that time was the inspector on the buildings.

Q. If you had asked that foreman how many boulders of approximately a yard or more were in that ditch, and he told you, you could check them up by looking over the remnants of them?—A. Yes, pretty close.

Q. So that you could have had no trouble in finding out, as a matter of fact, how many boulders there were in that ditch; is that not correct?—A. Yes.

Q. Then we will go to the yard. How long has the face of the north side, just next to the ditch, been in its present condition?—A. Since last October.

Q. Has no excavation been going on up to that face since last October?—A. No.

Q. Are there any boulders to be seen there approximately a yard in that face?—A. Yes, there are several exceeding a yard.

Q. How long is the face?—A. About 1100 feet.

Q. Is not all the stone that was taken out there piled in a place there?—A. Out of the yard, oh, no.

Q. Out of that portion of the yard, is there not a large pile of stone there?—A. There is a pile of stone taken out of excavation; that is the foundation excavation in the bottom of the yard.

Q. I am not speaking of the foundation excavation; is there not a pile of stones there taken out of what was the excavation to make the level of the yard?—A. No.

Q. What became of that stone?—A. In the dumps.

Q. It is put in the dumps?—A. Yes.

Q. Is the face a fair example of what the yard was?—A. At that point, yes, I think it is; not of the whole yard, but taking it all along, with the adjoining classification, it is.

Q. What percentage is there there of boulders that are over a yard?—A. You mean on the face?

Q. Yes?—A. Not very many on the face; a great many have been removed.

Q. How much on the face?—A. Do you mean how many boulders?

Q. What percentage is there on the face of boulders of upwards of a yard?—A. I should say not ten per cent.

Q. How much per cent did you classify solid in that yard?—A. Ranging from 15 up to 45.

Q. Where did you find boulders that would justify you in putting it 45 per cent?—A. In various parts.

Q. Where, for example?—A. Chiefly on the south side, and from the south side to the north side.

Q. Did you classify any massed material there?—A. No.

Q. All boulders?—A. Yes.

Q. Do you remember my talking to you along the yard about the massed material?—A. Yes.

Q. Now, at 105, the Monk yard, I was talking to you, was I not, about a ditch which was back of the station?—A. Yes.

Q. Did you not tell me, when we were talking of this ditch, that you had classified as solid rock part of the material of this ditch because it was cemented material?—A. No.

Q. You did not tell me that?—A. No.

Q. You swear that?—A. I swear it, yes.

Q. Did you not show me the bank where there was a stratum of stones, all loose rock size or smaller, which you had classified as assembled rock?—A. No, sir.

Q. Or which you had classified as solid rock?—A. No.

Q. You did not say that to me?—A. No.

Q. Then I imagined it when I wrote it down?—A. I certainly did not say that. I explained to you that that ditch did not come in the same classification as the yard. There were two classifications.

Q. Did I not ask you, pointing to some stones which were there, about the classification, and did you not show me the bank, where there was a stratum of stones of loose rock size which you had classified as assembled rock?—A. No.

Q. You did not do that?—A. No. We did not have a yard of assembled rock in that yard.

Q. Well, as solid rock?—A. No, sir.

Q. Then you will swear that you did not put stones which were loose rock size in as solid rock?—A. Certainly.

Q. Did you not say that where the stones in assembled rock were small, about as large as one's head in size, that you would not classify it all as assembled rock, but would give a greater proportion of assembled rock under the Lumsden instructions?—A. Yes, sir, I said that.

Q. At 106.2—A. I think you are getting into a cut I did not classify.

By Mr. Gutelius:

Q. In the excavation for the foundation of the engine house at Monk, what classification are you giving there?—A. It is a straight price.

Q. What is that price?—A. 90 cents.

Q. How is the 90 arrived at?—A. Bidding on the estimation. It is a second contract and tender.

Q. Is it not a fact that you, by your experience in a portion of that excavation, concluded that it would be fair and right for all of it, to classify it as 20 per cent solid on account of the boulders, and 80 per cent loose?—A. Throughout the yard?

Q. Yes?—A. No, sir.

Q. Did you change your classification according to sections that you took across the yards? Were there variations in the classification in various portions of the yard, as you have gone along?—A. As shown on the sections, no. We show in any note we took at the time of any boulder measurements, the positions and by the color; we have the date and color on the plan of the yard. Our progress was shown on the plan rather than on the profile.

Q. So that you are perfectly frank when you tell us that you believe that 20 per cent of the solid rock shown in the Monk yard was represented by boulders about a yard or over?—A. Yes. The boulders were so thick in some parts that we discussed seriously putting in massed rock, but it was only in sections, and we decided to take it by measurement.

By the Chairman:

Q. You did not classify any massed material?—A. Not on that particular cut.

Q. Did you anywhere on the place?—A. I have, but not on this Residency.

Q. On what Residency did you do it?—A. Residency 5; that is further east than we went.

Q. Tell us what you did there in classification? You classified ledge rock as solid?—A. Yes.

Q. And you classified some mixed material as solid?—A. Yes.

Q. Was there a large quantity of it?—A. Yes, a fairly considerable amount.

Q. Did you classify any boulders there?—A. You mean on boulder measurement?

Q. Yes?—A. Yes.

Q. Did you classify under mixed material boulders of a yard and upwards?—

A. In the massed material?

Q. Yes?—A. No, sometimes less than a yard.

Q. I am not asking you about less. I am asking you about more. Were there any big boulders in the massed material?—A. Yes, but we did not measure them individually.

Q. Did you classify them separately from the massed material?—A. Oh, no, with the massed material.

Q. Where is that?—A. Mile 136.

Q. You have two cuts here at mile 135.3. How much have you in there of massed material?—A. A line, roughly approximating 7 to 10 feet—oh, well, more than that: to 15 feet at the lower part of the cut.

Q. How is it shown on the cross-sections?—A. By lines.

Q. It is shown as massed material?—A. Yes.

Q. Is the cut all taken out now?—A. Yes, it has been taken out three years.

Q. How much massed material is there in there? These are very big cuts?

A. Yes.

By Mr. Gutelius:

Q. About 25 per cent?—A. Something like that.

Q. 20 to 25 per cent?—A. Yes, about that: it is two years ago: I should think about that—not of the whole cut, but of the total rock returned about 25 per cent.

Q. Describe the material?—A. Well, it consisted of boulders from 15 cubic feet up to 30 or 40 cubic feet, up to 2½ yards: from half a yard to 2½ yards. Some

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of them have less than a half a yard, and a pretty stiff binding material, not exactly blue clay, but a sort of indurated clay. It is rather difficult to describe it.

Q. It is clay?—A. Oh, yes, it is clay. Woods agreed at the time he came there—

Q. Never mind Woods; it is clay?—A. No, I do not like to say it is clay; it is material that is clay when it is wet, but friable when it is dry.

Q. When it is dry, what is it?—A. It is pretty friable.

Q. Sand?—A. Yes.

Q. It is a mixture of sand and clay?—A. Yes.

Q. What proportion of sand in it?—A. Very small proportion: just enough to make it friable when it dries out: about 20 per cent.

Q. What proportion of this clay is there in that mass?—A. Not exceeding 20 per cent.

Q. What proportion of big boulders is there in that?—A. Boulders over a yard—possibly not more than ten per cent—not more than ten per cent of boulders exceeding a yard.

Q. Of approximately a yard?—A. I say the boulders were very uniform in that country, remarkably so.

Q. Boulders that would go 24 feet?—A. Say 20 feet.

Q. We will say 24: what would the percentage be?—A. 20.

Q. And 20 feet, what would there be?—A. 40 or 45.

Q. You say the percentage of boulders of 20 feet and upwards would be about 40 per cent?—A. Of the mass, yes.

Q. And there would be 60 per cent of smaller boulders and cementing material?—A. Exactly. I think that is as fairly as I can put it. There would be about 40 per cent of various sizes down to 20, and below 20 feet, and including binding material, probably 60 per cent.

By Mr. Gutelius:

Q. That is 60 per cent of the mass, if separated, would be that sandy clay like material, and boulders of loose rock sizes?—A. Yes.

By the Chairman:

Q. Or less?—A. Or less, running down even to gravel. Here is a photograph showing the cut I am talking about. (Exhibit A.)

By Mr. Gutelius:

Q. Is that description which you have given us for the material less than solid rock size fair for the material which you have classified as massed material or assembled rock? Does that give you a good idea of your assembled rock when the boulders are taken out?—A. You mean of the percentage remaining?

Q. Yes?—A. Yes, I think that is fair. Of course, I am speaking from memory.

By the Chairman:

Q. This material was taken out in Residency 5 in the winter time?—A. The work was begun in November and finished in the following August.

Q. It was taken out in the winter time?—A. A lot of it.

Q. Did you allow anything for frost?—A. No.

Q. Do you know whether any frost was allowed as solid rock?—A. Yes, not on this district.

Q. On work you have been on?—A. Yes.

Q. On the Transcontinental?—A. Yes.

- Q. Where was it?—A. Up on District E, north of Nipigon.
- Q. Can you locate it?—A. The exact Residency, yes, it was Residency 9.
- Q. How long were you there?—A. One year.
- Q. Did they allow all the frosted material?—A. I am just speaking of material I turned in myself. We laid one off-take to a muskeg.
- Q. Off-take?—A. The off-take to a muskeg, and we removed the mass about two feet, and had to chop the rest out with hatchets down to grade, and we showed that by putting a rod in it by actual measurement as loose rock.
- Q. Not as solid rock?—A. No.
- Q. So you were up there for a year, were you?—A. Yes.
- Q. This material in Residency 5 which you have been telling us about, and the quantity that was taken out in the winter, and you took photographs of it,—that was in February 1909?—A. Yes.
- Q. And it shows the men working there with a pick, I think, does it not?—A. Yes, with picks and bars.
- Q. Was that stuff shot on District B?—A. Yes, that was shot with black powder.
- Q. The boulders appear there in the cut: apparently the men took out the materials surrounding the boulders, and then, after they got the material out, they attended to the boulders?—A. Yes: they are removing the boulders with a stone boat and the rest of the material with a car.
- Q. What size are the boulders shown in the photograph at station 6782? Are they loose rock or solid rock size?—A. These two boulders in the foreground are solid rock size.
- Q. Then all the boulders through that cut were treated after they had taken out the excavation?—A. Yes, they were loosened up.
- Q. So that they could be counted?—A. Oh, yes.
- Q. Did you count them?—A. No, sir.
- Q. Why not?—A. How could I possibly do it? I had about 25 places running that winter. I could not keep a man in every place.
- Q. You do not have to do that. On a Government job a boy can do a man's work. A boulder measurer can attend to five miles, can he not?—A. He could not get all the boulders.
- Q. He could attend to five miles and count the boulders?—A. No, not getting all the boulders.
- Q. How many miles could he attend to?—A. And get the boulders?
- Q. If you employ a man as boulder measurer, you employ him to measure boulders. How much distance would it be reasonable to put one man on Residency 5?—A. Not more than at the most two miles.
- Q. Over the whole Residency?—A. No, on parts of it.
- Q. How many miles are there in your Residency?—A. Twelve, well, I am speaking of the heavy part of the Residency.
- Q. Then how many boulder measurers would it take for the whole Residency?
- A. Do you mean to measure all the boulders?
- Q. What do you suppose? I do not mean to measure something that was not boulders. I mean to do what he is sent there for, to measure or approximate the boulders in that Residency that were upwards of a yard?—A. The Residency might be covered with three men, one man to two or three miles and two men on the rest.
- Q. How many men were there in that winter?—A. My own staff?
- Q. Yes?—A. Four or five, excluding the cook.
- Q. I mean engineers or assistants?—A. Yes.
- Q. What were the four or five men doing?—A. Cross-sectioning and doing a lot of work in the office and laying out culverts, to see the culverts were built.

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Q. In the field how many men were there?—A. They were in the field the whole time, excepting myself; I was not in the field the whole time.

Q. These men could have measured the boulders?—A. It was the time-keeper who had—

Q. But those men could have measured the boulders: they were spread over the twelve miles all the time?—A. No, sir, they could not measure boulders and attend to their work.

Q. Why not?—A. They might be working on a curve and be on the cars.

Q. If these men had been doing nothing else but measuring boulders, they could have measured all the boulders that were there?—A. No.

Q. If they had been doing nothing else?—A. No.

Q. Why not?—A. Not unless a man stayed in the cut the whole time.

Q. But if they stayed in the cut?—A. Oh, yes, if they stayed in the cut they could.

Q. How long would it take a day for a man to measure up the boulders that were exposed in a mile?—A. It would take him the length of time he would take to walk over the Residency and probably ten to twenty minutes in each cut.

Q. How did you arrive at your boulder measurement as a fact?—A. By taking them two to three or four times a month, having a man in there in the morning and in the afternoon, and dividing the day between two cuts.

Q. And what you found in the distance of how much?—A. I do not understand.

Q. You send a man in on a given day into a cut?—A. Yes.

Q. What would he do?—A. Measure the boulders and the amount of cars going out that day, and the number of cars going over the dump, and the amount contained in that material, and that material was estimated by the size of the cars, whatever they contained, and then work out the percentage.

Q. He would only stay there a short time?—A. No, he would be there a morning.

Q. About how much would they take out in the morning?—A. They might put out a big cut like that one we were looking at possibly 200 yards.

Q. In the morning?—A. Yes, if they were working a big cutting.

Q. In the morning; that is all the time he would stay there, you know?—

A. Yes; I should think they would take out up to 200 yards.

Q. Then he would count the boulders in that section out of which the 200 yards was taken?—A. Exactly.

Q. And then he would say "Well, 200 yards of material contains so many boulders, which amounts to, say, 20 yards, and he would put that in as ten per cent boulders?—A. Yes.

Q. And he would allow, till the next measurement, ten per cent boulders?—

A. Exactly. I commenced measuring boulders without measuring the yardage going out at the same time, but the results were useless, because it was impossible to know how much yardage was going out at the same time.

Q. Did you classify on any other Residency on Mr. Doucet's District than you have told us of?—A. No, only on 5 and 7.

Q. Did you classify on any other district on the Transcontinental?—A. Yes, on E.

Q. What Residency?—A. 9 and 8.

Q. Whose contract was that?—A. O'Brien, McDougall and O'Gorman, agents for M. P. and J. T. Davis.

Q. The contract is right above Lake Nipigon?—A. Yes.

Q. Contract 18?—A. No, contract 17.

Q. What sort of material is there there?—A. Chiefly ledge rock, or sand or muskeg.

Q. No clay there?—A. Yes, there is a good deal of white clay, too, not containing rock.

Q. How did you classify the clay up there?—A. On a percentage of loose rock and the remainder common, averaging about from 20 to 60 per cent of loose rock.

Q. In the winter you classified all the frozen material in what way?—A. In the winter we classified frozen material on its merits, without considering its condition at all. It is only perpetual frost we classify.

Q. In the summer you classified frost which never went out of the ground?—A. No, I do not think it amounts to more than 2,000 yards.

Q. How long had the right of way been cleared before the excavation was taken out?—A. In these particular ditches?

Q. In this perpetual frost district?—A. We usually found the frost in the off-takes in the woods.

Q. Did you allow any frost as loose material on the right of way?—A. I did not personally, but I believe it has been allowed in ditches and many places, opening up ditches in June and early in the year.

By Mr. Gutelius:

Q. Is there much perpetual frost back from the right of way?—A. Up there a tremendous amount, not more than a foot from the surface.

Q. As late as September?—A. Yes; that means all the year around, you know.

By the Chairman:

Q. The fact is that the frost stays in where the forest and moss has not been removed, that as soon as they remove it the frost disappears?—A. I think it is the moss.

Q. Removing the forest and moss?—A. The moss extends to two feet before you come to the real muskeg.

Q. But on the clay, does the frost remain the year around, where there is thick forest and moss?—A. Yes, it does; not so much on the clay as on the muskeg. As a rule, the clay under the moss is not frozen after the middle or end of June, but in the muskeg it seems to stay in longer.

(N.T.R. INVESTIGATING COMMISSION, EVIDENCE TAKEN AT TRANSCONTINENTAL RAILWAY OFFICES, QUEBEC, AUG. 19th, 1912.)

ADELPHIS O. BOURBONNAIS, sworn:

By Mr. Gutelius:

Q. How old are you?—A. Thirty-two.

Q. What railway work did you do before you were employed on the Transcontinental?—A. I worked on the Chateauguay and Northern Railway.

Q. What were you doing there?—A. Rodman.

Q. When did you first have employment on the Transcontinental?—A. In 1906.

Q. You have been Resident Engineer since when?—A. Since 1907.

Q. What Residency did you have?—A. Fifteen.

Q. You had been on that all the time?—A. Yes.

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Q. That extends from mileage—A. 12 to 24.

Q. Your whole Residency is on a supported four-tenths grade?—A. Yes.

Q. There is a fill from 20 to 24—A. Yes.

Q. Would it have been possible to have moved the line a little under the hill and secured a grade without any fill?—A. I do not know, sir; it is quite flat ground.

Q. It never occurred to you that a change of position of the line would have reduced the quantities?—A. I do not think it would reduce it very much, because it is very flat ground from 12 to 22.

Q. In the cutting at station just west of mileage 22 you had 199 yards of solid rock material; what was that stuff?—A. In the bottom of the cut there were some boulders and there was some shale.

Q. And the shale added to the boulders made the 199 yards?—A. Yes, sir.

Q. You have three Residencies?—A. Yes, I have now, but not since the start.

Q. Your Residency now extends to where?—A. Up to 47.

Q. You remember the cutting at 29.6?—A. Well, you see it was all done when I came there. I came there in July, 1910. That cut was finished in July, 1909.

Q. You noticed the openings that we made in the side of that cutting?—A. Yes, sir.

Q. What was the character of material that we got out of that hole?—A. Well, I think that it is assembled rock.

Q. Why?—A. Because it was pretty hard to take out.

Q. Pretty hard material?—A. I tried to take off some stone with my hand, and it was pretty hard stuff, pretty sticky together.

Q. Suppose we took that material as it laid in the ditch and classified it, after it was dug loose, was there anything that you would call solid rock?—A. You mean supposing we cleaned the ditches now?

Q. No, the excavated portion, what was lying on the dump there, when it was pulled out there and laid on the dump?—A. Then it would be like loose rock.

Q. Loose rock and common excavation?—A. Yes.

Q. There were only about one or two pieces that you would think of calling solid rock after it is taken out?—A. Well, yes.

Q. Lepage was ahead of you there?—A. Yes, he was.

Q. Suppose that you had never heard of the term, assembled rock, and take the specifications and contract as they were handed to you, could you have called the material excavated from these two holes that we made in the bank there solid rock?—A. I think I would have classified it as solid, according to our book specification.

Q. Why could you do that?—Was it solid rock?—A. Well, because they could not handle that stuff without blasting all the time.

Q. Does not the specification say "Solid rock that requires blasting"? It says it would include rock.—A. Which may be best removed by blasting.

Q. "All rock which may be best removed by blasting"—A. Yes.

Q. Could you call that rock?—A. Well, it is mostly rock. It is all boulders and clay.

Q. It is mostly stones?—A. Mostly stones and boulders, and between those boulders it is that blue clay.

Q. Supposing the specification had read "Solid rock which may be best removed by blasting", then what would you call it? Supposing the specification read "Solid rock excavation will include all solid rock in ledges or masses of more than one cubic yard", then could you call that solid rock, in the judgment of the engineer? In other words, it is not solid rock: it is not stone?—A. Well, in that particular cut there were stones bigger than one cubic yard.

- Q. But it is not all solid rock, all one lot of stone?—A. Well, no, it is not all a big lot of stone.
- Q. It is made up of a great many small stones?—A. Yes.
- Q. And sand and clay?—A. Yes.
- Q. And small stones and a few big stones?—A. Yes.
- Q. And because it was hard and had to be blasted you would call it solid rock?—A. Well, that is the only difference.

THE COMMISSIONERS OF THE TRANSCONTINENTAL RAILWAY.

Harricanaw River, June 7th, 1912.

To The Investigating Commission.

Gentlemen,—

I hereby request that the following figures be substituted for the ones given you last evening in giving evidence before you.

Total Approx. Quantity classified by me..... 821,797 Cu. Yds.

Classified as follows:—

Solid Rock	Approx. Quantity.....	23,341	“	“
Loose Rock	“ “	381,601	“	“
Common Excavation	“ “	416,855	“	“
		<u>821,797</u>		

In order to have same admitted, I herewith attach an Affidavit duly declared.

I have the honor to be,

Witness:

Your obedient servant,

JAMES MCG. RUTHERFORD.

—GEO. A. BUTLER,
Division Engineer No. 3-C.

I, Geo. A. Butler, hereby solemnly swear that the foregoing statement is correct to the best of my knowledge and belief so help me God.

Sworn before me at the Village
of Harricanaw, in the Co. of
Temiscamingue, June 8th, 1912.

N. McCUAIG, J.P.

GEO. A. BUTLER.

NATIONAL TRANSCONTINENTAL RAILWAY INVESTIGATION
COMMISSION.

Before GEORGE H. LYNCH-STANTON, K.C., *Chairman*.
and MR. F. P. GUTELIUS, C.E., *Commissioner*.

EVIDENCE TAKEN ON THE TRAIN ON THE N.T.R., BETWEEN STA-
TIONS BEAVER DAM AND ROBINSON'S LAKE. JUNE 6TH, 1912.

GEORGE ALBERT BUTLER, sworn—

Examined by Mr. Stanton:

- Q. What is your age?—A. Thirty-seven.
- Q. Where were you educated?—A. Deseronto High School and Queen's University.
- Q. What experience have you had in construction work?—A. I was on the T. & N. O. in the capacity of instrument man. I was leveller on location on the T. & N. O. Railway. I was transit man on location on the Transcontinental.
- Q. How long were you on the T. & N. O. roughly?—A. About three years.
- Q. After leaving the T. & N. O. you came on the Transcontinental as transit man?—A. No, I was chairman and transit man on the Ontario Land Survey work before I came on the T. & N. O.
- Q. What experience have you had since on this line?—A. I was transit man on location, and I took charge of the parties, and from the charge of the parties I was afterwards in charge of division work. I was in three different Residencies, and from that I was moved up to Division.
- Q. What were your duties on the Residency?—A. Full charge of the work, practically the same as division, except that, instead of having three or four different men on in the Residency, you have the whole work. You control the work.
- Q. What is a Residency?—A. It covers ten miles of work. You have charge of the construction and grading.
- Q. And the classification?—A. Subject to the Divisional Engineer.
- Q. But you are the first classifier?—A. Yes.
- Q. You classify the work in the first place?—A. Yes.
- Q. Subject to his endorsement, approval or correction?—A. Yes.
- Q. You had three Residencies; where were those?—A. I had two Residencies; on this road there was Abitibi and South River.
- Q. What are the numbers?—A. 9 and 17.
- Q. After you got through on those Residencies you did what?—A. I came to Davey Lake.
- Q. Is that where you are now?—A. Yes.
- Q. What is that?—A. It is a Residency and there is a division there.
- Q. What division?—A. Number three.
- Q. Have you the sole charge of that division?—A. Yes.
- Q. And your official position now is what?—A. Divisional Engineer.
- Q. Have you had sole charge of that division since the work began on it?—A. Yes, I have, with the exception of about three months.
- Q. And what was done in those three months?—A. I do not understand the question.
- Q. Was there any grading done up to the time you came on it?—A. No.

- Q. Then you have had the supervision of the excavation, filling and grading?
 A. Everything in connection with the work.
- Q. Since that time?—A. Yes.
- Q. And that includes all the excavation, filling and grading that has been done?—A. Yes.
- Q. You have classified, then, all the work?—A. I have, subject to the approval of the District Engineer, who was with me.
- Q. In classifying that work, had you the contract and specification before you?—A. Yes. Of course, I had read it over.
- Q. You knew what it was?—A. Yes.
- Q. The classification of the grading is regulated by sections 33, 34, 35, 36 and 36a of the general specifications; that is correct?—A. Yes.
- Q. You classified your work, then, after you had seen these specifications?—A. Yes.
- Q. Solid rock excavation, according to 34, will include all rock found in ledges or masses of more than one cubic yard, which, in the judgment of the Engineer, "may be best removed by blasting." Have you classified as solid rock excavation any rock which could be removed without blasting?—A. No.
- Q. Then all the solid rock excavation classified by you, in your judgment, required blasting?—A. Yes.
- Q. Then, with regard to loose rock: have you classified as loose rock and stones and boulders measuring less than one cubic foot?—A. Not to my knowledge.
- Q. You did not intend to so classify, if you did?—A. No.
- Q. You have, I suppose, classified as loose rock all loose rock, whether in situ or otherwise, that could be removed by hand, pick or bar?—A. Yes.
- Q. Have you found any cemented gravel?—A. Yes.
- Q. What do you mean by cemented gravel?—A. You take small stones, any sized stone that is cemented together like a paste—it is just like a conglomerate.
- Q. Could you break them with your hands?—A. No, you would have to use a blast or pick.
- Q. They were mortared together?—A. Yes, that is it.
- Q. You have not classified anything under the head of cemented gravel which was not cemented together?—A. No.
- Q. "Indurated clay and other materials" is another head of loose rock. Have you classified any indurated clay as loose rock?—A. It all depends on the interpretation of "indurated".
- Q. It says here "indurated clay". Have you classified anything which you called indurated clay as loose rock?—A. Yes, I have.
- Q. What have you classified as indurated clay?—A. I considered indurated clay was clay that was hardened, practically a mass, not soft, wet, or spongy stuff, but hard, en masse.
- Q. Which could not be ploughed behind a team of six good horses?—A. Not in my judgment.
- Q. You say the indurated clay which you have classified as loose rock in your judgment could not be ploughed behind a team of six good horses, properly handled?—A. That is right.
- Q. Have you classified as loose rock any clay which could be ploughed with a ten-inch grading plough behind a team of six good horses, properly handled?—A. Not to my memory.
- Q. Did you intentionally do so?—A. No. It was not my intention to ever classify anything as loose rock that was not loose rock; that is, I did not intentionally do so.
- Q. You classified a certain quantity of clay as loose rock?—A. Yes.
- Q. Why did you classify that clay as loose rock?—A. Because I considered it hardened material, and what I considered came out of the classification as loose rock—that is my interpretation of it.

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Q. What clay comes under the classification of loose rock?—A. I considered this hardened clay did.

Q. Why?—A. Under the indurated material.

Q. Did you classify clay as loose rock?—A. Just clay alone?

Q. Any clay? Did you classify anything you would call clay as loose rock?—A. Yes.

Q. Why did you classify that clay as loose rock?—A. Because I considered it came under clause 35 as indurated clay that could not, in my judgment, be ploughed with a ten-inch grading plough behind a team of six good horses, properly handled.

Q. You did not consider whether or not, after it was ploughed, it would cost the contractor more or less to move it?—A. It never entered my mind at all what the cost to the contractor was. I considered it purely from my point of view, on behalf of the railroad.

Q. And whether or not the contractor could, or could not move it, was no concern of yours?—A. No.

Q. It was no concern to you in your classification?—A. No.

Q. Did you ever make any experiment with a ten-inch grading plough behind a team of six good horses to find out whether the clay which you classified as loose rock could be so ploughed?—A. No.

Q. How did you then form your conclusions that it could not be ploughed?—A. Well, I have seen horses working with the ploughs, not up in this country, but I have seen them down at home. That is my only reason.

Q. You have only seen horses working on a farm?—A. Yes.

Q. You never saw six horses working?—A. I think I have seen six; I would not be positive about that. I have seen ploughing done for scraper work on most of the jobs on which I have been concerned.

Q. Have you seen it done with six horses attached to a ten-inch grading plough?—A. I am not sure about the ten-inch grading plough, or what sized plough.

Q. Have you seen six horses on a plough for scraper work?—A. No, I would not swear to that. I would not like to say I have ever seen six horses at work, although I have seen four.

Q. Were you ever instructed to make such a test?—A. No, I was not.

Q. Were you ever supplied with appliances to make such a test?—A. No.

Q. Then I may take it from you that you had no instructions or appliances with which to make a test, and it was simply left to your judgment, without making tests, to conclude whether or not it could be so ploughed?—A. Yes, that is right.

Q. If that clay which you classed as loose rock could be ploughed by the team described in clause 35, your classification is wrong?—A. According to the specifications it would be.

Q. You are sworn here, and I want to know, have you made your classification independently and honestly and to the best of your ability?—A. I have.

Q. And you have not sought to give this classification any strained interpretation?—A. No.

Q. But you have interpreted it as you have stated to me in your foregoing evidence?—A. Repeat that.

Q. You have not given, in your classification, any other interpretation to clause 35 than that which you have already stated to me?—A. To the best of my knowledge, that is true.

Q. Have there been any other materials classified by you?—A. Common excavation.

Q. Any other materials classified by you as loose rock?—A. No, that is the only two.

Q. Can you tell me how much material you have classified on your division?—A. Approximately 47 per cent.

Q. But I am asking you the total classification. On your division how much material have you classified? Give me the total first?—A. Approximately, 257,497 yards.

Q. Of that material, how much was solid rock excavation?—A. 5,642 yards.

Q. How much loose rock?—A. 158,746.

Q. How much common excavation?—A. 93,109 yards.

Q. What was the price paid for solid rock excavation?—A. \$1.75.

Q. And for loose rock?—A. 65 cents.

Q. And common excavation?—A. 34 cents.

Q. When you come into these muskegs filled with roots and vegetable matter, have you classified any of that as loose rock because of the trouble in cutting through the roots and so forth?—A. No.

Q. You could call it all common?—A. All common in that case.

Q. Have you classified any soft clay or soft material as loose rock because the horses could not work through it?—A. I might have; I could not answer that question fully.

Q. Do you remember of any?—A. Yes, I think I have; I believe I have.

Q. Do you recall any instance?—A. I could not state the quantity.

Q. Can you state where it was?—A. A cut at station 3001 to 3034 plus 50; I would state approximately ten per cent.

Q. On the cut at the place described you classified ten per cent as loose rock. What was that material?—A. It was what I would call like a gumbo. It is impossible to put teams on it without first corduroying it.

Q. How was it taken out?—A. It was taken out by the car, but you have to keep working back into it.

Q. How did you take it out?—A. With cars.

Q. How did you take it out?—A. Working against a face, backing cars up against it.

Q. Pick and shovels?—A. Yes.

Q. Pick and shovel used to load it on to the car?—A. Yes.

By Mr. Gutelius:

Q. Did it require to be picked out?—A. Yes, it came out in little chunks like.

Q. You could not take it out with a shovel?—A. No. In some cases they did take it out that way, but they could only take little chunks like that.

By Mr. Staunton:

Q. How much would that amount to in yards?—A. Approximately, 1200 yards.

Q. You call that gumbo; is it a clay?—A. Yes.

Q. Is it the grey or black clay?—A. It is a greyish color; it is more like a hardened sponge.

Q. But there were no roots or anything of that kind in it?—A. No, this was in a cut.

Q. I was asking you whether you had taken anything full of roots, like this stuff outside the window, and classified any of that?—A. No; I thought you were back in the cut.

Q. You told me all the material you put in as loose rock?—A. To the best of my knowledge.

Q. Did you ever classify clay of the kind you have been speaking of, on any other road than this, as loose rock?—A. We never had the same classification on any other road.

Q. You have not worked under a specification like this at any time before?—A. No.

By Mr. Gutelius:

Q. You never classified clay such as this as loose rock before this job?—A. No.

By Mr. Staunton:

Q. What did you classify it as on other jobs?—A. Hardpan.

Q. What were they paid for hardpan as compared with loose rock?—A. There was no loose rock; it was common excavation, hardpan and rock; they did not recognize it at all.

Q. What were they paid for hardpan in what you have in mind?—A. If my memory serves me right, 45 cents.

Q. Where was that?—A. On the T. & N. O. I would not swear to that figure.

Q. Was it the same material as this?—A. I would say so.

Q. But they made a contract, in that case, to pay for hardpan, as you recollect it, somewhere about 45 cents?—A. Yes; that is an approximate figure, to my knowledge.

Q. You told me the cost of moving this material did not influence your classification?—A. That is right.

Q. Was any of your classification raised by any of your superior officers?—A. In what way?

Q. Did you ever return any material classified under one head that they put up to a higher classification?—A. You mean by a direct order, ordering me to do it?

Q. Any way, directly or indirectly?—A. It is a pretty hard question to answer. By consultation I was advised.

Q. What to do?—A. It was simply brought to my knowledge. My district engineer went into the material thoroughly with me.

Q. How did you classify it?—A. In some cases there was no difference; in some cases I was a little lower.

Q. Can you tell me a case of that kind?—A. No, because there was only very little of the work done.

Q. State it your own way?—A. There was one classification, if my memory serves me, in which the classification was raised approximately 20 per cent over what I classified it.

Q. By whom was it raised?—A. By Mr. Molesworth's authority.

Q. Who was he?—A. District Engineer.

Q. Did he inspect the work?—A. Yes.

Q. With you?—A. I was with him. He considered that I was too low.

Q. Was that in the beginning of the work?—A. No.

Q. How had you been classifying when he did that?—A. There was over 50 per cent of the work done—approximately 50 per cent.

Q. Did he raise the common excavation?—A. No.

Q. What did he raise?—A. The cut was in progress. I was classifying on that basis in progress, and he said that my classification was not high enough, considering that material, and after consultation with me—at least after I consulted him—and the cut was taken out I decided he was right. That is the only case I know of.

By Mr. Gutelius:

Q. You changed from common excavation to loose rock, what was equal to 20 per cent of the cut?—A. Yes, approximately.

Q. And you agreed with him, before the cut was taken out, for the same reasons that you have given us heretofore?—A. Yes.

By Mr. Staunton:

Q. What did he point out to you that changed your mind?—A. I was probably a little harder at that time. I thought I should be more strict, and we had the specifications there; at least, we read the specifications over again, and I interpreted it that way, according to the way I answered here to-night.

Q. You have given the contractor 20 per cent the best of it ever since, have you?—A. No, just this particular cut I have reference to; I remember it was a small cut.

Q. And the material in it was clay?—A. Yes, clay.

Q. Had you ever been classifying that same clay lower?—A. On progress work we always classify lower.

Q. Then what did you do?—A. Then on the final we always keep under, in case we have made any mistake in the calculation.

Q. Then you may raise it?—A. Yes.

Q. Have you your original data that you made at the time?—A. I would not be positive.

Q. You copied this book from your data?—A. Yes, that is taken from the office.

Q. On the work what did you have with you, going out taking classification?
A. I would go over the work with the resident engineer, and take notes, and advise him what I considered, and we would consult together.

Q. But when you were out by yourself?—A. I always go with the resident engineer.

Q. When you made your classification?—A. Yes.

Q. Before Mr. Molesworth came there, who had been with you before that?
—A. Nobody.

Q. You say you always went with somebody?—A. But nobody superior to me.

Q. Had he always been with you when you classified the fifty per cent that was classified—A. Mr. Molesworth is the district engineer. I always go with the resident engineer.

Q. How do you arrive at your measurements?—A. How do you mean?

Q. The quantities?—A. You mean on the ground?

Q. Yes?—A. By cross-section.

Q. You cross-section?—A. Yes, every time.

Q. You do not make any guess work?—A. No, everything is measurement.

Q. And you keep your cross-section in writing?—A. Yes, we have them all on record.

Q. You have them all now?—A. All in book form and also in the original sheets: they will be sent in to you very shortly.

Q. So that the original sheets show the measurements you took and the cross-sectioning you did right on the ground?—A. Yes, to the best of my knowledge they do.

Q. They were intended to show it?—A. Yes. The resident engineer takes the cross-sections.

Q. He does the work?—A. Yes; I am divisional engineer, and I do not take the cross-sections; the resident engineer does that.

Q. The resident engineer and you together go on a particular piece of work for the purpose of making the classification?—A. Yes.

Q. When you go on that work for that purpose, do you take any measurements to ascertain the quantities?—A. No, except that I simply check his figures in the office.

Q. Then he is responsible for the quantities?—A. Yes.

Q. And you are responsible only for the classification of the quantities he gives you?—A. Yes, that is all.

Q. And you do not cross-section or do anything?—A. No.

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Q. Did you ever have occasion to check up any of his measurements?—A. Not yet, because I have no final estimates yet.

Q. I do not understand that?—A. There has been no final estimates returned on the Residencies under me yet.

Q. Will you go over that and check it?—A. If I suspected anything—supposing the cut would show too large a quantity according to my view, I would remeasure his cut.

Q. So that you will, or you have examined the work and made up your mind whether, in your opinion, the measurements were correctly made?—A. I would not say that, because the final estimates are not in yet.

Q. But you will do that?—A. Yes.

Q. Did you sign the monthly and final estimates?—A. In every case, except I should happen to be absent, I think that was only once. I always looked over them myself.

Q. Had the resident engineer anything to do with classification?—A. Well, he would consult me. I am more in a consulting capacity.

Q. You mean you would consult him. He did not make the classification at all?—A. Oh, no, never.

(N.T.R. INVESTIGATING COMMISSION.)

June 7th, 1912.

WILLIAM D. ROBERTSON, sworn :

Examined by The Chairman :

Q. You are an engineer by profession?—A. Yes.

Q. How long have you been an engineer?—A. Well, I am a practical man, not a graduate, you know, but I have been practising road, surveying and engineering, since about 1888 actively. I was with my father before that as a youngster.

Q. Then you are an Ontario land surveyor?—A. No, I am a Nova Scotia land surveyor.

Q. How long have you practised your profession as an engineer in this province?—A. I came on the Transcontinental in March, 1905, I believe was the time, the first of March. The work started in 1904, and I came in 1905.

Q. Prior to that what were you engaged at?—A. The year before that I was in Labrador, timber land surveying; the summer before that, and previous to going to Labrador, from November, 1902, up till, I think it was some time in December, some time in the fall of 1904, I was on the Mabou and Gulf, both on location and construction, and previous to that, from July, 1906, till November, 1902, I was assistant city engineer in the city of Everett, Massachusetts.

Q. Since you have been on the Transcontinental what have you been employed at?—A. I went out the first year with Mr. Goodwin as instrument man. I applied for a party, but could not get it.

Q. You were a year as instrument man?—A. Yes, or nine months on that run, and I went to Ottawa, and Mr. Macpherson asked me if I could handle a party, and I said I thought I could, I had previously, and he said if Goodwin would recommend me he would send me out in charge of a party on location, and he did recommend me, and they sent me out in charge of a party up in the east end on District C.

Q. How long did you continue in that work?—A. Until I started in this division, May, 1909. They took me out of the bush; they sent for me up to Grand Lake Victoria to come down and take this division.

Q. What is this division?—A. Division 4c originally, and is yet.

Q. How big is your division?—A. 43.82 miles, something like that.

Q. And what is your position in that division?—A. Divisional engineer.

Q. And has the construction been under way ever since you took charge of the division?—A. Yes, sir. There was some clearing done when I came in here, but that was all.

Q. What have your duties been as divisional engineer?—A. General supervision and looking over the work; and instructing the resident engineers with reference to the work, and anything that came up that they wanted to consult me about.

Q. Under you what engineers are there?—A. In charge of Residency 15 is M. L. Guimont; in charge of 16 is T. C. Rousseau; in charge of 17 and 18, R. F. Smallian.

Q. Are there any other engineers subordinate to you in your division?—A. No, there are the instrument men who are under—

Q. But engineers?—A. No.

Q. Are there any engineers over you in this division excepting the chief?—

A. Well, of course, I am directly under the district engineer, Mr. Balkam.

Q. Are you under any other engineer?—A. Well, I suppose under him and his assistants.

Q. Who have been the contractors in your division?—A. Foley, Welch & Stewart are the agents for the main contractors.

Q. The main contractors being the Grand Trunk Pacific?—A. Yes. They had all the work in my division, and Foley, Welch & Stewart were doing the work as their agents, I believe, and they sublet to others; the grading from the Okikidosik district to White Fish, they sublet to Hogan and Tomlinson, and they did a few miles further on themselves, and they sublet a couple of miles to John Linder & Company, and they did the next section themselves, and they sublet a couple of miles around Molasses River to Freeman, and they did the section beyond that themselves, till they came to Residency 15, and they sublet from this end of 15 to Robinson Lake to a fellow named De Sherburin, and a further section they let to Matt Point, and from there to the end, about a mile, they did themselves. Of course, in the camps on Matt Point's work they had a walking boss, and he overlooked all this work in the meantime. That is on the grading, of course. They have other subs on the piledriving and that.

Q. Have you had anything to do with the classification of the grading?—A. Yes.

Q. What were your duties in regard to classification?—A. When I first undertook to classify here, as I said this morning, the country was new to me, and the material was new to me. In the first estimate we gave we had not got very far into the work and we kept the classification down in our reports.

Q. But describe to me first your duties with regard to classification as divisional engineer?—A. Well, I went over the work with the resident engineers, to begin with, and the material looked pretty hard—

Q. What were your duties simply?—A. I used to go out and consult with the resident engineers with reference to classification.

Q. The resident engineers classified the work and you supervised it; is that it?—A. They referred it to me, and I approved or disapproved.

Q. So that the classification work is first done by the resident engineers, and then they sublet their classification to you for your consideration?—A. Yes.

Q. Are you constantly on the work over your division?—A. Well, from time to time, yes, mostly, sometimes twice a week and sometimes once, and sometimes once in two weeks, as the case might be.

Q. And all the estimates that are made by the resident engineers on your division are submitted to you for your approval?—A. The estimates come through my office monthly.

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Q. All the classifications are submitted to you for approval?—A. Yes, they all come through my office.

Q. Have you any record available at this moment, to show the amount of classification in yardage that you have up to this date passed in your division?—A. I have not it at this moment with me. I have it in my office.

Q. Can you tell me approximately what it would amount to?—A. No, I would not undertake to.

Q. You could not give me any idea?—A. No.

Q. Into what divisions did you divide the classifications?—A. In looking at the material that was taken out, as I thought it should be classified.

Q. Under what heads did you classify it?—A. There was solid rock, common excavation, and item 5, which is loose rock or other material—I classified this clay as other material.

Q. What are the three classifications?—A. Solid rock, loose rock and common excavation.

Q. Are those the three heads under which you classified the grading?—A. Yes.

Q. What did you classify as solid rock excavation?—A. Large boulders and ledge.

Q. Large boulders and ledge rock?—A. Yes.

By Mr. Gutelius:

Q. Where is Mabou located?—A. In Cape Breton; they located a line from the Harbor to the Strait of Canso.

Q. How long is that line?—A. The road was constructed five miles.

Q. You classified that?—A. No, that was done by day labor; the company did that themselves.

Q. This is the first specification you ever worked on in railways?—A. Yes.

By Mr. Staunton:

Q. You know under the general specification classification is covered by clauses 34, 35, 36 and 36a; that is right?—A. Yes.

Q. You have read those?—A. Yes.

Q. And had read them when you made your classification?—A. Yes.

Q. What did you classify as solid rock excavation?—A. The ledge rock, boulders and assembled rock.

Q. What do you mean by that?—A. An aggregation of large boulders cemented together, as it were, with hard cement gravel.

Q. Do you mean cemented together so that they adhered if you lifted them up, and that they had to be broken apart?—A. No, sir, not necessarily broken apart. You might have to pry them out.

Q. Did they adhere to each other?—A. They adhered to the gravel.

Q. There was gravel between them, but the gravel was in a solid mass in which these boulders were embedded?—A. Sort of cemented together.

Q. What do you mean by that?—A. The particles would adhere to each other.

Q. Would the rock adhere to the particles?—A. It could be broken apart.

Q. Would it adhere to the particles?—A. Well, I cannot say positively that they would.

Q. Could I separate them with my hands?—A. I cannot say whether you could or not.

Q. Am I right in saying that the interstices between these two boulders might be filled up by loose material?—A. In some cases they might.

Q. You would not describe rocks as adhering together though only had loose material between them, would you?—A. No. The rocks would not adhere together, but they would be in such a way that they would probably be too heavy to haul without blowing.

Q. I understand the rock to be all right if it is the size, but what I want to get at is, when one speaks of a mass of rocks adhering, if you had the power to lift it all together, it would not fall apart?—A. No.

Q. It might come out from the other material?—A. It might come out from the other material.

Q. Then it is a misnomer to use the word adhering?—A. Well, it might be.

Q. It may be embedded?—A. It may be embedded in this cemented gravel.

Q. Is the cemented gravel en masse itself, or is it in disintegrated particles?—A. Some of it is so solidly packed together that you have got to blow it.

By Mr. Gutelius:

Q. You mean to shoot it?—A. Yes. Of course it separates. I do not know whether it is cemented together or not, but it is so hard and solid you cannot make much impression in it with a pick or bar.

Q. In any of this assembled rock that you speak of, it would be possible to take it down by means of pick or bar, if you worked out a face against it?—A. Yes; you might pull it down that way to a face.

Q. It would not be assembled rock unless it was in position so that you could pry out the rocks if you were working out a face?—A. Naturally you would pry them out, of course. It is not cemented in. It is cemented gravel, and to a face you might pry them out, but I think it would be just as cheap to blow them out—cheaper.

Q. To be assembled rock, as I understand you mean that it is rock masses separated by other material in such a manner as that you could take each of the particles or pieces of rocks out, if they were less than a cubic yard, by means of pick and bar?—A. You probably could.

By Mr. Staunton:

Q. You have stated, I understand, that large stones and boulders measuring more than a cubic foot and less than a cubic yard would be loose rock?—A. Yes.

Q. And all loose rock, whether in situ or otherwise, that may be removed by hand, pick or bar, you would call loose rock?—A. Yes.

Q. Then you have been describing to us cemented gravel, what you consider cemented gravel?—A. Well, there is cemented gravel in this assembled rock. There is a little in there that cements the assembled rock together.

Q. Besides that was there any other cemented gravel—any bodies of cemented gravel?—A. Just on one cut on my work, I think, which was east of Kakamenon, which was all cemented together.

Q. Then we come on the indurated clay; do you find indurated clay?—A. Well, there is indurated clay in most of these cuts.

Q. Was it in any large quantities?—A. Well, yes; the cuts were principally of indurated clay.

Q. Did you classify any clay as loose rock?—A. Yes, all that indurated clay.

Q. And you say that all these clay cuts are indurated clay?—A. Mostly all, all but a small percentage.

Q. How did you arrive at the conclusion that they were indurated clay?—A. Because it was hard and tough.

Q. Could that clay be ploughed behind a team of six horses properly handled, behind a ten-inch grading plough?—A. I have never seen it tried.

Q. In your opinion, could it be ploughed by such?—A. I do not know what condition it might have been in, or how it would work with a plough at all.

- Q. In the condition in which it was before they commenced to remove it, could it be ploughed by such a team?—A. I cannot say whether it could or not.
- Q. Then the question whether or not the clay that you classified as loose rock could be ploughed by such a team did not enter into consideration with you when you were arriving at your conclusion as to whether or not it was indurated clay?—A. No, I did not think it would be feasible to plough it. I did not think you could plough it in any shape you could handle it. You would have to cut it up after ploughing it. That was my opinion. You would have to cut it in long strips.
- Q. Keep to whether or not it could be turned over in furrows by a ten-inch grading plough?—A. I doubt whether you could turn it over in furrows. You might cut it up in strips. I doubt whether it would turn over.
- Q. What do you mean by that?—A. You might cut strips in it, but I do not know that you could turn it over; it was so heavy it would fall back, I imagine.
- Q. What do you mean by strips?—A. Furrows.
- Q. You could turn a furrow?—A. You might cut a furrow, but I do not know that you could turn it.
- Q. How could the plough proceed without turning it?—A. It would fall back after the plough.
- Q. The plough is so constructed it turns it over?—A. It turns it on edge at the time, and if it is heavy and tough enough it will fall back.
- Q. I thought it turned over after the plough passed?—A. Not always.
- Q. Does the plough not turn it past the perpendicular?—A. Not always.
- Q. Usually does it not?—A. In loose ground.
- Q. Is the construction of the plough not such that it must do so?—A. It generally tips over on the other side.
- Q. Is the construction of the plough not such that it must turn it past the perpendicular?—A. Well, the force of the plough turns it generally.
- Q. I said the construction?—A. I do not think so.
- Q. Do you know whether it does or not?—A. I have ploughed where the furrow has turned back on me, so that if the construction of the plough was such that it would have turned more than perpendicularly, I do not see why it should have turned back.
- Q. That was ploughing against a hill side?—A. No; ploughing where there is wire grass the sod will fall down behind you, and you have to turn it over with a hoe.
- Q. Do you say the clay we are speaking of would not turn over?—A. I question whether it would.
- Q. You are not prepared to give an opinion on it?—A. No.
- Q. You think a plough might cut through it?—A. I think a plough might cut through it.
- Q. Have you any reason to think that that clay so far down as the frost line is not soft enough for ploughing?—A. I do not think it could be ploughed to advantage.
- Q. That is not what I asked?—A. You might cut it with a plough; I think perhaps you could.
- Q. Is it not ploughable so far down as the frost line goes?—A. It probably is; I never tried it.
- Q. Is it not fairly soft, so far down as the frost line goes?—A. Not in dry weather; it is very hard.
- Q. Is it not a fact that the surface does not bake on this ground?—A. It does bake.
- Q. If any person says that the peculiarity of this clay is that it disintegrates, that portion of it which is exposed to the atmosphere, it is a mistake, is it?—A. I do not know that it is.

Q. Is it not apparent to our eye when we are going along the railway that at least the top surface is soft and will crumble up in your hand?—A. That is when it is taken out and exposed to the air?

Q. Yes, the top?—A. Yes, but you will find this clay on the top of the cuts, where it has not been touched, bakes.

Q. We are talking about where it has not been touched?—A. That is, on a slope?

Q. Yes?—A. There is always a moisture running down, a drainage, that keeps that moist.

Q. We are talking about it where it dries?—A. That is on the dumps; it will dry up in powder.

Q. It will dry up in powder?—A. Yes.

Q. The peculiarity of ordinary clay is that it bakes and does not pulverize?—A. I have seen this bake and crack on the top of these cuts.

Q. Is there anything different in this clay down to the frost line from any other clay?—A. Well, I have never seen clay just like this before. It is not like the clay I have been used to working. It is not as loose.

Q. In what does it differ?—A. It is more compact and harder.

Q. Did you ever see a clay in any other country that was looser?—A. Yes.

Q. Where?—A. Down in Nova Scotia, in road beds, and in the States, in sewage and excavation and that.

Q. You would not find it in Old Ontario?—A. I have never been through Old Ontario.

Q. What were the facts in connection with that clay that induced you to classify it as loose rock?—A. The fact that it was so hard and tough, I could not consider it common excavation.

Q. Could you not dig it?—A. You could separate it with a hoe, but it was very hard to separate, very tough and heavy.

Q. Can you not work into any of these banks with a pick?—A. Yes, but you cannot do much at it.

Q. Have you shown us any place where that is the case?—A. That place where you were this morning, I think you would get all you wanted to handle of it.

Q. All we saw of it was crumbling, was it not?—A. Yes, it was all on the surface.

Q. How far would I have to go in to get it?—A. Down below the frost.

Q. Down to the frost line it is crumbling, is it not?—A. It appeared to in some cases; it appeared to be this morning.

Q. And the frost goes in here about three or four feet does it not?—A. About that, I should imagine.

Q. On an average how deep are these cuts?—A. They average from 5 to 25 or 30 feet.

Q. But an average?—A. They average 18 and 20 feet.

Q. You mean that if you averaged all the cuts through this railway, they would average that?

By Mr. Gutelius:

Q. You mean your average maximum is 18 feet?—A. Yes.

By Mr. Staunton:

Q. But what would the average be?—A. About five feet.

Q. Would there not be a great portion of that which was, even in your definition, common excavation?—A. No; there does not seem to be much difference in the handling.

Q. It is not the handling I am speaking of?—A. It is the material and it is the handling that counts in the material.

Q. Is it the cost of the handling that influences you?—A. No, it is the difficulty in removing it.

Q. It is not whether or not it is ploughable?—A. I do not know whether it is ploughable; I do not know whether it is advisable to plough it.

Q. You have formed no conclusion as to that?—A. I do not think it would l.e. I think the stuff would just fall back in.

Q. I want you to tell me candidly; I want your real sincere statement?—A. I am trying to give it; I am on oath.

Q. I am not questioning your oath for a minute, but I want to know whether or not you had come to any conclusion as to whether this was ploughable, when you made that classification?—A. No, I do not think that a plough would be feasible.

Q. Did that determine you to classify it as loose rock?—A. Not that, no.

Q. You may be right, or you may be wrong; other people have told me that they considered it ploughable, and yet they did consider it was loose rock. They said that was not what influenced them. I want to know whether you are in that same category?—A. That did not influence me, it was the material as I found it.

Q. What did not influence you?—A. The fact that it could or could not be ploughed.

Q. That seems to be, so far as I have been able to hear, the position which most of the engineers have taken, that it was not a question whether it was ploughable or not?—A. No, that did not enter into it; it was the material as we found it.

Q. And if I had come along on that material with a six-horse team, and a ten-inch grading plough, and had managed to turn it over, ploughed it right along, you would not have changed your mind as to whether it was loose rock or not?—A. No.

Q. So that we may eliminate the question of ploughing from the consideration entirely?—A. I think so.

Q. What were the difficulties of handling which induced you to make it loose rock? I would like you to tell me?—A. Well, the fact that it was so heavy, sticky and hard to move; when you put it in cars, in dumping you had to shovel it out of your cars in some cases, as well as shovel it in. If you dumped your car it would stay there, and you had to go in and shovel it out, and I figured that material was not common excavation and could not be classed as such.

Q. I imagine you would say that this specification does not supply the proper test, in your opinion, for ascertaining whether or not it is loose rock?—A. No, because, you take muskeg, you cannot plough it, but it is common excavation. We could not return that as loose rock; we did not consider it loose rock, but you could not plough it.

Q. Did you classify any part of that clay as common excavation?—A. Yes, we considered a small percentage on the surface, and sometimes at the ends of the cut there would be a softer clay and easier handled; we watched them working it, and we found some places where it was rather light and easily moved, and in those cuts we gave a lighter percentage of loose rock than in others. We classified it as nearly as we could, according to our judgment of the material as we saw it taken out.

Q. About what percentage of the clay would you allow to be common excavation?—A. Well, we have allowed from ten to twenty per cent in the different cuts—I think from ten to twenty or thirty per cent—somewhere along there.

Q. With the net result that you did not allow, in the whole, more than four or five per cent of clay as being common excavation?—A. No. The percentage of loose rock is not that heavy in my division. I do not think that the percentage in my division of loose rock on the whole would be over somewhere between 85 and 90 on the whole division.

Q. How much would there be of solid rock?—A. It would not be that on the whole division; I am speaking of the cuts only.

By Mr. Gutelius:

Q. You were taking the lower classifications, in your view?—A. Yes.

By Mr. Staunton:

Q. The percentage of the two lower classifications?—A. Yes, on my work. It would be somewhere about 80 per cent in the cuts; that is not taking into consideration the muskegs.

Q. What percentage of the clay that has been handled on your division have you classified as loose rock?—A. I say about 80 or 85 per cent.

Q. Now, you remarked in the beginning of your examination that when the work commenced the resident engineers were classifying the clay low, did you not?—A. Yes; we went over together, and we decided to keep it low, for this reason: it was the time all these investigations were going on, and the District Engineer told us that, to begin with, we would have to keep our classification away down; we were told that, and we went out and classified very low. We knew we were classifying low the first estimate, and from time to time—

Q. What did you classify this clay as then?—A. We gave them a small percentage in each cut. Where we give them 80 per cent to-day, we just gave them about 25, just enough to keep them quiet. We expected an inspecting commission to come up and say that we were right in our higher classification. We submitted to it till then, for their approval, and we held it till then, and when they did come up, I classified with the resident engineers as we came to each cut, and in most every case it was approved of.

Q. By whom?—A. The district engineer and the G.T.P. man.

Q. Who was the district engineer?—A. Mr. Molesworth.

Q. And who was the Grand Trunk man?—A. Tomlinson. In some cases the contractors wanted higher classification. Swenson was on the work and was representing Foley.

Q. Who ordered you to classify the clay low?—A. Mr. Wetherby said to keep the classification in the returns down until such time as it was approved of.

Q. Who is Wetherby?—A. Assistant district engineer to Mr. Molesworth.

By Mr. Gutelius:

Q. Was Wetherby with that party when you took the trip?—A. No, Wetherby was not on the trip.

By the Chairman:

Q. How much did you classify low in the way you have described it and afterwards changed?—A. Just on the first two Residencies the work had been going on, 17 and 18.

By Mr. Gutelius:

Q. How many months' classification?—A. Oh, the thing had been hanging for about seven or eight months before we got down to a settlement on the classification.

By the Chairman:

Q. So that you had a large amount to re-classify?—A. Yes, in some cases; and in some cases we raised. In the new Residencies I started the classification up where I thought it ought to be.

Q. How did you justify yourself for departing from the literal directions of section 35 of the specifications in classifying this clay as loose rock?—A. Well, it was hard indurated clay, tough clay, stuff that I thought could not be called common excavation, in my opinion.

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Q. But the only guide given to you in these specifications is the ploughability of the land?—A. As I said before, we dispensed with that, and I did dispense with it; I did not take it into consideration. The way the stuff was handling I considered it was loose rock, or other material than common excavation, which was equally as hard as loose rock.

Q. They mentioned indurated clay here?—A. Yes.

Q. So that it would not come under other material when it is mentioned?—

A. No, it probably would not.

Q. And all the stuff was indurated clay in your judgment?—A. Yes the most of it was indurated clay.

Q. During your classification, did anybody interfere with you in that classification?—A. No, not other than ask for more.

Q. But anybody in authority over you?—A. Nothing more than hold me down, to begin with. That was the only interference there was in reference to my classification. Well, in one case the resident engineer thought he ought to go a little higher, and I cut him down a little. He figured everything should be 100 per cent in that clay, and I thought some of it was not, and I cut his classification down at that time, and it was approved by the district engineer. The contractors all the time thought this clay should be classified 100 per cent right through.

Q. How is this clay that you classified as loose rock handled by the contractors?—A. With shovel and dynamite; in some cases they broke it open with dynamite; they had to shoot.

Q. Generally how was it handled?—A. Just in that way. They would come to a section of it, and they would have to blow it up, and take it with picke and load it into cars.

Q. How many shots would be put in, in a mile?—A. It all depends upon the cut, the height of it and the hardness of it.

Q. Is there a record kept of the amount of dynamite used and the place where it was used?—A. Yes.

Q. Cannot you give me any idea of how much was used?—A. No, I cannot, right off hand. Take that cut we saw this morning, they blew an awful lot there.

Q. But there was a lot of solid rock?—A. Yes, and they used a lot in the clay too. They used to bore holes right down through it and then break it up, working from a face like that.

Q. You do not mean to say powder was continuously used?—A. No, but in cases they did use powder to break it out. They would break out great chunks half the size of the end of the car, and then chop it up.

Q. If it could be chopped up out of a piece as big as the end of the car, could it not be chopped out of its original situation?—A. I do not think as well; they could not get at it to handle it as well.

Q. They could not get round it as well?—A. No.

Q. I understood that this clay would not blast?—A. Yes, it blows out all right.

Q. I understood it just blew out on the top, and would not break off?—A. Yes, it breaks off.

Q. Not anything like rock does?—A. No, not like rock. In rock there are seams, and it breaks off at the seams. You would break off more rock than probably you would of clay.

Q. How was the material measured in your division?—A. By engineers with instruments and rods.

Q. Describe what was done. Was it cross-sectioned?—A. Yes, and the slopes and stakes set out, and it was taken out to those stakes.

Q. Was any of it guessed?—A. No, not to my knowledge.

Q. None of it estimated?—A. No, none of it, to my knowledge.

Q. Did you return any description of the material when you were locating the line?—A. Very likely.

Q. What did you return the clay as?—A. Hard clay.

Q. Would you return it so that they would come to the conclusion it was common excavation?—A. I think perhaps I did, not having had any experience in the excavation of it. As I said when I came up here, I thought, without going into it, that it was just ordinary clay.

Q. Could you say that the blasting which was done was more than occasional, so far as the clay was concerned?—A. No, I would not say it was more than occasional.

Q. What did you classify as common excavation?—A. Well, muskeg and the softer clay that was there—well, loose and loamy. There are some cuts you will get some loamy clay in the ends.

Q. Did you classify any soft clay other than as common excavation?—A. The very soft, this blue clay, we get it in the bottom of those cuts, some of them; it is like gumbo. I classified that as loose rock also.

Q. That could be dug out also?—A. It could be dug out, yes.

Q. You classified that sort blue clay as—A. As loose rock.

Q. What is there in the specification to justify that?—A. No more than you cannot plough it. I am positive you cannot plough that to any advantage, because it is sticky and tough, and you go right down in it. It is like a quick sand, only it sticks to you, and it is very very heavy. It is certainly not common excavation.

Q. I understood from you that you had eliminated the question of ploughing?—A. Oh, yes.

Q. In all cases?—A. Well, I have, but that stuff is heavy and sticky, and hard to move, and it is just as difficult to move as the other.

Q. And that is the reason you so classify it?—A. Yes, hard and difficult to move.

Q. Soft you mean?—A. Soft, yes, and tough, just like rubber.

Q. Why could they not have taken out sufficient excavation here to put the tracks in, and then go along with a shovel, and take the portions of the excavation which was taken out to give the banks a slope, and run them down so that they would stand?—A. Well, I do not know that you could have handled, before you got drainage in those cuts, anything but light plant. I do not think you could, because in most of them you had to have corduroy, even for the horse cars.

Q. But your channels for draining are usually back of the bank?—A. That is just simply catch water; that catches the water that might be running in, but in excavating you get a lot of water in the cuts that you have to drain through the cuts.

Q. But would that water not drain into the cut that I first spoke of?—A. Into the ditch on the side?

Q. Yes?—A. No. We have these on the side when we are taking out the cuts.

Q. First you make a passage way through the cut through which your track could pass, leaving room on each side for small drains. Then you have your banks more or less perpendicular. Now, then, if you put down your tracks, and go through with a shovel, you could trim your banks back; could you not?—A. Yes, you could do that; that is gulletting the cuts down to grade.

Q. Getting the banks to proper slope?—A. Yes, gulletting it in the first place, just to get your track through. That could have been done.

Q. Then could it not have been taken out with a shovel?—A. Not to slope.

Q. Well, pretty nearly to slope?—A. You would have to take out more than you would need.

Q. You could take out a large quantity of that?—A. Yes; you would have to take out one-half slope, and then let it slope itself the other half.

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Q. Why is that not practicable?—A. I do not know but that it might have been practicable to gullet it at the cuts first, and then take the other out with a shovel to half slope; that might have been practicable.

Q. Would you not have classified it then as common?—A. Well, I do not know whether I would or not.

Q. Had you any directions given to you as to how you should direct the material to be taken out?—A. No.

Q. If you had insisted on gulletting it, had you the power to order it to be done?—A. I suppose I had.

Q. On pain of not classifying it?—A. No, I do not think classification would have entered into deciding whether it would be gulletted or taken out to slope; but we generally took it out to slope, and it is up to the contractor to take it out.

Q. When you are paying him a high price for it, of course he would take it out, but if you had said, "You gullet this cut, and afterwards put your shovel in there"—A. In some cases we would be taking more than we need to. When you put the shovel in to take out your extra width, you would be taking out a third more than you would require.

Q. In the majority of cases you would not take out more than you would require?—A. Well it would have to be a very high cut, or you would take out more.

Q. How high?—A. 18 or 20 feet; you would not be wasting much by taking out that slope; in fact, it would require to be more; it would require to be thirty. A shovel would take out more than half slope in anything under thirty feet. Anything below that you would be taking out more than you really needed with a shovel; so that in any cut under, say, 25 feet, I do not think it would be practicable to gullet it and take it out with a shovel. You would be taking out more material than you would require.

Q. Supposing you had gulletted such cuts as you could have done in a practical way, would you have made much saving?—A. No, I do not think so. There are only a few high cuts on the work, and I do not think we would have saved very much.

By Mr. Gutelius:

Q. In the discussion that occurred between the district engineer, yourself, the representative of the contractors, and the G.T.P. divisional engineer, were there any reasons given by these gentlemen to you as to why that classification should be raised?—A. As to why the classification in the estimates as they were being returned should be raised?

Q. The classification in the estimates that had already been turned in had been raised?—A. Yes.

Q. What were those reasons?—A. Well, that the material was too hard to be classified as it was; it was not common excavation; it was hard clay.

Q. Did they refer to any clause in the specification which would help you out in concurring in their recommendation to raise it?—A. No, I do not remember that they referred to any special clause.

Q. Was the plough test discussed at all at that time?—A. No, I do not think it was.

Q. Go slowly about this?—A. I do not think it was. I do not remember of the plough test being discussed.

Q. Was the specification discussed at all as printed?—A. I cannot say that I remember of it being discussed.

Q. Do you mean to say that you accepted a recommendation on classification that did not refer to the specifications?—A. I do not say that I accepted anything in that case. I say I classified the material. I went over the material and classified it as I thought it should be classified, and it was a question whether

they were satisfied. In some cases they were and in some they were not, and I classified it as I thought it ought to be classified from the condition of the material and how I found it.

Q. What did their visit have to do with your classification?—A. Nothing more than the District Engineer approved of my returning the classification as we thought it should be. It was held back previous to this.

Q. The classification you made at first you were satisfied was not right?—A. I was satisfied it was not, but I did not want to have to change my estimates afterwards. I did not want to return anything I would have to take back.

Q. That you would have to lower, you mean?—A. Yes.

Q. This discussion that occurred between you gentlemen was simply to verify your original idea?—A. Yes, they were looking for more classification—the contractors were—and there was no inspection made up to that time of the classification.

Q. Did they want more than you gave them?—A. Yes, in some cases they did; they wanted 100 per cent in most every one of those clay cuts; they were looking for it, fighting for it.

Q. Supposing that in a test that should be made in your presence, those cuttings which you have classified as 80 per cent loose rock, which is called hard clay, the plough would go through and break it up, and that you were instructed to classify according to the specification, what would you do in preparing your estimates now for the final?—A. If I was instructed to classify it—

Q. According to the specification?—A. Yes; after a plough test, if it should prove, as I think it would, as I say, that it would have to be then handled with difficulty after the plough, of course I should transfer my classification under instruction, but I would certainly not change my opinion, and would put myself on record to that effect.

Q. Do you mean to say that the test provided in these specifications has anything to do with the moving of the material?—A. Well, generally. The stuff that you plough—you would not plough it unless you put it in condition so that it is convenient to move.

Q. Is that plough item not simply a test?—A. It may be a test; I suppose it is a test.

Q. I want you to go stronger than that, because the thing is clear?—A. It is put there as a test; that is what it is there for.

Q. Is it right for you to use a test as a method of transporting or moving material?—A. It might have been right.

Q. Is it right for you to use a test?—A. It is right to use a test, if you think that practicable.

By the Chairman:

Q. Is it right for you to use a test other than that set forth in the classification?—(No answer).

By Mr. Gutelius:

Q. Supposing the test had been to take a two-inch pipe and drive it down with a twelve-pound hammer in any material; and any material that the pipe could be driven through with a twelve-pound hammer in the hands of a good man would be common excavation; if that were the test, where would the relation between the test and the removing of the material fall?—A. I would be down and out.

Q. Therefore there is nothing in the test that indicates how the material shall be removed?—A. No, not how it shall be removed.

Q. Then you cannot tell, so far as the specifications are concerned?—A. No, so far as the specifications are concerned, if that stuff proves it can be ploughed, I am wrong, according to the specifications.

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Q. If it can be ploughed—that is, broken up—is it not, under those specifications, common excavation?—A. Under the specifications, with that test.

Q. Then any classification that you made, that will ultimately show that it can be ploughed, and your instructions have been, and are now, and, we will say, will be repeated, that you must follow the specification; your instructions then are to follow the specification; you will willingly change your classification because the specification so directs you?—A. If they are to be rigidly held to, yes. I say rigidly, according to the specifications, if we are to go by that test, and that test proves it can be done—

Q. Then you will change your evidence?—A. No.

Q. You will change your classification?—A. No, but my opinion with reference to that not being common excavation would never change.

By the Chairman:

Q. In your opinion as an engineer it is not common excavation, although it may be common excavation according to the specification?—A. Yes, that may be so.

Q. You have already stated that you have not formed any opinion as to whether it is ploughable or not; in fact you did not consider that at all?—A. No.

By Mr. Gutelius:

Q. Can you, with your seemingly fixed ideas, join in that plough test with an open mind?—A. Yes, I certainly can.

By the Chairman:

Q. But you would not change your mind?—A. With reference to it being other than common excavation, no—not that material. I do not think the plough test is a fair test. As an engineer I would call that loose rock.

By Mr. Gutelius:

Q. As an engineer, given a specification to work to, you are expected to work to that specification; is that right?—A. Yes, that is right, if it is reasonable at all. If it is not reasonable you report to someone else. I reported my classification to the district engineer.

By the Chairman:

Q. Did you call the attention of the district engineer to the fact that, in construing the specification literally, this was not loose rock?—A. No, I do not remember that I did.

Q. Did you say to him that this specification of loose rock was not applicable to this locality?—A. I may have said that. I do not just remember what arguments I used, or what reasonings I used. I simply said this material was certainly not common excavation in my opinion, and he saw the material and saw them working at it himself, and he had his own opinions.

Q. Apparently all of you ignored the directions of the specifications?—A. If we did not ignore it, we would be returning muskeg as loose rock.

Q. You all did ignore it, as a matter of fact, did you not?—A. We certainly did in that case of ploughing, as I say, because, if we did not, we would be returning muskeg as loose rock.

Q. Does not the specification as to loose rock only apply to hardness?—A. Well, that is all right.

Q. Does not the specification clearly mean that it is to be loose rock if it is too hard to plough?—A. That may be the meaning of it, but there is clay in the cuts, blue clay and gumbo.

Q. Reading the specification, could you not come to the conclusion that the specification meant only that it was too hard to plough, and not too soft to plough?—A. Well, no, I cannot say that, because, take this gumbo, it is soft stuff, but you cannot plough it.

Q. Did you classify any frozen material as loose rock?—A. No, sir. I know that has been done on some work, but it has not been done on ours.

Q. Would you do it simply because it was frozen?—A. It would depend upon whether they had to take it out when it was frozen or not, if it was really necessary.

Q. Would you, if you were given a specification, and sent out there, without any further instructions, classify material as loose rock merely because it was frozen?—A. If they had to take it out while it was frozen.

Q. Leaving that out?—A. You cannot very well leave it out.

Q. If they chose to take it out?—A. If they chose to take it out, and we did not require it then, I would classify it as common excavation, but if we directed them to take it out while it was frozen, I would classify it as loose rock.

Q. But only if you gave directions?—A. Yes.

By Mr. Gutelius:

Q. Supposing the plough test shows the clay you have classified as loose rock is common excavation; and we go to your district engineer, and he says, "I accepted Mr. Robertson's signature on the classification," how are you going to conduct yourself? What instructions have you that you could refer to? He puts the classification up to you?—A. With his approval.

Q. Have you his approval?—A. No more than he was satisfied to accept it and considered it was all right.

Q. He has accepted Robertson's recommendation because he knows you to be an engineer of standing and an honest man. You tell us that you have classified this irrespective of the specification, the plough test, and if the plough test is made and happens to prove that it is common excavation, where are you going to get off? What excuse are you going to give Mr. Staunton and me?—A. I say I did not change my mind with reference to it not being common excavation.

Q. In the face of a specification which has been handed to you and which you have been told to work by; what motive have you in ignoring it and standing pat?—A. Because I do not really think it is feasible to plough it.

Q. I am saying, if it is ploughed and broken up and you see it?—A. Well, I make a mistake, certainly.

Q. And you will make your peace by correcting?—A. I certainly made a mistake if it can be handled by a plough. I think now that a plough test would not change my opinion. I do not think you can prove to me it is common excavation with a plough.

By the Chairman:

Q. I think you are contradicting yourself unintentionally. You said, did you not, that even if it could be ploughed, it is such material that you would not classify it as anything but loose rock?—A. In my opinion you might plough it, but I do not think you would leave it in condition that you could handle it after ploughing it, feasibly.

By Mr. Gutelius:

Q. You have got away from that, and said the condition has nothing to do with the test—A. I mean to say I really do not think now the test will prove that it is ploughable. If you plough, and prove it breaks it up, and puts it in such a condition that you can handle it easily with shovel and scraper, then I have made a mistake in classifying it as loose rock, but I do not believe you can, and I do not believe to-day you can handle it with a plough; I sincerely do not.

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Q. Break up is all that the plough test means?—A. You must break it up so that you can handle it with shovels. There is not much use breaking it if you cannot handle it with pick and shovel.

Q. This is a test we are talking about; we cannot think of it in the same line, unless you think of it as a test?—A. Supposing you can pull that plough through with a six-horse team, in fact you can pull it through there, whether the material is thrown up or not, that is the test?

Q. Yes, that is the test, dragging the plough through the material?—A. That may be a test, but what good would it do towards breaking it up?

Q. It is only testing it?—A. Not whether it does any good or not?

Q. No (No answer.)

By the Chairman:

Q. Ploughing means turning it over?—A. Yes, so that you can handle it.

Q. If you could turn it over with a plough, would that satisfy that it was loose material?—A. Yes, if it breaks up.

Q. If you can turn it over?—A. If you can turn it over and it stood in one ribbon, one strip—

Q. Just turn it over, I do not care what condition it is in, after it is turned over, would you admit it is loose material, no matter what condition you will have it in after it was turned over?—A. I would not like to say I would. I would like to see the condition it was in after it was turned over. I would say if you could turn it over so that you could handle it—

Q. If you could turn it over in furrows, irrespective of anything that it will do, would you classify it as loose rock, or would you classify it as common excavation?—A. Well, it is just as I said before; if you simply turn it over, and it has then to be handled again, I would not call it common excavation. If it has then got to be broken up by some other means before you can move it, I would not call it common excavation.

Q. But you would say if you broke it up, and it broke itself after turning it over, you would consider it common excavation?—A. Yes, if it broke in such a way as you could handle it.

Q. How would you have to handle it then?—A. With either shovel or scraper.

Q. Then to summarize, what you say is that, unless the plough will turn it over and leave it in a broken up condition, you would not class it as—A. To be handled by shovel and scraper; otherwise I would not consider it common excavation.

Q. Can you conceive of a plough turning it over and not leaving it broken up?—A. Yes, I think I can. I said that stuff would fall back.

Q. Can you conceive of a plough turning it over and not breaking it up?—A. Yes, I think it would break it up if it turned over, because there is no sod to hold it.

Q. Then if the plough would turn it over, it is common excavation?—A. It would probably be broken up in a condition that you could handle it.

Q. Then the plough test is all right if it will turn it over?—A. I should imagine yes, coming back to that, yes, it would; without the sod, it would naturally break up, if it turns over.

By Mr. Gutelius:

Q. And the only verification that you have received from higher officers is that your estimates were not returned to you for revision?—A. Yes.

By the Chairman:

- Q. And your belief that your higher officers knew the condition of the soil?
 --A. Yes. Of course they were on the work from time to time and saw it in operation and knew exactly what we were doing and how we were classifying.

(N.T.R. INVESTIGATING COMMISSION: EVIDENCE TAKEN ON TRAIN
 AT COCHRANE, June 7th, 1912).

H. G. O'LEARY, sworn:

Examined by Mr. Gutelius:

- Q. You are an engineer by profession?—A. Yes.
 Q. Where were you educated?—A. Toronto University.
 Q. What construction work were you engaged at before coming to the Transcontinental?—A. On the Lake Superior Branch.
 Q. Of the G.T.P.?—A. Yes.
 Q. That was your first engineering work?—A. I was on the Transcontinental before that.
 Q. In what capacity?—A. I was chairman, leveller and transit man.
 Q. When did you have your first Residency on construction?—A. Residency 17, Lake Superior Branch.
 Q. What year?—A. I think it was the fall of 1906.
 Q. And you have been continuously engaged in railway construction since?
 --A. Since 1904.
 Q. How many Residencies did you have on the N.T.R.?—A. I was Resident on one, and I was instrument man on 21 before.
 Q. And you are now?—A. Division engineer.
 Q. You had to do with the construction and classification of Division 2?—
 A. Division 2.
 Q. And you are now in charge of divisions 2 and 3?—A. Yes.
 Q. District C.?—A. District D.
 Q. Having been resident engineer on the Lake Superior Branch of the G.T.P., you had to do with classification?—A. Yes.
 Q. How did the specifications for classification on the G.T.P. compare with those of the N.T.R., under which you are now working?—A. Do you mean the wording of the classification? I think they were very nearly identical; they were very close. The words were not the same, but I think they were very close to the same. I do not think we had the wording "Continuous blasting" in ours. We had the plough test and the boulder measurements exactly the same. I do not think we had the "continuous blasting" or "blasting may be occasionally resorted to."
 Q. How did the prices paid on the Residency there compare with the prices on the division here?—A. The main contractor's prices were lower. If I remember correctly, it was 25 cents, 50 cents and \$1.45.
 Q. Here it is, 34?—A. 34, 50 and \$1.75—no, not 50; the loose rock is 65.
 Q. 34, 65 and \$1.75?—A. Yes.
 Q. Is there any difference in the classification of the material between the work that you did on the Lake Superior branch and that which you did on this division?—A. The material I encountered there was not the same. We were dealing more there with quicksand, boulders and solid rock. Here it is practically all clay.

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Q. What did they classify quicksand as on the Lake Superior division?—A. Classified as loose rock, with some solid.

Q. You classified the contractors out; that is, you gave them enough classified material to ensure their men a day's pay?—A. Yes.

Q. Was there a plough test in the G.T.P. specification?—A. Yes.

Q. If you had encountered clay similar to that excavated on your division here when you were on the G.T.P., would you have classified it as loose rock in the same proportion?—A. Yes, the way we were classifying, very nearly as high, I think.

Q. But not quite as high?—A. Well, possibly not.

Q. Why would you classify it higher here?—A. I am saying according to the way we were classifying there.

Q. Why would you not, under practically the same specification, make the same classification here as you would have made up there?—A. Well, that involves a question as to whether the man in the field is the man who is classifying, or whether he has to change his judgment in accordance with the Chief Engineer's instructions.

Q. You are speaking of the Chief Engineer's instructions, then, in connection with classification on your division here?—A. We received them, not direct from Mr. Grant, but from our superior officers, and our classification was accepted and passed by the district engineer, the inspecting engineer and the Grand Trunk engineer, and we based our specifications, to a large extent on that.

Q. On what they would pass?—A. On what they said. In some cases our classification was raised by them, and in some cases lowered, and we changed—at least I did—according to that.

Q. Were you ever instructed to increase the classification on this work where, in your judgment, you would not have done so, if left to yourself?—A. Well, that is a question that involves the interpretation of the clauses of the contract, that our judgment has to be influenced by what the contract calls for in the specification, and in these cases I have seen a great many written opinions by lawyers, stating what was meant by the different clauses of the contract.

Q. What opinions were those?—A. Alec. McDougall, of McDougall & O'Gorman, had a whole bunch of them, and I saw them.

Q. Did he offer them to you of his own accord?—A. No, his engineer was a personal friend of mine; he went through college at the same time as I did. It was he who showed them to me.

Q. Those were opinions by Mr. Lafleur?—A. And there were some Toronto men, I think E. F. B. Johnston was one, if I remember rightly. I remember there were quite a number of Toronto lawyers.

Q. See if you can remember some of the names?—A. I could not say; I could not swear to any of them, but it strikes me E. F. B. Johnston was one. I would not swear to it.

Q. And you felt, after those opinions were given as to the specification, that they were probably right, whether your judgment agreed with them or not?—A. I felt that, coming to a case of law, that they would probably know better what would be the interpretation placed on that by a judge to a certain extent.

Q. Then that was the reason that you coincided with the classification which your superior officers suggested?—A. No; there was a certain classification given on part of this work; I did not take it at first; there was a classification given and that classification had been raised.

Q. Tell me how that raising was done?—A. It was done when Macfarlane took this division over, and I think it was Mr. Sunston who did the reclassifying.

Q. You do not know this of your personal knowledge?—A. No, it was before my time, and that classification, I understood, was the accepted classification.

Q. And you endeavoured in your work to classify in accordance with that?
—A. Where I could take that as a standard; some places I am considerably lower, and a few places I am higher.

Q. You have classified some of those blue clay cuts as high as 90 per cent. loose rock?—A. Some of them have gone up, I think, to 98 per cent; that is the highest on my work.

Q. In so classifying did you take into account the plough test provided in the specification?—A. We were talking of the plough test, whether the plough test was actually dragging a plough through it.

Q. Better answer the question?—A. I want to explain what I meant by taking it into account. I took into consideration that the plough test, by ploughing it, did not put it in shape to be handled by a slush scraper.

Q. You did not consider the paragraph with reference to ploughing as a test, but rather as a method of excavation?—A. Well, I considered the interpretation of that "cannot be ploughed" to mean that it could not be ploughed and put in shape to be handled. Of course that was after talking over with a great many men. Mr. Staunton suggested that this had been talked over. I wish to say it has been. I have talked it over with nearly all the contractors. I have obtained their opinions and others.

Q. Contractors' opinions are rather dangerous in classification, are they not?
—A. Oh, yes.

Q. Is the suggestion as to the paragraph in connection with the ploughing being a test new to you?—A. No, we disregarded that on the branch.

Q. Did you disregard it here?—A. Practically to that extent.

Q. I understand then, that, so far as your work is concerned, having regard for your superior officers, that you did disregard the plough test?—A. Well, to the extent as I say, that the plough test—

Q. Having regard to your superior officers?—A. You mean by that, having regard to what they considered?

Q. Yes?—A. Well, we disregarded it to that extent also. I had that from my superior officers, that the ploughing had to put it in shape to be handled by earth methods.

Q. Who gave you that idea?—A. I think Mr. Mattice and Mr. Balkam both. I know Mattice has.

Q. When did you last speak to Mattice about classification, including to-day?
—A. You mean in regard to my classification?

Q. Yes?—A. When he was district engineer.

Q. You did not speak to him at all recently?—A. No. I may have passed a word, but nothing of any account, nothing serious.

Q. Balkam also made it clear to you?—A. I think so.

Q. That the plough test meant that after the material was ploughed it was to be in condition to be handled by a slush scraper?—A. I think he said by approved earth methods; presumably he means slushing and scraping.

Q. If left to your own judgment, with nothing but the specification which you would be endeavoring to abide by, and a plough test was made which would loosen the material in some of the cuts, or adjacent to the cuts, and it was broker up so as to be handled by a slusher, would you change your classification in that cut?—A. I think it should be changed. May I state that at camp Mile 54 there is a big clay cut, in which there was some of that very soft blue gumbo. That cut was ploughed; they had two teams of horses and they ploughed it and took it out by carts.

Q. What classification did you give it?—A. Practically loose rock; they were only able to work at that cut at one time two days in two weeks.

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Q. With carts and ploughs?—A. No, with car and track. They ploughed it and took it out with car and track.

Q. Did it not occur to you that when they ploughed it and took it out that way, under the specification it should be common excavation?—A. I would not say it should be common excavation. I am willing to admit that my classification is high in my own judgment.

Q. I think you feel your classification is high?—A. Yes, I am willing to admit my classification is high, but in my judgment there is practically no clay which should be classified as common excavation.

Q. That is your judgment, irrespective of the specification?—A. Yes.

Q. But if you would hew to the specification, that cut at mileage 54, as far as they ploughed, would have to be common excavation?—A. Well, the thing was when they ploughed, they ploughed it and it turned over in a long ribbon, it did not break up at all, and then they went along and cut it with their spades and shovelled it in.

Q. And they handled it fairly nicely?—A. Well, they paid the contractors 54 cents a yard for that, and had to give them free horses and free car and track, to let them make anything. It took the contractor's full original price for the station men to handle that cut.

Q. And to have made it common excavation, they would have lost money?—A. Oh, yes, everybody.

Q. And you did not feel it would have been a square deal to have let them lose money, when other clay was being classified as loose rock?—A. Well, that clay was very much the same as any other clay which we were classifying. My personal opinion is that there is no clay in this country as clay—or, at least, very little, there is some—which two teams of horses could not drag a plough through, except what is too soft for the horses to walk in.

Q. Suppose a contract had been made in which it was specified that all clay on District 3 was to be called common excavation, what would you have done then?—A. Well there would not have been any question; it would have been common excavation.

Q. Then how would your judgment have been?—A. There would be no question on the thing.

Q. Then it is because the language in the present specification is not sufficiently clear to your mind, rather than on account of the material?—A. No, no. The language in the specification is not clear to me, but I also think that the difficulty of handling that material was greater than the difficulty of handling material which would come under the specification as loose rock, namely a bunch of boulders one foot square. There would be the difficulty to the contractors; take a gang of ten men and work them in the clay, and work them them in what there is no question about, in the loose rock, the men would handle a great many more yards of loose rock than the others.

Q. The cost to the contractor influences you?—A. I think all the specifications are made up according to the cost of the material, that instead of calling them solid rock and common excavation, if you labeled those one, two and three, and gave your definition of them, your definition is fixed by the cost of moving that particular object. When you get down to what the specifications are, they are fixed in order to cover the cost of different materials, which are to cover the difficulty of moving these materials. The price is fixed by the difficulty of moving the materials. I think myself that the specifications really hardly cover the blue gumbo. I cannot see where it fits under any particular item.

Q. Had you no compunction of conscience in putting it under one of the items when you did not think either of them covered it?—A. No, not according to the way things were going.

Q. If you wanted to purchase some wooden pipe, which is not covered in the specifications or contract, how would you arrange a price for that?—A. You would arrange with the contractor, and put it up to the district engineer, who would put it up to the chief.

Q. If material in excavation was encountered which you did consider was covered by the contract, why do you not use the same method?—A. We have. The classification of the blue gumbo has been sanctioned by the district engineer and inspecting engineer.

Q. Not only sanctioned, but you were advised in discussion that they classified the material that way?—A. Yes, when we were asked on a thing, that is what was done. If my personal opinion differs from the chief engineer my feeling is that I have to change my mind to suit his.

(N.T.R. INVESTIGATING COMMISSION: EVIDENCE TAKEN ON THE TRAIN BETWEEN GRANT AND CROW CREEK, JUNE 9th, 1912.)

H. M. PARDEE, sworn:

Examined by the Chairman:

Q. You are an engineer by profession?—A. I am not a college man; I put myself through.

Q. Where were you educated?—A. Upper Canada College.

Q. And then after you left school you went out to make your living?—A. Yes.

Q. At what? A. I first started in to bank; I worked in that for about six years, and I worked for Clergue and Company at the Sault.

Q. As what? Banker?—A. No, as clerk in the purchasing department.

Q. Then what?—A. Then I went with Clergue on the Algoma Central.

Q. What position did you occupy there?—A. Rodman.

Q. And you continued to be rodman till when?—A. I was rodman there for about a year.

Q. Then what did you do?—A. I stayed there for a year, and then went to the G.T.P. as axeman, and then I was tapeman, and then I drifted round as topographer for a couple of years, and I ran instrument, level, and on construction on location, and then I started in over here, Residency 4, the T.C.R., as resident engineer.

Q. How long have you been on the T.C.R.?—A. I would be about three years and a half.

Q. When did you get your first Residency?—A. That would be about three years ago.

Q. And when did you commence then actively to act in classification?—A. Well, I could not say—about two years and a half ago, when I was made divisional engineer.

Q. Had you any connection with the classification until you were made resident engineer?—A. No, I had not.

Q. Of course when you became resident engineer you were more or less engaged in classification?—A. Yes.

Q. And then you became divisional engineer two years and a half ago?—A. A. Yes.

Q. Then you took up the classification and became responsible for it?—A. Yes, in a way.

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- Q. You became responsible for it until it was handed on higher up?—A. Yes.
- Q. Then you were resident engineer where?—A. Resident engineer on Residency 4, District D, T.C.R.
- Q. Whose contract?—A. That was on Foley's—at least, I should say the G.T.P.—Foley, Welch & Stewart.
- Q. Subs for the G.T.P.?—A. Subs for the G.T.P. Railway Company.
- Q. You became Divisional Engineer two years and a half ago?—A. Yes.
- Q. What was your division?—A. Division 7, where I am at present.
- Q. Describe what it is?—A. Division 7, District C, T.C.R. Railway.
- Q. Whose contract?—A. That was O'Brien, McDougall and O'Gorman.
- Q. Your headquarters are where?—A. At Hearst, mile 232.
- Q. Hearst is the place formerly called and commonly known as Grant?—A. Yes.
- Q. Have you got the total of the classification that you have certified since you have been there, of all kinds?—A. You mean that I have signed?
- Q. That you have turned in?—A. Yes.
- Q. Have you it here?—A. I have not it with me. I can give you about the percentage.
- Q. That is what I want?—A. About 48 per cent loose rock.
- Q. How much per cent of your work was solid rock excavation?—A. Practically nothing. There was no solid rock to speak of.
- Q. Forty-eight per cent. of it was what you classified as loose rock?—A. Yes.
- Q. And 52 per cent. of what?—A. Common excavation.

By Mr. Gutelius:

- Q. With a very small amount of rock?—A. Yes.

By the Chairman:

- Q. You are only giving me approximate figures?—A. Exactly.
- Q. Can you give me any approximate figures about the amount of classification you have made?—A. Made myself?
- Q. No, that has been made in yards in your division since you came into it?—A. Well, I cannot very well.
- Q. You could not tell me anything near it?

By Mr. Gutelius:

- Q. Some 15,000 or 20,000 yards to the mile?—A. Yes, it would be something like that.
- Q. And how many miles are there?—A. 65 miles.

By the Chairman:

- Q. The grading on your division is made up of cuts and fills, and where there is material in a cut you carry it and deposit it in the fill?—A. I do.
- Q. And you are paid for that work one price?—A. Yes.
- Q. When you have not sufficient to fill up to grade line from cuts on the line, you take it next from the side borrow?—A. Yes.
- Q. That is on the railway right of way?—A. Yes.
- Q. Then what do you pay for the material taken off the track and from the side borrow?—A. Well, it is 43 cents for common, and 65, I think it is, for loose; that is loose rock.
- Q. And you pay the ordinary price for solid; you do not take any solid out for that, do you?—A. No, not for that.
- Q. When you have not sufficient in the side borrow, where do you get your material?—A. In this case we have always had sufficient.

By Mr. Gutelius:

Q. It would be train fill?—A. Yes.

By the Chairman:

Q. It is not train fill that is taken from the side borrow?—A. No.

Q. The next thing you use is train fill?—A. Yes.

Q. Do you include the excavated material from the ditches in side borrow?
—A. No, I do not.

Q. That is paid for at excavation prices?—A. Yes, as loose rock and common.

Q. Or whatever it is?—A. Or whatever it is.

Q. Then you resort, after you have exhausted the side borrow and the ditches and the cuts, to what is called train fill, do you not?—A. Yes.

Q. And the train fill you obtain from borrow pits?—A. Borrow pits, exactly.

Q. Is there much of that in your division?—A. Yes, there is.

Q. A large quantity?—A. Well, I should say yes.

Q. You could not give me any estimated figures?—A. I suppose there would be a million yards anyway, or a million and a half.

Q. A million to a million and a half of yards?—A. Yes.

Q. What are they paid for that?—A. 55 cents; that is for train fill.

Q. Does it make any difference where it comes from?—A. Yes; and then they are paid one cent a yard for over five miles, for overhaul.

By Mr. Gutelius:

Q. One cent a yard per mile?—A. Yes.

By the Chairman:

Q. Train fill is material carried by the contractor on cars from borrow pits, wherever he may find the most convenient?—A. Yes, or wherever we can find the pits. We have got to get the suitable material.

Q. Wherever you can find the pits most convenient suitable for the purpose?
—A. Yes.

Q. And this material is preferably gravel?—A. Yes.

Q. Has it been on your division all gravel?—A. No, it has not.

Q. A large or small proportion?—A. Well, a small proportion is gravel.

Q. And the rest is clay?—A. Well, there is some clay, but we are going to get a good deal of sand.

Q. Clay, sand and gravel is the train fill?—Yes.

Q. Pretty nearly everything excepting this muakeg?—A. Yes.

Q. He is paid a cent a mile over five miles?—A. Yes, for train fill material.

Q. In classifying material on this line, you have classified, I believe, a large quantity of the clay as loose rock?—A. Yes.

Q. Will you give me your reasons for doing that?—A. Well, the reasons were that it was very wet and hard to handle.

Q. In the first place, you are familiar with the specification?—A. I am.

Q. You know that in the specification there is a definition of loose rock excavation?—A. Yes.

Q. And you classify a large amount of clay, in fact most of the clay, as loose rock, do you not?—A. Yes, I did.

Q. Tell me by what process of reasoning you arrive at the conclusion that you should classify this clay as loose rock?—A. Well, it was very wet and hard to handle.

Q. Some part of it you classified as loose rock because it was wet and hard to handle?—A. Wet and hard to handle, and hard material.

Q. Is the wet material hard?—A. No, it is not.

Q. Then keep them separate. First, you classified part of it as loose rock because it was wet clay and hard to handle?—A. Yes.

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Q. That was not hard, but it was too soft to handle economically; is that your meaning?—A. Yes, that is the meaning all right.

Q. You mean to say that it cost the contractor——?—A. It was very expensive stuff to handle.

Q. That is one head. Now, the next heading of clay which you classified as loose rock was what?—A. It was too hard to plough and had to be blown.

Q. Did you classify the top, the surface clay, as loose rock material?—A. No, I did not.

Q. How deep did you classify in your usual cuts as earth excavation?—A. From a foot to a foot and a half from the top; it was common excavation.

Q. How was that taken off?—A. It was taken off in carts.

Q. How was it moved out of its present position?—A. With shovels.

Q. Then you passed through that for a foot or a foot and a half?—A. Yes.

Q. What did you come on then?—A. We came on a more sticky gumbo; I cannot say in all cases that we did that.

Q. I mean usually?—A. Usually, yes.

Q. I am not pinning you down to all cases. I want you to understand that unless I ask you with particularity, I am only asking you generally over your work?—A. I understand.

Q. You came on sticky gumbo—A. Yes, soft, sticky gumbo.

Q. And that is the material you first spoke of as being soft and wet?—A. Yes.

Q. Why did you not class that soft material as common excavation?—A. This is the second piece you are speaking of?

Q. Yes?—A. Well, because it was too hard to handle.

Q. How did they handle it?—A. They handled it with picks and shovels; they shot it with dynamite.

Q. You are talking now only of the soft material?—A. Yes.

Q. They did not shoot soft material?—A. They did in some cases; I have seen it done.

Q. In your work did they generally shoot this soft material?—A. No, they did not.

Q. Tell me how they handled this soft material you call gumbo?—A. With picks and shovels.

Q. How would they pick the soft material?—A. The pick kind of loosens it up. It is a kind of soft, mucky stuff, and they cut it out in chunks and shovel it in, if they can.

Q. What would they use? One of these mattocks?—A. Yes, a mattock generally.

Q. A mattock is not usually used in hard material?—A. No, they use picks.

Q. You say they took it down with mattocks?—A. Yes.

Q. Cut into the face of it?—A. Yes.

Q. Pulled it down with a mattock?—A. Yes.

Q. And threw it in with a shovel?—A. Yes.

Q. That is a fair description of their methods?—A. Yes.

Q. That was usually the way the material was taken out?—A. Yes.

Q. How deep would this material average?—A. It would average right to the bottom of the cuts.

Q. I am speaking now of the soft material. Was there anything below the soft material?—A. Not generally, no.

Q. Then in some cases it would be loose, common excavation on top, and then right to the bottom of the cut gumbo?—A. Yes.

Q. Tell me about what proportion of your work was gumbo?—A. About 48 per cent.

Q. But tell me what proportion of your work was gumbo—soft clay that was classified as loose rock?—A. About 99 per cent of soft stuff.

Q. Then you had no indurated or hard clay on your division?—A. About one per cent of it.

Q. About one per cent of it was indurated or hard clay in your division?—A. Yes.

Q. So that, as far as you are concerned, I need not trouble you at all about indurated clay or hard clay?—A. No.

By Mr. Gutelius:

Q. To make it clear, were any of these clay cuts of yours excavated by means of shots and powder?—A. In the winter there was some with shot.

Q. But only in case of frost?—A. Yes.

Q. Not on account of the material being so hard that it required blasting?—A. No.

By the Chairman:

Q. Was much of this material, gumbo, taken out in the winter?—A. Quite a good deal of it.

Q. Have you any notion about what proportion of it?—A. About, we will say, fifty per cent, I suppose. I cannot very well tell.

By Mr. Gutelius:

Q. Roughly, half of it?—A. Yes.

By the Chairman:

Q. I suppose your returns will show all this?—A. Yes.

Q. I want it put in a summary, and I can check it by the returns, so that you need not trouble yourself to be accurate, as long as you get reasonably near it. It is a convenient way of getting it?—A. Yes.

Q. Did you allow that loose rock because it was frozen?—A. No; well, in rare cases there was some of it allowed, but very little of it.

Q. Do you show in your returns that it was put in as frozen?—A. No, I do not think so.

Q. About what proportion did you allow because it was frozen? I suppose that question need not be asked, because you would have allowed that same material, if it had been taken out in the summer, as loose rock?—A. Yes.

Q. So that it makes no difference?—A. No.

Q. Did you ever classify any of this soft clay at any time as common? What I mean is, did you ever change your classification, or have you pursued this course from the beginning?—A. I have pursued that course, to the best of my ability.

Q. I am not questioning your integrity, but I want to find what you did. Have you pursued that course from the beginning?—A. I have.

Q. Did you ever raise your classification?—A. Yes, I have raised it in a few cases.

Q. What did you raise?—A. I have raised it in cuts.

Q. From what?—A. I have raised it in some borrows.

Q. From what?—A. From common to loose rock.

Q. Do I understand you to mean that, having classified your material as common excavation and sent it in, you afterwards classified that same kind of material as loose rock?—A. Loose rock and vice versa.

Q. Why did you do that?—A. Well, I do not know. I thought my judgment was not quite right at first.

Q. At first you put it in as common?—A. I put it in as common.

Q. Who talked you into changing your judgment?—A. Nobody.

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Q. Somebody must have protested, or you would not have changed, would you?—A. Oh, yes.

Q. Did any person protest?—A. No.

Q. Was the contractor satisfied?—A. I do not know. The contractor never knew anything about it, as far as I know.

Q. He got paid on estimates?—A. I know he did, but he never spoke to me about it at all. There have been cases where he has spoken to me.

Q. You first began by putting in the soft clay as common excavation?—A. Yes, I have.

Q. Then, without any persuasion by any person else, you changed that classification?—A. I have changed it.

Q. And the contractor, so far as you know, made no complaint of the first classification?—A. I think not.

Q. How much did you classify as common excavation before you changed your judgment?—A. Oh, it would not be any very large amount.

Q. About how much?

By Mr. Gutelius:

Q. How many months?—A. Well, I suppose about ten or twelve months, all the time I was up there. The work was going on, and they were moving this stuff.

By the Chairman:

Q. I want to be fair with you, and your answers may mean what you do not wish to say, unless you are very careful and understand the question. You told me that in the beginning you classified this soft clay, which you describe as gumbo, as common excavation?—A. Yes.

Q. How long did you continue to classify gumbo as common excavation?—A. I never continued.

Q. How long did you do it?—A. I never did it.

Q. You said you did in the beginning and then you changed your mind?—A. No: I say I changed parts of things that I thought were gumbo, which I found had not been working so hard as the others; I changed it back again.

Q. You mean you have rectified what you considered were mistakes you had made?—A. Exactly.

Q. But you never changed your general method of classification?—A. No, no.

Q. You see now it gives an entirely different impression?—A. Yes.

Q. Then have you classified all the work that has been classified on this division?—A. On my division?

Q. Yes, from the beginning?—A. No.

Q. Who preceded you as divisional engineer?—A. I will have to explain to you. I started off with thirty miles at first.

Q. On that thirty miles who preceded you?—A. No person.

Q. Then you did all the classifying on that thirty miles?—A. Yes.

Q. Which thirty miles is that?—A. That was from 218 to 248.

Q. Where is that? Grant?—A. Yes, it passes through Grant, mile 218 to mile 248.

Q. On section D?—A. On section D.

Q. Was there any divisional engineer on the remainder?—A. Yes.

Q. And when did you take charge of that portion?—A. I took charge of that last September, I think it was—part of it.

Q. Was there much classification made before you took it up?—A. It was nearly all made.

Q. Who was the man who classified that?—A. Mr. McLellan and Mr. Sunston had this end of it.

Q. So that you only had half the division?—A. I only had half the division.

Q. So that you are not responsible for the classification on the western half?—A. Well, I have had it added on to both ends.

Q. How much did you have added on to the western end?—A. I have 20 miles on the other end.

Q. 20 miles on the west end?—A. Yes.

Q. And how much on the east end?—A. And the balance at this end.

Q. The balance on the east end?—A. Yes.

Q. Your section was in the middle?—A. Yes.

Q. Are you responsible for the classification of either of these ends?—A. Well, only in places where the work was not quite completed.

Q. Generally speaking, you are not responsible for it?—A. No, generally speaking I am not.

Q. But over all your work you made the same classification?—A. I did.

Q. And over all your work it was soft clay?—A. It was soft clay, yes.

Q. Do you know what gumbo is?—A. Well, I guess I do.

Q. Where did you learn what gumbo was?—A. I saw it out on Residency

4. Don't you call that gumbo you get around Lake Abitibi—blue clay?

Q. Describe gumbo? What is it as you call it?—A. It is a sticky clay.

Q. Colored what?—A. Oh, kind of the color of the table cloth.

Q. The table cloth is very bilious looking?—A. It is a bilious looking orange.

Q. What is the color in your judgment?—A. A kind of grey—bluish grey.

By Mr. Gutelius:

Q. Some yellow?—A. Some yellow.

By the Chairman:

Q. At the station in Grant, opposite the freight house, on the 8th of June, the contractors were digging out a quantity of clay and spreading it to fill the yard?—A. Yes.

Q. Is that what you call gumbo?—A. It is when it is softened up.

Q. Is that stuff what you call gumbo?—A. No, not at the present time: if it was wet it would be.

Q. Gumbo is simply clay more or less in solution?—A. Yes, that is the way I would put it.

Q. How would you classify that clay at Grant?—A. That which they are taking out at the present time?

Q. Yes?—A. I would classify it as common excavation.

Q. That was taken out with a mattock and shovel?—A. Yes.

Q. If that clay had been wetter, and still to be taken out with a mattock and shovel, you might classify it as loose rock excavation?—A. Well, I am getting a little mixed up in it.

Q. I think you are. You told me if that clay was wetter it would be what you would call gumbo?—A. Yes.

Q. Do you mean that?—A. Well, it would be, and what I want to explain to you is that that stuff, when it is wet, is very hard to handle; I do not know whether you would call it gumbo or not. At the time that country was opened up it was very hard stuff to handle when it was wet.

Q. When you use the word "gumbo" here, you only mean grey or yellowish clay that is very wet?—A. Yes.

Q. That is what you mean?—A. Yes.

Q. And if that does not mean gumbo, then you have not been speaking of gumbo at all?—A. No.

Q. That is what you mean, is it not?—A. Yes.

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Q. You do mean now that you have classified what one sees in going along this line in cuts—that is, a greyish clay—as loose rock when it was so wet that it was very expensive to handle?—A. Yes, that is exactly what I am trying to get at.

By Mr. Gutelius:

Q. The specifications for the N.T.R. are the only specifications you ever classified material under?—A. Yes, that is so.

Q. Your whole schooling, then, was on this railway?—A. Yes, as far as classification is concerned.

Q. Is it not a fact that you did discuss the classification with your higher officers?—A. Oh, I have discussed it, yes.

Q. Did you not get this classification such as you knew they would approve?—A. Yes.

Q. Did you make any personal study of the specifications with reference to the plough test?—A. Yes.

Q. Did you consider the plough test at all in classifying?—A. I did.

Q. Did you ever make a test with the plough?—A. We did, yes; we tried to move one cut with a plough.

Q. Could you plough it?—A. We could plough it, yes.

Q. And after showing it could be torn up by the plough, you still called it loose rock?—A. Loose rock, as the plough did not help it out any.

By the Chairman:

Q. What do you mean by "did not help it out any"?—A. Well, did not make it any easier to move.

Q. It turned it over, though?—A. It might run through it, and you could see that a furrow had been there, and you might not be able to in other places; some places it would catch hold of a little chunk of it and turn it over.

By Mr. Gutelius:

Q. But it tore the material out?—A. Yes.

Q. The plough went in the stuff?—A. Yes.

Q. In the interpretation of the contract did you not consider that the clause relative to ploughing was a test, rather than a method of excavation?—A. Yes, that is the way I should have taken it, I should think.

Q. Then you did test it, and found that it stood the test, namely being able to plough it?—A. Yes.

Q. And because it could not be handled cheaply after ploughing, you called it loose rock?—A. Yes. The way I got it was that if you could plough it, and it was any help by being ploughed, why the plough was to be used, and it was to be called common excavation. But if your plough did not help it at all, then the man had to use his own judgment, as far as I have learned.

Q. You know the difference between a test and a method of moving material?—A. Well, yes, I have seen tests made.

Q. Suppose that, instead of the plough test, it had been a test to drive a piece of two inch gas pipe through the material with a sixteen pound hammer, and that you could have driven this through, and found the material as hard as it is actually, how would you have classified it?—A. Well, if I could have done that, I would classify it as common.

Q. Don't you see a plough test might have been made on each of these cuts, the same as the tube test, and after that it could be removed in any way that they chose, and you would, according to the specification, be compelled to classify according to the test?—A. Yes.

By the Chairman:

- Q. It could be ploughed?—A. Yes, it could be ploughed.
 Q. Just as it could be tested by the tube?—A. Yes.
 Q. And yet you put it in as loose rock?—A. Yes.

By Mr. Gutelius:

- Q. If the price of common excavation on this contract had been 60 cents a yard, and the price of loose rock 75 cents a yard, would that have influenced your specification?—A. I hope not.
 Q. Make sure about that?—A. I hope not.

By the Chairman:

Q. If the price had been 60 cents for common excavation and 60 cents for loose rock excavation, and you thought you could plough it, then how would you have classified it?—A. You mean just changing it around?

Q. No, if the price had been 60 cents for common excavation and 60 cents for loose rock, and the plough would have gone through it, as you say it would, then how would you have classified this soft clay—if the price had been the same?—A. I think I would classify it just about the same, as far as I interpret—

Q. But it would not be loose rock?—A. No, that is the trouble: it is not loose rock. There should be a class in between. There should be something to cover this material.

Q. If the price had been the same, if there had been no difference in the price, how would you have classified it when you were told to so classify that stuff on which you could use the plough test? How would you have classified it then?—A. It is pretty hard to say.

Q. The price paid for common excavation and loose rock is what influenced you?—A. Yes.

Q. That is what influenced you?—A. Yes.

Q. And if the price had been as good for common as it was for loose, you would have made it common?—A. Yes.

By Mr. Gutelius:

Q. Because of the plough test: that would have been the reason?—A. Yes.

By the Chairman:

Q. Is that what you mean? Here you have a cut, and in your hand you have a specification, and that specification says that all material, excepting rock, which is described as solid, which can be ploughed with a ten inch grading plough, drawn by six good horses properly harnessed, shall be classified as common excavation. Now, you came along and you saw this material and you said, "While I believe that six good horses can draw a plough through there, yet it will not leave it in any better condition for handling; I know that the price to be paid for common excavation is exactly the same as the price to be paid for loose rock: it will not benefit the contractor one cent for me to call this loose rock any more than to call it common excavation"; what would you have called it under these conditions?—A. I would call it loose rock.

Q. You will still call it loose rock?—A. Yes.

Q. Why?—A. Well, because the plough was no good; it did not help things out.

Q. What is the use of considering whether the plough was any good or not, when the man was getting the same price for one as the other? I think, Mr. Pardee, what your evidence amounts to is this: that you thought it should be loose rock excavation unless the ploughing improved it?—A. Yes, that is it exactly.

Q. That is the whole thing?—A. Yes.

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By Mr. Gutelius:

Q. Then you do not accept the clause about ploughing as the test for classification?—A. Well, I did not think, from what I saw of the plough test, that it helped the work any that I saw done.

Q. And that as a test for classification it was no good, and you did not use it?—A. That is it.

Q. I think that is what you mean?—A. Yes.

Q. You practically abandoned the plough test in your classification?—A. Yes, that is what I did.

Q. I notice on your division a great many places where the sub grade has been raised through muskeg country. That appears to me to be too high. When I suggest lowering these grades from one to three feet, does it appeal to you as a method that might have been adopted in reducing the cost of grading this railway?—A. It does, certainly.

Q. Can you take your profiles and show a new grade line which will keep the gradients within the present maximum limits and figure how much saving could be made in dollars?—A. I could.

Q. That would be all right if it was done in that way?—A. Yes.

Q. And at the same time give them a four-tenths and six-tenths railway?—A. Yes.

By the Chairman:

Q. Do you think that ought to be done for economical construction?—A. I think it should.

Q. Do you think there would be much saving made?—A. Quite a good deal.

Q. It is an important item, is it?—A. Yes.

Q. And the grades are kept unnecessarily high?—A. In places I think so.

By Mr. Gutelius:

Q. Who is responsible for the adoption of the present sub grade line on your division?—A. I say the chief engineer.

Q. Why?—A. Because he is the man that looks after that, as I understand it—the man who approves of it.

Q. Who presented those grade lines to the chief engineer?—A. I suppose the locating engineer.

Q. You received that profile completed and you worked to it?—A. I worked to it.

Q. Without any variation?—A. Yes.

Q. Generally?—A. Yes.

Q. In the location of ditches, what officer says where ditches shall go?—A. The divisional engineer.

Q. Are you satisfied that all the ditches you dug on your division are necessary?—A. I had to get proper drainage; that is, if you want to keep your borrow pits dry, and I believe that was the intention—at least on the Grand Trunk Pacific—that we were to keep our borrow pits dry out on the prairie.

Q. This excessive ditching was caused by draining the borrow pits?—A. Yes, and giving a dry roadbed, as I have always learned.

Q. Was there much classified clay in your drainage ditches?—A. No, I should think it would run about between 20 and 25 per cent.

Q. Of classified material?—A. Of classified clay.

Q. This contract was let first to the G.T.P.?—A. No, to Davis.

Q. First to Davis?—And then to O'Brien, Macdougall and O'Gorman.

Q. And then sublet?—A. Yes.

Q. In that subletting what was the average length of sub contracts, to the fellows who actually performed the work?—A. Between eight and ten miles.

Q. Did they sublet many individual contracts to station men?—A. Yes, it was all pretty much sublet to station men.

Q. What do we understand by station men?—A. Station men are men who build two or three stations and do the work on those stations.

Q. A station is 100 feet?—A. Yes.

Q. And they receive a price per yard?—A. A price per yard.

Q. For material as finally classified?—A. Yes, as finally classified—well, no, I should not say finally classified.

Q. As classified by the engineers?—A. As classified by the engineers; that is, by the divisional engineers.

Q. Does the divisional engineer always pass upon an estimate for station men?—A. Yes; as a general rule, yes.

Q. He should always do it?—A. He should always do it.

Q. Why should not the resident engineer make a classification and hand it direct to the station man?—A. In this way: that I had a copy of these estimates sent to my office, and I looked them over, and I was satisfied that they were correct.

Q. You are satisfied that all estimates given to station men conform to the estimates and classification given to the general contractor?—A. I am.

Q. And to ensure that they do conform, the divisional engineer should join with the resident to prevent any possible variation?—A. Yes, that was always my policy.

Q. In the contracts that have been let to the station men here, what are the rates given to station men generally?—A. I will have to consider it.

Q. .23, .36 and \$1.30 is one that we saw yesterday; how does that look?—A. I could not tell you as to the station men very well.

Q. .23, .36 and \$1.30?—A. I should think that would be about right.

Q. That is about what they got?—A. About what they should get, or what they did get.

Q. If the station men had received .43, .65 and \$1.75, would you still have classified in the same way?—A. Yes, I think I would have. You ask, if the station men would have those prices—the same price as the main contract exactly?

Q. Yes?—A. I suppose I would. It is a pretty hard proposition to run up against.

By the Chairman:

Q. In other words, did you not classify as you did to give the station men a chance?—A. No, I do not think so.

Q. You did not do that?—A. No, I do not think so.

By Mr. Gutelius:

Q. What do you think of the price for cement, \$16?—A. I would not give any opinion on it, because that is the first cement I ever had anything to do with.

(N. T. R. INVESTIGATING COMMISSION: EVIDENCE TAKEN ON TRAIN BETWEEN GRANT AND COCHRANE, JUNE 9th, 1912.)

RALPH HOLLAND, sworn:

Examined by the Chairman:

Q. You are an engineer by profession?—A. Yes.

Q. How long have you been in the employ of the N.T.R.?—A. Four years last April.

Q. Always engaged on construction?—A. On the N.T.R., yes.

Q. And before you came on the Transcontinental, where were you?—A. I

was with the Kettle Valley lines in British Columbia from 1900 to 1901, and from 1901 to 1908 I was with the Canadian Northern.

Q. Where were you on the Canadian Northern?—A. I was engaged on the main line to Edmonton and in Quebec and Ontario, the Hawkesbury-Ottawa line.

Q. So that you are pretty familiar with the construction of railroads in Canada?—A. Yes.

Q. What is your position now?—A. Divisional engineer.

Q. How long have you been divisional engineer?—A. Three years.

Q. On what division?—A. Division 4, and then when 5 was amalgamated with 4, I took over division 5, and when division 6 was amalgamated with 4 and 5, I took over the three divisions. That covers 100 miles, all the Fauquier contracts.

Q. Did you become divisional engineer as soon as you came on the road?—A. No, I was 11 months as resident engineer.

Q. Where?—A. First Residency west of Cochrane, Residency number 10.

Q. On Fauquier's contract?—A. Yes.

Q. On the present division?—A. On the present division.

Q. We know from other witnesses how this material has been classified on your division, and we understand that a large quantity of clay has been classified as loose rock, and you were one of those who classified a large quantity of clay as loose rock. Have you practically classified, or revised the classification, of all Fauquier's clay?—A. No, sir, I only classified the first 40 miles.

Q. You have read the specifications?—A. Yes.

Q. You will remember the specification says that clay which may, in the opinion of the engineer, be ploughed with a ten-inch grading plough drawn by six good horses, properly handled, shall be classified as common excavation?—A. Yes.

Q. Did you classify any clay as loose rock which, in your judgment, could be so ploughed?—A. We did not have any test. We classified no clay that we thought could be ploughed to a commercial advantage; that is, by ploughing it, it could be made more easily handled.

Q. You say you made no tests; do you know whether any tests were made?—A. Well, there was one test made at the Mettagami. I did not see it myself, but I saw the result of it.

Q. That was a plough test?—A. That was a plough test.

Q. Where was this plough test?—A. Mileage 134.

Q. Who made it?—The sub-contractors, Videau and Overend.

Q. What did they make it with?—A. Grading plough and four horses.

Q. You saw it after it was ploughed?—A. Yes.

Q. How much did they plough?—A. They ploughed a strip five or six hundred feet long.

Q. How wide?—A. Twenty feet.

Q. Did they turn it over?—A. Parts of it; the plough would jump out.

Q. But, generally speaking, did they turn it over?—A. Yes, they turned it over.

Q. What shape was it in when it was turned over?—A. Just one length; it did not break or crumble.

Q. Do you mean turned over like a piece of rubber?—A. Yes.

Q. How long afterwards did you see it?—A. Next morning.

Q. How long did it take to fall apart?—A. It was picked apart.

Q. How long would it take to fall apart?—A. A week.

Q. It would crumble all up in a week?—A. Some of it, not all of it, some never would.

Q. Does not all this crumble when it is exposed to the atmosphere?—A. Not all; some hardens.

Q. That which does harden will crumble by a blow?—A. Yes, it has a tendency that way.

Q. How long had this surface been exposed to the atmosphere that was ploughed?—A. When I saw it?

Q. How long had it been exposed before it was ploughed?—A. They ploughed it the first thing, as soon as they grubbed it.

Q. Do I understand that this was the original surface of the soil?—A. Yes.

Q. And do you mean to tell me that that stuff turned over and stood like a ribbon?—A. Yes, not a ribbon for two or three hundred feet, but for fifteen or twenty feet it was a ribbon.

By Mr. Gutelius:

Q. Were there any pieces longer than a foot or two?—A. Well, they ran over that.

By the Chairman:

Q. What was the average?—A. Well, they looked to me to be much longer than the plough, and the plough is eight feet.

Q. What did they do with that stuff when they turned it over?—A. They picked it and wheeled it in a dump.

Q. Did you see any of them cross it with a scraper?—A. Yes, we tried to load the scraper, but could not get the stuff in.

Q. Was it moist?—A. Fairly so.

Q. How far down was it? I am taking the datum line to be the grade line. How far was it above the datum line?—A. There was four feet depth.

Q. But where you did the turning over?—A. Two or three feet.

Q. Below the grade line?—A. Below the ground line.

Q. That is where you ploughed it?—A. Yes.

Q. So that it was in low ground?—A. No.

Q. Was it in a cut or on the level?—A. No, on the level, certainly.

Q. Below the grade line of the road?—A. Below the grade line of the road.

Q. Would it have been fair to have ploughed that in a cut?—A. How do you mean fair?

Q. Was this ploughing done on a knoll or in a hollow?—A. Yes, on a slight knoll.

Q. You say what you saw there, although it could be ploughed, it could not be ploughed to any advantage to the contractor?—A. No, sir.

Q. The ploughing was of no advantage to him?—A. No advantage.

Q. And he broke it up with picks and mattocks?—A. Yes.

Q. Can you show me any material of that kind near the surface of this country?—A. I can show you the spot where that was done.

Q. Do you think you could find a place where you could turn over that stuff now with the same result?—A. You could not on the right-of-way now.

Q. But outside of that?—A. You could on the drainage area, I feel certain of that.

Q. Or any part that is not affected by the drainage?—A. Yes.

Q. What percentage of the clay in your district has been classified as loose rock?—A. 70 per cent average; that is in the cuts—70 per cent.

Q. In your judgment the plough test does not make it common excavation, unless it improves the material?—A. No.

By Mr. Gutelius:

Q. You do not consider the clause in connection with ploughing to be a test at all?—A. I considered it in this way, that it has to be a commercial test; it has to render the material in a condition to be handled commercially.

By the Chairman:

Q. Do you know what the sub-contractor is getting for this work?—A. On Fauquier's contract?

Q. Yes?—A. .32 for common and .55 for loose rock and \$1.60 solid rock.

Q. What did the station men get?—A. .23 to .27 for common and .40 to .48 for loose rock, and I do not know what the solid was.

Q. Was the most of the stuff taken out by station work?—A. The majority of it, yes.

Q. So that the actual work on the ground cost not half of what the contract price was?—A. It cost the station men's price.

Q. And you have given us the general price paid to station men?—A. Yes.

Q. The station men did a great proportion of this work of grading?—A. Yes.

Q. Was most of the work let to station men?—A. Where possible, it was let to station men, except where they could not handle it in the large cuts.

Q. There would be a good profit in the job, would there not?—A. Well, from the station men's price to the contractor's price there is a big difference.

Q. From the station men's price to the contractor's price is a far call?—A. Yes.

By Mr. Gutelius:

Q. When you first tackled this classification, were you not surprised at the material which was being called common excavation?—A. Not surprised at the material when I first came in.

Q. When you first came in, and found they were classifying clay as loose rock, did that not surprise you?—A. It did, until I saw how it worked. When I saw the actual work my opinion changed.

Q. Supposing the men who were removing the material, whether station men or sub-contractors, had been receiving the same prices as given to the main contractors, would you not still have felt that the classification which they were making was too high?—A. Well, I would have felt that it was on the high side, that it was good classification.

Q. Very liberal classification?—A. Yes.

Q. What convinced you ultimately that it was reasonable classification was that the men who did the work were scarcely able to make wages?—A. What convinced me was that men working by the day for the contractors could not make wages at common excavation prices; that is, day wages, not station men's wages.

Q. At sub-contractors' prices?—A. Yes.

Q. And that the classification would have been liberal if the sub-contractors had received the original contractors' figures. It would have made an easy job at that classification?—A. Yes.

Q. So that the cost of the work to the party who did it has some influence with the classifier?—A. What is that?

Q. The cost of the work to the contractor or station men has some influence with the engineer who makes the classification? Some of our friends have said no it did not, absolutely?—A. In my opinion it had to have.

Q. It must be so?—A. It must be so.

Q. How can an engineer arrive at a conclusion as to comparison of hardness unless he takes into account the labor and its cost?—A. The only way we can get it.

Q. Did these men, after they learned this clay was going to be classified as loose rock, work with the same vim and energy as men that you have known on the Canadian Northern?—A. Yes, I really think they did.

Q. They seemed to do the same amount of work per day?—A. Yes.

Q. This work was very expensive?—A. Yes.

Q. To what do you attribute, as compared with the Canadian Northern construction, the reason for this very expensive railway?—A. Is this in regard to classification or—

Q. Everything; I am going to ask you why this cost so much more money than so many miles of the Canadian Northern would have cost in the same country?—A. The spirit seemed to be that the railway was to be the best built, without regard to expense; that everything for the betterment of the road was to be done, and done at the time of the building.

Q. Now, if the question of expense had been made paramount, the same as on the Canadian Northern, what changes would have been made, so far as your district was concerned?—A. Well, we would have had lighter grades.

Q. Just think of all the things that you would have to change in this railroad to make it the same type as the Canadian Northern, and tell us in your own language?—A. Well, first on the openings, the culverts; where we put in concrete permanent culverts, a cheaper culvert could have been put in, to last for a number of years.

Q. What would it be?—A. Either a cedar box culvert or pile trestle, to take the place of our concrete culverts.

Q. The question of openings would have amounted to a large sum in this first lay-out?—A. Yes.

Q. What next?—A. The next was on the quantities of the grading.

Q. How would you reduce the grade quantities?—A. By using more maximum grades, more sags.

Q. By preserving the maximum of four-tenths east and six-tenths west, could you have introduced sags and momentum grades to advantage?—A. Yes, sir.

Q. Would that have amounted to very much money on your 40 miles?—A. Considerable.

Q. In the matter of ditching, would the Canadian Northern have constructed as many ditches as we have built here?—A. In my idea, it was necessary to put in every drainage ditch we have done.

Q. Would a Canadian Northern divisional engineer allowed you to have dug so many ditches, if they had built this railroad?—A. I think they would have.

Q. Would the Canadian Northern Railway have allowed you to have made the embankments so high across the muskegs?—A. No, sir.

Q. Those embankments could have been lowered and the standard of the road maintained?—A. I think so.

Q. And that would have created another large saving?—A. Yes.

Q. That is clear; the standard of the N.T.R. could have been maintained over your 40 miles and considerable money saved by laying the road-bed lower?—

A. Yes, sir, exactly.

Q. You never worked on the C.P.R.?—A. No, I know nothing of the C.P.R.

Q. Did you ever do any contract work yourself?—A. No, sir.

Q. Never interested in any contracts?—A. No, sir.