SAM 16731

READ, STUDY, COMPREHEND, THEN CRITICISE.

GOUDIE'S

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Perpetual Sleigh Road

SUPERSEDES THE RAILWAY,

AND IS CAPABLE OF CARRYING PASSENGERS AT A

RATE OF EIGHTY TO ONE HUNDRED MILES AN HOUR.

FROM THE ATLANTIC TO THE PACIFIC OCEAN IN 40 TO 45 HOURS;
FROM MONTREAL TO FORT GARRY IN 15 TO 16 HOURS;
FROM TORONTO TO HALIFAX, N. S., IN 16 HOURS;
OR FROM LONDON TO ST. JOHN, N. B., IN
20 HOURS.

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TORONTO:
PRINTED AT THE OFFICE OF THE "MONETARY TIMES,"
64 AND 66 CHURCH STREET.

1874.

him, in decrying those discoveries, in applying to those who m[illegible], even the very greatest, the epithet of 'schemers,' and then, when he finds that beyond all dispute some new matter is good and has come into general practice, taking to it grumblingly, but still taking to it, because, if he did not, he could not compete with his co-manufacturers. The aim and object of such a man, indeed, is to insure that he should never make a mistake by embarking his capital or his time in that which has not been proved by men of large hearts and large intelligence. It is such a practical man as this who delays all improvement. For years he delayed the development in England of the utilization of the waste gases of blast furnaces, and he has done it so successfully that, as I have already had occasion to remark, this utilization is by no means universal in this kingdom. It was such men as these who kept back surface condensation for twenty years. It is such a man as this who, when semaphores were invented, would have said, 'Don't suggest such a mode to me of transmitting messages; I am a practical man, sir, and I believe that the way to transmit a message is to write it on paper, deliver it to a messenger, and put him on horseback.' In the next generation his successor would be a believer in semaphores; and when the electrical telegraphist came to him and said, 'Do you know that I can transmit movement by invisible electrical power through a wire however long, and it seems to me that if one were to make a code out of this movement, I could speak to you at Portsmouth, at one end of the wire, while I was in London at the other.' What would have been the answer of this practical man? 'Sir, I don't believe in transmitting messages by an invisible agency; I am a practical man, and I believe in semaphores, which I can see working.' In like manner, when the Semens regenerative gas furnace was introduced, what said the practical man? 'Turn your coals into gas, and burn the gas, and then talk of regeneration! I don't know what you mean by regeneration, except in a spiritual sense. I am a practical man, and if I want heat out of coals I put coals on to a fire and burn them," and for fifteen years the practical man has been the bar to this most enormous improvement in metallurgical operations. The practical man is beginning slowly to yield with respect to these furnaces, because he finds, as I have already said, that men of greater intelligence have now in sufficiently large numbers adopted the invention to make it a formidable competitor with the persons who stolidly refuse to be improved. The same practical man for years stood in the way of the development of Bessemer steel; now he has been compelled to become a convert. I will not weary you by citing more instances, but one knows, and one's experience teaches one, that this is the conduct of the so-called practical man; and his conduct arises not only from the cause which I have given (his ignorance of the principles of his profession), but from another one, which I have had occasion to allude to when speaking upon a different subject, and that is, you offend his pride when you come to him and say, 'Adopt such a plan, it is an improvement on the process you carry on.' His instinct revolts at the notion that you, a stranger, and very likely his junior, and very probably, if the improvement be an original and radical one, a person not even connected with the trade to which that improvement relates, should dare to assert that you can inform him of something connected with his business that he did not know. In too many cases (continued Mr. Bramwell) the owner of a manufacturing business, whose capital kept it going, and whose commercial aptitude rendered it prosperous, left very much of its actual working to some foreman or manager, who was often one of the so-called, as distinguished from the real, 'practical men.' He pointed out how such persons scoffed at and obstructed inventors, and derided them as 'schemers;" and pointed to Mr. Bessemer as a man who was long described as a 'schemer' because there were difficulties of detail in carrying out his great invention, which for a time he could not overcome. In conclusion, Mr. Bramwell advocated the formation of a society to give prizes for the most economical forms of engine construction and maintenance, and said that such a society would be a valuable outcome of the meeting of the section."

SAM 1673

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PREFACE.

"Bring forth the blind people that have eyes, and the deaf that have ears: let the people be assembled; let them bring forth their witnesses, that they may be justified: or let them *hear and say it is the truth.*"

This pamphlet is composed of two parts, written at different times, but each intimately connected with the other—1st, the letter addressed to our Honorable Premier; 2nd, the Appendix;—and I ask your very careful consideration of both, as the one will help to a more thorough understanding of the other, and each will be found to contain both *facts* and *figures* which it is very *important you should be acquainted with.* Indeed, I have no hesitation in saying that the letter addressed to the Premier and the Appendix—altogether apart from the novel scheme of transit which they describe—will be found to contain an amount of technical and other information concerning the railway system to be found nowhere else; information which it cost me weary months of labor to cull from a hundred different sources, many of them not easily accessible to the general reader. It will, therefore, *amply repay* the most careful perusal.

It may also be well to remark that as it is now nearly three years since the letter was written, and chronic ill-health has prevented me thoroughly revising or re-writing it; and as it was intended to influence the Pacific Railway policy of the *late* Government, there may be found slight discrepancies in figures and dates, or trivial errors in speaking of political actions or events, but nothing which can in any way affect the conclusions sought to be established. The letter, however, although prepared for the consideration of the *late* Government, was never sent to it, as previous to its publication I had received such information from Ottawa as convinced me that their policy on that most important subject (the Pacific Railway) had actually passed beyond their own control, they having made arrangements with Sir Hugh Allan such as precluded the possibility of a change, no matter how advantageous the change might offer to be; and further, that if I published my scheme, or tried to create a public feeling in favor of it, the likelihood was, that I would be accused of being in league with the enemies of my country, and one of those who,

bribed with American gold *(sic)*, were doing everything in their power to prevent the success of the Canada Pacific Railway. Hence, having first submitted my plan to the person most interested in the Pacific Railway, I concluded that it would be better for me to keep quiet until Sir Hugh had made the failure which, from the knowlege of railways I then possessed, I felt certain he would make, and the Government of the day had decided what plan was to be tried next.

Both events are now things of the past. Sir Hugh has made his failure, and the Government has explained its policy and developed its plan for the construction of the Canada Pacific Railway : a plan which, but for the one saving clause in regard to time, would be far more disastrous to the Dominion than the much reprobated plan of their predecessors.*

I repeat that the Government, having now made known their plan and reiterated their determination to build the Canada Pacific Railway, I hasten to lay my scheme of "Sleigh or Roller Roads" before you, and in doing so I bespeak for it your very serious and earnest consideration, so that you may be able to judge whether or not it is the means by which you may be enabled to escape the fearful burthen of debt that the building of a railway to the Pacific must inevitably entail upon you and your children; also, whether or not my Sleigh Road would make our great North-west a really valuable, because an easily accessible, land.

Doubtless you may find my pamphlet but dry reading, and, in a literary sense, very faulty, for I am the merest tyro in literary composition. But in that case I beg of you to allow the vast importance of the subject, and your own personal interest in it, to cover up the defects of style. I would also suggest that, should you sometimes feel like

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* I of course attach no weight whatever to the clauses of the Bill which enact that all contracts, agreements, etc., etc., must be submitted to Parliament before taking effect. Indeed, I look upon it, to coin a phrase, as mere constitutional dust thrown in the eyes of the public to blind them to the real issue and responsibility; for so long as our Government is carried on by *party*, just so long must the responsibility rest on the shoulders of the *few men* acting as *leaders*. Consequently, whether the Canada Pacific shall be built or left unbuilt—whether the wealth and resources of our young Dominion shall be developed and husbanded with care, or recklessly squandered in useless enterprises—are matters that, for the time being, rest entirely in the hands of the Hon. Alexander Mackenzie and the half-dozen men who lead the great party of Reform; and the sooner the general public come to realize that fact the better it will be for all concerned, for thepublic will then know exactly where to put the blame or to bestow praise, according as actions are well done or the contrary. It will also make the weight of responsibility hang all the heavier on the shoulders of our rulers, and cause them to act with wise circumspection.

exclaiming, "Why this repetition, this amplification, and superfluous explanation?" that you will reflect just for a moment that the talent—or genius, rather—necessary to write concisely, clearly, and at the same time interestingly, on a novel and technical subject, is one of the rarest gifts which nature bestows upon her children, and consequently that I am to be commiserated, rather than blamed, because she has refused to place me among the favored few. At the same time I would have you believe that all, or nearly all, the repetition is *intentional* and for a purpose. Compression, condensation, etc., are very valuable qualities, particularly to newspaper editors, who can and do publish a *new* and *corrected* edition of the same subject every day for weeks and months together; but for one who has but a single chance of influencing the public mind—especially if his subject be new and scientific in character—it is hardly so applicable. I have, therefore, aimed to present certain *facts* and *ideas*, in a number of places and in quite a variety of aspects, in the hope that should they fail to impress you on one page, you may comprehend and appreciate them in another; and until we are all gifted with the clear, receptive, and fertile intellects so common among critics—intellects which require but a hint, a mere suggestion, to put them in full possession of any subject, however novel and intricate—I am afraid that some such course of circumlocution will always be necessary in explaining a new subject to a comparatively thoughtless and unwilling public.

I may also mention that I have been very severely censured by my friends, because—they say—I have mixed up politics with the description and advocacy of my "Perpetual Sleigh Road," asserting what, from a little past experience, I am afraid will be too true, "that I am sure to make enemies of both parties, and that, as a consequence, my invention will be viewed through jaundiced spectacles, and almost to a certainty condemned, simply because its author refuses to be a party man." My answer is—1st. That I felt it my duty as a man to warn my fellow-citizens of the *exceedingly dangerous* position in which they have been placed by *past policy*; 2nd. That my invention is altogether independent of political favor, and has all the world before it; 3rd. That the same instincts that make me an inventor made me a politician, and one who generally speaks what he believes, caring very little indeed whether it squares with that evanescent thing called Public Opinion or not.

THE QUESTION OF THE HOUR

IS,

Can the Present Railway System be Superseded

BY A "NEW STYLE OF TRANSIT," AS MUCH SUPERIOR TO THE RAILWAY AS THE RAILWAY WAS TO THE STAGE COACH? IF NOT, WHY?

TO THE

HONOURABLE ALEXANDER MACKENZIE,

PREMIER OF THE DOMINION OF CANADA.

HONOURABLE SIR,—

Seeing you have declared it to be your settled policy to begin at once and finish as soon as possible—consistent with the best interests of the Dominion—a line of railway through Canadian territory to the Pacific Ocean, I take the liberty of reminding you that there are a great many very important questions to be asked and answered, not only to the thorough satisfaction of your common sense, but also of your conscience, before you can feel justified in throwing upon the shoulders of our young community such a tremendous burden as is implied in the construction of a work like the proposed "Pacific Railway."

And, in my opinion, the responsibility is enormously increased by the fact that no one at all acquainted with the construction and operation of railways can believe, that even if the said road was built and in operation, that it could be maintained and operated without large annual subsidies from the revenues of the Dominion—say from five to six millions of dollars per annum. It is also impossible to believe that such a road could carry farm produce, minerals, or other heavy freight, at such charges as would enable producers of the North-West or Pacific Provinces to send their goods to Eastern markets—their only possible outlet.

Permit me, then, to state a few of the questions which seem to leap into existence the very moment we try to fix our attention on this most

momentous subject; questions which, in my opinion, have not as yet received the attention which their importance to the welfare of the country demands.

In the first place, do you feel perfectly satisfied that a railway of a thoroughly useful and practical kind can be built through Canadian territory to the Pacific? 2nd. Could it be built for such a sum of money as four millions of hard working but comparatively poor people can spare from the more pressing claims of every day existence? 3rd. Supposing the road built, would there be any probability of its earning sufficient during the next ten or fifteen years to pay interest on the tremendous outlay necessary to build it, or even of its being able to pay the necessary maintenance and operating expenses? 4th. Most important of all, *is it possible* for a *railroad*, however built and operated, to supply the wants or develop the resources of such an immense stretch of country as that lying between Ontario and the Pacific? Would not the charges for freight and passage be such as to exclude the farmer of Manitoba and the miner of British Columbia, not to mention places much nearer hand, from all the benefits of our markets?

By what magic would it be possible to make the charges other than such as will—nay must—prevent us receiving the produce of their fields, forests, mines and rivers, and them from taking our manufactured goods in return?

In short, unless the *speed* is very much *higher*, and the charges immeasurably lower than the *lowest charges* now made for railway carriage in *any part of the world*, would there be any chance of its being used as an emigrant road?

Would there be any probability of our filling up the North West with people, whose strong arms and willing hearts would develop the vast resources of that distant portion of our young Dominion, or would there be the least hope, by means of such a road, of our maintaining between the Provinces that social, political, and commercial intercourse, that *oneness* of thought, feeling, and interest, which is absolutely necessary in every well-governed country. If then it is true, and I hold it to be incontrovertable—1st, that it is physically impossible to build a railroad between Ontario and Fort Garry, on the only route where it could be of service to the Dominion, viz., along the north shores of Lake Superior. 2nd. That even if the railroad was built, the charge for passage between the points named would be nearly if not quite as high as that charged for crossing the Atlantic ocean. 3rd.

That it is impossible to carry ordinary farm produce, minerals, and other heavy freight by railway for more than 600 miles at less than from one-half to *two-thirds* of their *market value?* Would it not be wise to weigh well the following queries:

1st. *Is* the "Railway System" the *absolutely best system of transit* which it is possible for the genius of man to devise? Is the railroad so *perfect* in all its parts, so thoroughly adapted to all the requirements of man and nature; so perfectly applicable to the condition and circumstance of every country, small or great, densely peopled or sparsely settled, that it cannot be *improved upon?* Do you really and truly believe that the present railroad system is the *complete* and perfected outcome of those great, godlike faculties which man possesses for the subjugation of Nature; in short, that it is the *finality* of man's *invention* in the way of locomotion? 2nd. If you do not believe the railroad to be *perfect* as a means of *transport*—and no man in his senses, no engineer in the world does so—is it not your plain and obvious duty, before incurring the fearful amount of debt necessary to build one to the Pacific, before spending, directly or indirectly, an amount of money which actually baffles all ordinary comprehension to realize, and which would build a good, substantial and commodious *dwelling-house* for every *fourth family* in the Dominion, to make certain that there is *absolutely no chance* of the railway system being *superseded* by an *entirely different system of transit*, as much superior to the railway as the railway was to the stage-coach of fifty years ago. 3rd. If there is any chance, even the smallest, of such an invention being made, is it not your duty to look for it, and to encourage by every means in your power those who are trying to make the discovery; to give a fair, full and impartial consideration to any system of transit which has for its end to supersede the present plan by one more efficient, cheaper to build, to operate and maintain? Nay, more; is it not obviously to the great *advantage* of the country that you put to an exhaustive trial any system of transit which, with fair show of *feasibility* and *probability*, is maintained to be capable of carrying *more* passengers and freight with infinitely more comfort, safety and speed than any railroad in existence; while it can be built, maintained and operated (summer and winter equally) for less than *one-fourth* the amount necessary for a railway, rather than to run the risk of building the present railroad, and then find, before it is half finished, that for all practical purposes it has become useless, being superseded by a new system, infinitely supe-

rior in every respect to the old? However, before discussing the possibility or probability of superseding the railway by a new and superior system of transit, it will in my opinion be for the best interests of all concerned to take a pretty close view—1st, of the difficulties of building and operating a railroad between Ontario and the Pacific Ocean; 2nd, at the *cost* of such a road, and the chances of its ever earning sufficient to pay interest on the outlay, or even of its paying operating and maintenance expenses; 3rd, the probable effect of a railroad in *peopling* the North-West and the Pacific Provinces; and what chance the people who did settle in the said provinces would have of becoming a contented and prosperous population, such as would add to the strength and material well-being of the Dominion.

Having done so, we will then take a general view of the "Railway System" as a "*mechanical contrivance*," and having ascertained its *capabilities* and *defects*—inherent, local and accidental—we will be in a position to judge whether or not it is possible to improve upon it as a "System of Transport;" also to say if we have done so in the plan about to be proposed as a substitute for and great improvement upon it. In the first place, then, can a railroad of a thoroughly useful and practical description be built through Canadian territory to the "Pacific Ocean?" It is hardly necessary for me to point out that this is a query which can be answered intelligently and authoritatively only by engineers, who have fixed upon and made a complete survey of the route; and as that has not yet been accomplished, there must necessarily be a good deal of guess-work in any estimate or opinion we may form. There is one point, however, on which all are agreed, viz., that no railroad can be carried by the North Shore of Lake Superior; consequently we must go back—no one knows how far—and build our road for many hundred miles through an inhospitable and barren wilderness, that never can be settled: a circumstance of itself sufficient to condemn to eternal poverty any road, even if otherwise capable of yielding a profit. British Columbia is described as a sea of mountains. "The whole Province consists of a series of mountain ranges, rising, it may be, to no great height, but none the less formidable obstacles on that account to the construction of a cheap railway. The country between the Upper Ottawa and Lake Winnipeg is well nigh an unknown land; but this much we do know, that the snow falls *deep* and lies *long* in the basin of the Hudsons Bay. In the winter season, in a country without inhabitants, in which the ground freezes to a depth of

10 to 14 feet where there is ground to freeze, in which the thermometer sinks to 40° below zero, it is not easy to understand how passengers will be made comfortable, how water-tanks are to be kept open, or how employees are to be saved from perishing on account of the necessary exposure to the cold." As an evidence of this danger, it may be stated that at "Herman station, on the St. Paul and Pacific Railroad, men were frozen to death going from the depot to the water-tanks on the 13th January, 1873." Indeed no one can look at the map and not be impressed with the idea that the cost of construction of the Canada Pacific must be enormously enhanced from the position of the road. Sir Hugh Allan, than whom no man ought to have a better idea of the difficulties of making such a road, seeing he was president of the company that professed itself willing to undertake the job, expresses himself as follows:—"The road would meet with great difficulties west of the Rocky Mountains owing to the canons and mountain ranges; *and it was a question whether any really practicable route had been found by which the road could be carried to the Pacific Ocean. They had no idea of the difficulties presented by those mountains, which, rising to the height of 9,000 or 10,000 feet, have directly at their bases enormous gulfs, through which ran swift and deep rivers. Therefore it was a matter of very great difficulty to find a proper route.* Still, it must be found, and they must not give it up if they could not find it at once, but must look for it until they did find it. He had not the slightest doubt but that they would find it. The country north and east of Lake Superior also presented considerable difficulties, and *they would have to make the road west of it first and leave that section to the last.*"

I think, after that quotation, it is needless for me to say any more in regard to the *practicability* of building the "Canada Pacific Railroad," further than to intimate that the explorations since made and the experience gained only goes the more fully to confirm the opinion that, although it may not be *physically impossible* to build the said road—and what engineering project is *physically impossible?*—it is *financially impracticable* for a country of less than four millions of people—that in truth it would be an act of sheer insanity in Canada to undertake such a job at the present time.

The second query, as to cost, may best be answered by Mr. Fleming. Indeed it is altogether impossible for ordinary minds to grasp the magnitude, the immensity of the undertaking in any other way than that in which he puts it in his official report.

Mr. Fleming, Chief Engineer to the "Dominion Government," remarks as follows :—

"That a just conception may be formed of the real magnitude of the project under discussion, and the means necessary to its attainment, attention may for a moment be drawn to a few leading details. The construction of 2,000 miles of railway, measured by the average standard of similar works existing in this country, implies the performance of labourers' work sufficient to give employment to 10,000 men for five or six years,—it involves the delivery of 5,000,000 cross-ties or sleepers, and over 200,000 tons of iron rails for the "permanent way,"—it comprises the erection of 60,000 poles hung with 1,000 tons of wire for the telegraph,—it necessitates the creation of motive power equivalent to over 50,000 horses, which power would be concentrated in four hundred locomotives,—it involves the production of from 5,000 to 6,000 cars of all kinds, which, coupled with the locomotives, would make a single train over 30 miles in length ; and, lastly, it implies a gross expenditure in construction and equipment of not less than $100,000,000.

"It will likewise serve as a salutary check on hasty conclusions, to weigh beforehand the cost of operating a truly gigantic establishment of the kind, after its perfect completion. A few figures derived from actual results will show that the first construction of a railway through the interior of British North America is even a less formidable undertaking than that of keeping it afterwards open, in the present condition of the country. For operating the line successfully, the fuel alone required in each year, and estimated as wood, would considerably exceed 200,000 cords ; for keeping the road in repair, a regiment of 2,000 trackmen would constantly be employed in small gangs throughout its entire length ; for the same purpose there would be on an average annually required 600,000 new cross-ties, as well as 30,000 tons of new or re-rolled iron rails. The annual repairs of rolling stock would not cost less than one million dollars. Over 5,000 employees of all kinds would be constantly under pay, and as these men would usually represent each a family, there would not be far short of 20,000 souls subsisting by the operation of the road. The aggregate amount of wages in each year after the road was in operation would swell out to nearly $2,000,000, while the gross expenditure for operating and maintaining works would annually exceed $8,000,000.

"Again, if to this last sum be added the interest of first cost, it becomes evident that until the gross earnings of the railway in each

year come up to the enormous sum of $14,000,000, it could not pay interest on the capital invested."

It may be well to note in regard to this estimate, gigantic as it is, that it covers only 2,000 miles of railway, while it is well known that the "Canada Pacific Railway" could not be less than 2,500—and more probably 2,700—you must, therefore, of necessity add, say 40 millions, making in all, according to Mr. Fleming, 140 millions, as the probable cost of the whole line. Another thing to be noted is, that the estimate is calculated on the most moderate scale in every particular, and for a road which is expected to do but a very moderate business. For example, we have one locomotive for every five miles of road, and two and a half to three cars of all kinds per mile, now in the United States the *average* locomotive power is one engine for every three miles, in England it is 0·93 parts of an engine per mile, and of cars in the United States it is over *six* per mile, and in England considerably over 28 cars of all kinds per mile, or *twelve* times the number calculated for the Canada Pacific. Again the cost is calculated at $50,000 per mile, while the company that proposed to build the road founded their calculations on a probable cost of $80,000, and tried to make their arrangements in the London money market at that figure, showing that they were well acquainted with the facts—which no professional engineer ever doubted, viz,, that such a road could not be made for a less figure, if it could be completed for that sum. But as it is now nearly two years since both estimates were made, great changes have taken place in the "iron market," in fact, since that time all kinds of railroad iron has nearly or quite doubled in price, consequently we must add at least 16 millions for the advance in iron, making Mr. Fleming's calculation 156 millions, and the late Pacific Railway company's at least $216,000,000, an amount of money which is altogether incomprehensible to any ordinary intelligence, indeed the great danger and difficulty in dealing with such sums is, that they produce very little, if any, impression upon the mind unless it is bewilderment. Yet it is absolutely essential that we should realize as clearly as possible the *immensity* of the obligation we are requested to undertake; I will, therefore, put it in this way: It is considerably more than *double* the paid-up *capital, deposits, coin, securities, and circulation* of *all* the banks in the Dominion of Canada for the year 1867. And if that is not *enough* to make you "stop and think," I will add that, which no man who is acquainted with or has studied the subject will deny, viz, that it will cost at the very lowest calculation six millions a

year over all possible income to keep such a road in operation, which sum capitalized would make at least 80 millions more or in round numbers say $300,000,000, and if any sane man in this Dominion will tell me that he believes that the three-and-a-half or four millions of people inhabiting this country can afford to spend that amount in building a railroad through a wilderness two or three thousand miles in advance of settlements, a road which would require to be rebuilt three or four times over, before it could possibly be required by the population which it is supposed will ultimately inhabit the country lying between Ontario and the Pacific Ocean, all I have to say to him is, that he and I differ in opinion, and that I consider it would be a veritable waste of time to argue the matter with him. Indeed it has always been a puzzle to me how any government composed of sane, intelligent men, practical politicians, statesmen, who ought to have been and surely were perfectly acquainted with the material resources and capabilities of the country which they governed, could think of pledging the faith and honor of the nation to undertake such a work, or even entertain the notion of laying the people under such tremendous liabilities, for such an object, until at least every intelligent man in the Dominion had had an opportunity of studying the subject in all its bearings, and coming to a deliberate conclusion as to whether it was really worth his while to allow himself to be taxed the amount necessary to carry out the project; or rather, if he could afford to do so without inflicting an injustice upon himself, his family, and the interests of the entire Dominion? And the action of the late Government I can explain only by remembering that rulers are but men, swayed by and governed according to the *prevailing ideas* of their time, and not over anxious to sit down and count the *cost* and *consequences*, especially if the consequences are a good way off—so long as their present action is likely to add coherence and strength to the force that keeps them in power.

So much then as to the probable cost of the "Canada Pacific Railway." The next questions which force themselves upon our attention are, would the road, if built, earn enough to pay interest on the original outlay; or even to pay operating and maintenance expenses? Would it fill up the country with people, and render communication with the Pacific *cheap, comfortable and expeditious*, and thereby *create a "through trade with India, China, Japan, &c., &c.*; these are the questions which must be answered, and, according to the *verdict of reason and experience*, should be the fate of the "Canada Pacific Railway."

As I have already asserted more than once, that the Canada Pacific Railway could by no possibility earn even its operating expenses, it would be a waste of time to go on, proving that it could not earn interest on the capital necessary to build it. Indeed, I have the greatest difficulty in proving that it will earn anything at all—in all my calculations I have supposed it to earn between five and six millions per annum—we have no basis to go upon, no data on which to found our figures ; this being the first time in the history of railway construction, so far as I am aware, that it has been seriously proposed to build a railroad nearly three thousand miles long from *nowhere* to connect with *nothing*, or what is pretty much the same thing, through one wilderness to connect with another.

I am aware that it is the fashion to point to the Union and Central Pacific Railway as a case in point, and an example of what can be achieved by pushing roads out into the unpeopled regions of the Continent. For my part I can see no similarity between the position and prospects of the Union and Central Pacific Railway and the Canada Pacific Railway.

Suppose, for example, that the Union and Central Pacific had turned out a complete failure, it would have entailed a liability of little more than two dollars per head of the population of the United States. Suppose the same to happen in the case of the Canada Pacific, and the loss would be at least fifty dollars per head, or two hundred and fifty dollars for every family in the Dominion. Is there any similarity in the risks run by the two peoples?

Again, the Union and Central Pacific Railway Company had something really reasonable on which to found a probability—if not a certainty—of success. They knew that the western end of their line would terminate in California—a name to conjure with—one of the richest and most productive countries in the world, having a population of over a million of the most enterprising and go-aheadative people on the Continent ; they were aware also that they would get the entire trade, export and import, of that unique settlement " Utah," with its hard working and productive hive ; they knew, further, that there were numerous growing settlements along both slopes of the Rocky Mountains, while the Mountains themselves were alive with hardy miners, whose iron sinews yearly wrung from mother earth, millions of that glittering dust for which all men sigh, the many scheme and the few labor ; that marvellous metal whose sheen casts a glamour, alike

over the rude untutored sons of the Prairie, and the most refined intelligence of the city, arousing in both those desires, which stamps frailty on the brow of man. Oh rare product of nature's alchemy, which can subdue even the Pet creation of the Almighty—heaven-born genius—and bring it into fellowship with the sordid and grovelling miser, who bows in lowly adoration at the shrine of the golden calf! for thee the poet waves his wreaths of fancy's gayest flowers, and the painter makes the coarse dull canvass eloquent with beauty; for thee the sculptor shapes and fashions the lifeless marble into forms lovely as the outward seeming of an angel, while the orator chants thy matchless charms in words as sweet and sonorous as the sound of a silver bell. But a truce dear fancy, sweet as are thy tones, and oft as I have communed with thee on other themes and at other times, the majority of men would say you had no place here, so good-bye for the present, while I return to hard dry facts.

The Union and Central Pacific Railway Companies could also point to the immense trade which their country did with all parts of China, India, Australia, Japan, New Zealand, &c., &c., a trade amounting to hundreds of millions, and ask if it was not reasonable to suppose it would find its way over their road, rather than go round by Europe and back by the Atlantic? Again, they had a *native* population in the East of over thirty-eight millions—a population of the most restless and enterprising description—thousands and hundreds of thousands of whom were perpetually on the move from East to West, and from North to South, and only waiting the opportunity of a Railroad to scatter themselves over the Golden States and Territories—California, Utah, Arizona, Colorado, Wyoming, Nevada, New Mexico, &c., &c. They could also calculate upon getting a good share of the immense volume of foreign immigration (500,000) which annually lands upon their shores. Moreover, their road would connect the great cities of the Atlantic seaboard with the towns and cities of the Pacific; the people at both ends being famed for their love of novelty, sightseeing, and consequently of travel; it was therefore only reasonable to calculate that thousands and tens of thousands would make the journey yearly between California and the East, and *vice versa*, simply for change of scene,—in a word, in my opinion, the Union and Central Pacific Railway Company had the most reasonable prospects of success before starting, which any company could possibly ask.

The position of the Canada Pacific Railway is just the *reverse* of all

this ; in the first place, the road will be nearly—if not quite—*a third longer*, and will for a good part of the way pass through a more difficult and unpromising country. 2nd, our population is only *one-tenth* of the United States ; our Railway will begin in a country of less than four millions, and end in a comparatively *unknown* Province of less than 20,000, running its whole length—except for the few scattered settlers of of Manitoba—through an unpeopled and in great part inhospitable wilderness. 3rd, we have no direct trade with the East, while our indirect export and import Asiatic trade does not amount to three millions of dollars. 4th, our native population could by no possibility send out more than 20,000 people per annum—*they ought to send none*—to develop the resources of the North-West and Pacific Provinces, for it is absurd to suppose that the thousands who annually find their way to the great cities and manufacturing towns of the United States, will ever take to farming ; you will find by looking into the matter that, generally speaking, a certain number in every million will seek trade in place of agriculture, even when the advantages and profits are all in favour of the latter occupation.

5th. Our foreign immigration has only averaged about 23,000 per annum for the last 10 years, for whom we have been lately paying about $15 per head—a number more than balanced by the emigration to the United States. In fact we have been, and are now, expending large sums of money, and making great exertions to increase the population of the older Provinces, and yet the cry is still " they *do not come*." I have seen it asserted time and again on the very best authority, and I firmly believe it to be a fact, that Ontario and Quebec alone could absorb from 80,000 to 100,000 emigrants annually for many years to come, without in any way overstocking the labour market. It must, therefore, be quite apparent to you that if, within the next ten or fifteen years, we succeed in settling some 200,000 or 300,000 people in the North-West and Pacific Provinces, we will have accomplished it at the expense and to the permanent injury of Ontario and Quebec. In attempting to people the " Great North-West" with our present resources—by means of an enormously expensive railway—we are simply imitating the example of the man who left his private means in three per cent. consols, and borrowed money at ten per cent. to carry on business, only that in our case the *interest* will be the veritable " *shent* per *shent*."

Let us take for granted that the " Canada Pacific Railway, if built, would be equally successful (in proportion) with the Union and Central Pacific Road ; in that case what would be the probable earnings ?

The gross earnings of the Union and Central Pacific Road amounts to about $17,000,000 per annum—65 per cent. being for local and 35 for through freight. Now, you will please note that the Union Pacific Railway has thoroughly established its connections, and carries the *entire trans-continental traffic* existing at the present time ; yet its whole income from that source does not much exceed $7,000,000 ; and not one-half of the freight producing that amount was ever rocked on the placid bosom of the wide Pacific ; and as it would be absurd to suppose that the Californians will send their *native* produce to Vancouver's Island (*800* miles by sea) to take the Canada Pacific Railway in preference to their own Union and Central Pacific Railway, it must be evident that we can share only in the trans-Pacific trade of that railway —about three millions of dollars per annum. Now, how much of that sum could we count upon getting for the Canada Pacific Railway ? Could we reasonably reckon on getting one-third ? Hardly ; for in the first place nine-tenths of all the Eastern products carried by that route are intended for *American consumption*, and will be left here and there along the entire line. Moreover, *if any railways are built*, there will be at least three American ones in operation by the time ours is complete. For the sake of argument, however, we will suppose that we get one full *half* of the entire traffic ; that would give us in round numbers $1,500,000 per annum. We will also suppose that our merchants will import direct, and bring all the Asiatic produce consumed in the Dominion by the same route. In that case—calculated on the American standard—we would receive $30,000. Add the present British Columbia and Manitoba traffic, or rather *quadruple the present traffic* of the said Provinces, and we might get in all, say (at an extravagant estimate) $2,000,000. As to the other *local traffic*, Mr. Mill (in "The Canadian Monthly") calculates it in this way :—"The *population* that is to *create* a local traffic has yet to be *found* and carried into those northern regions ; the coal, the metalic ores, and the lumbering districts from which freights are to be drawn have to be discovered, and may be found at points not accessible from the railway," &c., &c. Grant, however, that we will get another million from sources at present unknown —calculating on the American standard it would require a population of 750,000 people in the North-West and British Columbia to give that amount in traffic to the railway—we will have in all *three* millions of dollars as the *utmost supposable* income of the "Canada Pacific Railway," for at least ten years after its completion. Very

likely your answer to my calculations will be, that we do not intend to depend upon the present "trans-continental trade," or the amount of Asiatic produce *we* consume. You will probably tell me that the "Canada Pacific Railway" is designed to carry the immense volume of trade now passing between England, Europe and Asia, and *vice versa*—an amount of traffic beside which the freight of the "Union and Central Pacific Railway" is a mere bagatelle. Now, notwithstanding the general acceptance of that idea, notwithstanding the fact that both political parties, and all our principal newspapers, have been for years past earnestly educating the public to look upon the Canada Pacific Railway as a settled matter, only waiting the favourable moment to be carried out, and that immediately thereafter we would become the great carriers of the world; I ask you in all seriousness if it is reasonable to hope or believe that we will get the "Asiatic trade" for our railway? I say it is *not a reasonable expectation.* The idea can have originated only in the mind of one totally ignorant of the real capacity of the "railway system," and, like the great majority of similar errors, it has passed into general currency from being adopted and nursed by men whose literary and political ability is very far in advance of their mechanical and mathematical skill.

You are, no doubt, aware that the Union and Central Pacific Railway had the same hope, and held out the same expectations to their shareholders; were their hopes realized? or have their expectations been fulfilled? If not, why? Is it because the Union and Central Pacific Railway is an American road, passing over American soil, that English traffic is refused to that route? Certainly not. Commerce, like death, levels all distinctions, and respects not national vanity; all prejudices give way to the superior attractions of dollars and cents. The Union and Central Pacific Railway failed to get the immense traffic passing between England and the East simply because it could not carry it as cheaply as by the old method of steam and sailing ships; and also because all kinds of goods are injured more or less; many would be nearly destroyed by 2,000 miles of railway carriage.

Let us look for a moment at a few of the great staple commodities, those which form seven-tenths of all the traffic between England and the Asiatic continent: "Hardware," "Cloths," "Cotton," "Wool," "Silk," "Jute," "Indigo," and, above all, "Tea." Now, how many of the articles mentioned, or any others you can recollect, could pay freight

across the Pacific; unloading and loading on the cars in British Columbia, then railway freight across the Continent; unloading and loading again on board ship, and then freight across the Atlantic to England? *Not one!* Just look at the figures, (putting out of sight the probable injury to goods in transit.) Across the Pacific (7,000 miles) at $20 per ton (a low figure), $20; unloading, &c., $1; railway journey (at the *lowest* rate charged by any railway in the world), $40; unloading, &c., in Montreal, $1; by steamer to England, $10; in all $72 per ton. Now, take any sum you like from the *sea* freight, if in your opinion I have made it too high, and deduct the remainder from the price of one ton of goods, and then put it to your own common sense, if it is not absurd to expect to carry the traffic of India, China, Japan, &c., by means of a railway nearly 3,000 miles long? But as it is a common expression that "one can prove anything by figures," I will give you one quotation from the New York *Tribune's* report of the Tea Market for 1872:—

"It has been found that *Tea* can be brought to New York, and even to St. Louis, at *less cost* by way of the Suez Canal than by way of San Francisco and the Pacific Railway. This has caused a falling off compared with 1871 of about 3,000,000 pounds in the quantity imported by the *latter route*."

And surely it is self-evident that if the Union Pacific Railway cannot carry Eastern produce intended for consumption in America, nor transport such a high priced commodity as tea, that we could never pay the additional charges across the Atlantic; and carry such bulky goods as wool, cotton, jute, &c., &c., especially as our road will be nearly a third longer. Now, if all this is true, and there can be no possible doubt of it, where in the name of wonder is our *through freight*—of which we hear so much—going to come from, or of what is it going to be composed? As to the passenger traffic between England and the countries named, nineteen-twentieths of it consists of soldiers coming from or going to India, &c., and I will not insult your common sense by suggesting that the British Government would send them by our railway, when she could forward them for a fraction of the cost in her own troop-ships through the Suez Canal.

In making the above statements, I am perfectly acquainted with all the superior advantages claimed for the Canadian route over its American rival. I know well that it is customary to believe that the Canadian route will be by far the more direct; that it will be hundreds

of miles shorter than the Union Pacific; that the grades, curves, &c., will be far more favorable. I am also aware that there are boundless resources of wood, coal, lime, silver, gold, and other precious commodities in the Pacific Province; while all along the route can be found an abundance of the finest lands on the face of the globe—land sufficient to give subsistence to a hundred millions of people, and leave a surplus that could supply food for every hungry stomach in Europe for ages to come. And, notwithstanding all that, I am, after the most careful consideration, forced to declare that the Canada Pacific Railway (if built) would not earn one-half its *operating* and *maintenance* expenses; indeed, I lay it down as a fact, fearless of contradiction by those whose knowledge of the subject gives them a right to dispute, that it is *physically impossible*, with any conceivable through traffic, to make a railroad 3,000 miles long pay its *own expenses*.

The questions which next claim our attention are—What effect would the Pacific Railway have in peopling the Great North-West and Pacific Provinces? and what chance would the people who did settle in those Provinces have of becoming a contented and prosperous community, such as would add to the strength and material well-being of the Dominion?

In the first place, I would remark that the railway system is, after all, only a "mechanical contrivance," built upon certain well understood scientific principles, and depending for its successful operation—particularly in North America—on many circumstances over which we have only partial control; such, for instance, as our frosts and snows in winter, and our freshets in spring. Consequently it may be called a rude and imperfect machine, consisting of two parts—the Locomotive and the Rails; and it is surely hardly worth while to waste time in proving that which must be self-evident to any one who gives the matter a moment's serious consideration, viz., that being but a rude and imperfect machine, it must be capable of yielding only a *certain* and *definite* amount of service for a given outlay of money, the amount of work performed, in proportion to the outlay, differing of course according to the time, place and country in which the road is located.

Yet, self-evident as this fact must be to any thinking mind, it is, nevertheless, continually lost sight of, or set at naught by railway promoters and the public—the common idea seeming to be that the iron horse has annihilated space as the telegraph has time; and consequently

that a hundred miles more or less can make but very little difference to a railway company, except in building the road. And, strange as it may seem, this absurd and rediculous error is by no means confined to the ignorant and thoughtless, as you may easily prove by a perusal of the speeches delivered by any railway promoter you may happen to think of. Take as a recent example the one delivered by Sir Hugh Allan at the banquet given to him in Montreal at the time he was going to England on his Canada Pacific mission.

In that speech Sir Hugh recounts the wonderful resources of the Pacific Provinces and the North-West; their iron and coal, their gold and silver, their boundless forests, inexhaustible fisheries, &c.; and without a smile upon his face, or, I firmly believe, a doubt in his heart, he talks of enriching the city of Montreal and the other Provinces of the Dominion by *importing* the said products of the forest, mine and sea by means of his proposed Pacific Railway, which was to be only *2,700 miles long*, and run its whole length through an *unpeopled wilderness*. In a word, the railway is looked upon as being practically *unlimited* in its capacity—that is, that it can be made to carry farm produce, minerals and general merchandise, no matter the *distance* between the consumer and producer; and that if it does not do so, it must be because of the *dishonesty* and bad management of officers and servants, or the *inordinate greed* of the Directors and Shareholders.

Now, in opposition or contradistinction to that general and absurd idea, I hold that the "Railway system" is not only a rude and imperfect machine, but also that it is a machine of very *limited* and *definite* capacity.

For example, in building a steamship it is merely a matter of cost and requirement whether you will make it 100, 1,000, or even 10,000 horse-power.

Not so with the locomotive engine. Practically speaking, you are at the outside limit of your power, when you get to the 35 or 40 ton locomotive of the present day. There are good and sufficient reasons for this limitation of power in the locomotive, which I will endeavour to explain, as the explanation will enable you to comprehend the reason why railroads, under certain conditions, must prove failures—absolute and complete failures. The first and principal reason is that the hauling power of the locomotive *depends upon and is limited by the friction*—or *adhesion*, as it is sometimes called—between the driving-wheels and the rails, hence the power of the engine to haul a load will depend (other

things being equal,) upon the *weight* carried on the driving-wheels and the condition of the rails. Thus a 35-ton engine will have, say 17 tons resting on the drivers; and as the coefficient of friction between the driving-wheels and the rails may be taken, under the most favorable circumstances, at *one-fourth*, or say 600 pounds per ton of the whole weight, we get a little over 10,000 pounds as the effective hauling power of an engine of that weight; in short, the outside tractive power of the heaviest locomotives does not exceed 12,000 or 13,000 pounds. Now, to *increase* this *tractive power*, we must enormously increase the *weight* on the *driving wheels* of the locomotive; but the important question comes in here—What would be the effect of the increased weight on the permanent way? The answer of experience is, that any considerable increase in the weight of the engines would destroy the permanent way so quickly that the track repairers and rail-layers would hardly have left one part of the line *finished* before they would be wanted back again to relay it. Indeed it is the universal opinion among railway engineers that any increase in the weight of our engines as at present constructed, would be altogether too destructive to the track to be seriously thought of. To load each pair of wheels even as heavily as now is considered very bad practice among the most intelligent locomotive builders.

"The blows dealt by passing wheels upon the rail joints, and the bending or breaking strain brought at any instant upon the joint in the rail, where the wheel presses, depends upon the weight which the wheel carries, as well as upon the speed at which it moves; consequently, to diminish the track repairs (that which is by far the most greedy of all maintenance accounts), the weight borne per wheel by the present locomotive must be *lessened* at *least one-half*, so that it may agree more nearly with the load borne per wheel by the cars;" and how this is to be done, without at the same time *diminishing* the *power* of the locomotive, is the "great problem" among railway engineers.

Now serious—nay, radical—as is this *defect* in the railway system (I mean the *limited power* of the locomotive), it seems to be very little thought of—if it is taken into account at all—yet your own common sense will show you, that it is of the very first importance that it should be always before the eye of a railway promoter; it would save him from many hasty conclusions (as to what a railroad *could* or *could not do*), conclusions which have led, and will continue to lead, to most disastrous results.

I repeat, then, that the railway and locomotive are, after all, but a mechanical contrivance of very *limited* and *definite capacity*—that is, the engine is limited, practically speaking, to a weight of 35 tons or thereabouts, and is capable of hauling (on such a road as the Canada Pacific is likely to be) a gross load of 200 or 230 tons, or 80 to 100 tons net freight, at say 20 to 25 miles an hour.

The next thing to be ascertained is, at what cost could the engine haul

the said 80 tons of freight between Manitoba and Montreal, or *vice versa* —taking the distance at 1,200 miles?

This is really an all-important point to settle, for it must be apparent that the producer can afford to pay only a certain proportion of his produce to have the surplus carried to market, and unless a railroad can carry it for that proportion, that is, at such a tariff as will leave the farmer, &c., &c., a fair remuneration for his toil, a surplus sufficient to furnish himself and his family with all the necessaries, and a few of the comforts of life. Such a railway can be of no service to him, and he can have no inducement to follow in its track, no matter how rich and fertile the land may be.

And, that being admitted, proves conclusively (unless we accept the idea that the locomotive engine is really unlimited in power) that there must be a point beyond which it is absolutely impossible to operate a "freight railway" at a profit, either to the forwarder or the owners of the road; and if we can but find out *definitely* where the point of limitation is, it will henceforth become an easy matter—a mere matter of calculation in short—to say whether such and such a railroad should be built or not; it will also become a comparatively simple matter, to estimate the probable effect of any particular road in peopling the section of country through which it runs.

The question then is, at what cost could the Canada Pacific Railway (if built) carry a ton of freight between Manitoba and Montreal, and *vice versa?* Now, simple—as at first sight, this question may seem to the majority of men, it is, nevertheless, one of the most difficult and important problems which you can present to the statist or engineer—a problem, the attempted solution of which, in other cases, by ignorant (though honest) bunglers, and interested and selfish speculators, has cost the trusting and credulous public hundreds—nay, thousands—of millions, and brought ruin and misery to thousands of previously happy and prosperous homes; indeed, the railway tariff, especially in regard to produce, is by far the most important and widely discussed subject of the present day, at least on the American continent.

I have studied the subject for years; I have read scores of letters, speeches, and orations on the subject; perused numerous pamphlets, and listened to innumerable debates, &c., &c., and after all, the only conclusion I could arrive at was, that what No. 1 affirmed, No 2 contradicted, and what No. 3 declared to be indisputably true, No. 4 held to be sheer nonsense, &c.

I have perused elaborate statements—written by men of great general intelligence—showing in the most conclusive manner—as they believed—that such and such a railway could carry freight at, say, 3 to 4 mills per ton per mile; and then found, after considerable trouble, and oft-times expense, that the same railroad was carrying every ton of freight the country yielded, charging an average of 2½ to 3 cents per ton per mile, and after all, could barely pay two per cent. on the capital

invested. We have also heard the most tremendous outcry made about the enormous profits made by certain western railroads (United States), and the immense dividends paid on stock said to be watered to more than half its full value—and a few months after we have seen the same stocks (with the water most effectually squeezed out of them), go a begging at one-half, and in some cases, one-third their former value ; and I have noted particularly that the very men who talked the loudest about the enormous profits made, and the low rates at which freight could be carried, if railroads were only honestly conducted, were very careful to avoid becoming possessed of such valuable property, even when offered dirt cheap. It may have been that their pure and spotless consciences recoiled from the thought of injuring the poor farmers of the West, &c., or being made parties to a "legalised robbery"—by receiving large dividends, gained by extortionate freights, though I am reluctantly compelled to declare that their general character would never have led one to credit them with such generous and patriotic motives.

In short, my deliberate conviction is, that it is next to impossible to predict with any degree of certainty, what will be the earnings, and, consequently, charges of a railway running through a new country—that is if the railway is managed on commercial principles—it is at all events certain, that not one road in a dozen, either in Europe, America, Asia or Africa, ever fulfilled the honest expectations of those who projected and built them.

To begin with, very few indeed, have a correct idea of the railway system, what it is, and consequently what it can and cannot do. The natural result is that it is credited with infinitely more than its real ability ; half the working charges are overlooked, or greatly under estimated, while the traffic is over estimated ; peculiarities of time, place, and circumstances, are unheeded or forgotten, &c., &c.. You will find an example of the way in which railway projectors generally estimate traffic and expense, &c., &c., in appendex No. 1. But though it is thus difficult to estimate the probable *income* of such a road as the Canada Pacific, it is by no means so difficult to give a pretty correct guess at the *outlay*. For example, the 60,000 miles of railroad in the United States costs on an average, $5,300 per mile per annum to operate and maintain it ; and you will please note that with the exception, perhaps, of Belgium, the United States railways are the most *cheaply operated* of any railroads in the *world*. Now, if you multiply the length of our road by 5,300, you have got an answer; but as there can be no doubt that the average of the United States is *too low* for a railraad like the Canada Pacific, passing as it does, through a wilderness, and having an average of three to five feet of snow on the level throughout its *whole length* during the winters, it would be only prudent to allow 20 per cent. for overcoming any such obstacles—the cost per mile in that case would be over $6,300 per mile, from this sum you may deduct 30 per cent for the difference in the values between the United States and Canada, making the cost per mile per annum,

about $4,400, or suppose we take the even $4,000 per mile per annum (certainly an under estimate) ; in that case we would require a yearly revenue of not less than $10,800,000, and as we have shown that the utmost supposable income of the Canada Pacific Railway will not amount to three millions, it is quite plain that the road (if built), could never be managed as a commercial speculation, for in that case the tariff would require to be 20c. per ton per mile for every ton of goods passing over it, which is equivalent to saying the road would be closed. We are, therefore, shut up to the conviction that the Government must not only build the road, but that they will also require to operate and maintain it, at a tremendous sacrifice to the general public of the Dominion ; consequently, in making our calculation as to the probable expense of moving a ton of freight between Montreal and Manitoba, and *vice versa*, we take for granted that the Dominion Government will supply funds sufficient to enable the managers of the road to regulate their tariffs, on the same principle and according to the rules governing such roads as the New York Central, Grand Trunk, Great Western, Erie, &c., &c.

Estimating, 1st, by the local tariffs of the Grand Trunk, Great Western, &c., viz : 4½c. per ton per mile ; the cost per ton would be $54.00 2nd. Tried by the tariff of the narrow-guage railroads—which cost to build only some $9,000 per mile, plus the bonuses—the amount would be $36 or 3c. per ton per mile, or suppose we estimate the probable charges by the English tariffs, for example : that of the London and North Western, a road which carried 15,000,000 tons of freight last year, and despatches daily (every twenty-four hours,) no fewer than 626 *merchandise* trains over all parts of the line ; the earnings for goods traffic on that road averaged 6s. 3d. sterling per train mile, or an average all round of 1½d. or 3c. per ton per mile. Judging then by the standard of this great English road, we are brought back to the $36 charged by the Canada narrow-guage roads, as the lowest sum at which a ton of freight could be carried between Montreal and Manitoba, and *vice versa*, for it must be distinctly understood that we are taking the *lowest* English charges, the *average charges* in England being about 4½c. per ton per mile ; in France the charges is 3¼ to 4c. ; in the United States, 3 and 6-10ths, &c.

Now, I would like to ask, just by way of parenthesis, if you know of any kind of produce which the farmers of the Northwest could raise, that would bear such charges for transport to market? or, if you are acquainted with any kind of manufactured goods, required by the people of the Northwest, which we could send them at the same rates ? I hold that there are no products natural to, or likely to be, produced in the Northwest ; nor, as a rule, are there any manufactured goods required in the said Province, which could bear such charges for transport.

I fancy that no man with an intelligent knowledge of the subject will be inclined to doubt the assertion, that the successful cultivator of our great " prairies " must for many years to come confine himself to

raising cereals, wheat, oats, corn, &c., &c., or become a patriarch of flocks and herds ; in this latter case he would have but a very limited market for his products, the principal of which—his wool—would come into direct competition with the produce of more favoured Southern lands, such as California, Cape of Good Hope, Australia, &c., (countries producing already more wool than is really required), against which it is perfectly safe to say he could not hold his own, indeed it is quite *certain* that he could not, for it has been tried more than once on a most extensive scale, only to end in failure. We may, therefore, take it as a settled matter that the farmer of the Northwest will confine himself to grain crops ; and in that case his export market will be Montreal ; there, his wheat, as an average, may command say $1.20 to $1.30 per bushel ; corn—the great staple of the west—would be worth 60c to 65c per bushel ; oats, 34c to 39c, &c. Now take the distance between Manitoba and Montreal at 1,200 miles—the shortest known route—and the rates of freight three cents per ton per mile, or $36 a ton—divide the ton by the bushel and keep to yourself the secret of the profits made or likely to be made by farming in the Northwest. If, then, as the above calculation clearly proves, it is impossible to carry farm produce, minerals, and other heavy freight, for a distance of twelve or thirteen hundred miles except at a loss, it must be self-evident that the railway is no longer of use or benefit, and consequently ought *not* to be *built.* Indeed, I hold that at a space of 800 miles—or under the most favourable circumstances—at 1,000 miles, you will find the *utmost limit* to which it is possible to carry a paying railroad, and that immediately beyond that, there is a line on which the intelligent locomotive engineer and railway projector may read the following warning, written by the well-known gent's, " Calm Calculation," " Much Abused Common Sense," and " Dear bought Experience." " All beyond this line is loss, debt, and difficulty," not only to the Railway Company but also to every man and woman who through ignorant or selfish misrepresentation may be induced to settle in this section of country ; and such will continue to be the case until in the course of time by the growth of population and development of resources the place may become *self-sustaining*, but in *no case* can such a settlement be of use or benefit, material, political, or otherwise to the *country* which has *planted* it.

It has just been suggested to me, " that although my calculations may be all right, still, as they are based upon a local or 3c tariff they are not applicable to the case under discussion ;" " that the calculation ought to be made on a through tariff," &c., and as this, doubtless, is a very general opinion, and the subject itself one of the most important which it is possible for Canadians to discuss at the present moment ; you will pardon my seeming prolixity if I try to find out what force there is in it. In the first place a good deal will depend on the manner in which you view the road. I have gone on the supposition that the " Canada Pacific Railway " will be managed and its tariffs regulated on the same

principles as the other great railway corporations of the continent ; that it is to be operated on ordinary commercial principles, and to be made pay as much as it possibly can, say for the first ten years after completion—between three and four millions annually, or 35 per cent of its operating expenses—but if I am in error, and the road is to be looked upon rather as a *benevolent* enterprise, got up at the expense of the entire Dominion for the sole use and benefit of the Northwest and Pacific Provinces of course, I have nothing to say further than, Why charge anything at all ? Why not make it absolutely free ? It would be much better in every sense to do so than to mix up business with charity ; but as I cannot suppose any set of men capable of perpetrating such a piece of absurdity as I have supposed, we will believe that all intend to look upon the " Canada Pacific" as a " commercial speculation," &c. Having then got upon firm ground we can argue the matter of " through rates," and in the first place I would say that whoever says that through rates should be applied in the case of the Canada Pacific *assumes*—although he may not know it. 1st. That the Canada Pacific will be a *paying concern*, and that its managers will be able to regulate their tariffs so as to suit the wants of particular districts ? 2nd. That 3c. per ton per mile is an *exorbitant charge* for railway carriage for the distance named. 3rd. That *through* or *way* rates are mere arbitrary regulations depending on the *will* of the managers ; now as *every one* of the assumptions are *erroneous*, the conclusions drawn from them must be so also. I hold, in the first place, that through freights are an entirely *exceptional* arrangement, growing out of exceptional circumstances, and existing only between the city of Chicago and the seaboard ; and they are only *practicable* between the points named, because the city of Chicago is the grand centre or focus, into which is poured the grain grown on the 44,000,000 acres of land cultivated in the West, over one thousand million bushels—an amount which keeps her elevators continually full, so that a locomotive can back in and take on its *full* load at a Chicago elevator and make the run to New York, Boston or Montreal, without *change* or *break*. A few moments reflection will show you how it is that certain railways can afford to take traffic at through rates, and how a large load at very low rates, may be more profitable than a small load at high rates, par example : We, the public, insist, or the company thinks it is its interest, to run a certain number of trains per day at a given speed per hour, from end to end of their lines, so that the public may take a ride when and as far as their business or pleasure may require, consequently, the company must keep a certain number of engines, passenger and other cars, and the men to operate them ; moreover, they must keep the track in good repair, &c., to do which requires a very large outlay of money, and you will please mark particularly, that by far the largest portion of this *outlay*, may be described as outlay of a fixed or permanent character, and is *independent* of the *amount* of

business done; thus, the engine has five passenger coaches behind it, each coach is intended for the accommodation of fifty passengers, and the train once started, must go right on to its destination, whether it is *full* or *empty*, the *expense* will be *precisely* the same, whether it carries fifty or 250 passengers. Consequently, it is plain, that it would pay the company much better to carry the 250 or full compliments of passengers for 3c. per mile, than the 50 at 10c. per mile ; all that is needed, therefore, to insure "through rates" is to guarantee the railway a large traffic; and what holds good in the case of passenger traffic, is still more powerful when applied to freight, because passengers load and unload themselves, whereas freight requires to be handled at an expense of not less than 50c. per ton on an average. If, as before explained, the road is to be managed on commercial principles, we must *divide* the *fixed charges* by the *number* of *engines* and *cars* on the *road*, and each engine and car must earn its *proportion* of the whole sum. There are only two ways in which they can do so—1st, by being operated up to their full limit of useful work at low rates 1.69c. per ton per mile, as in the case of the six great competing routes of the western states, or 2nd, by just taking what freight is offered at high rates, as in the case of ninety-nine out of every hundred of the railways in existence. So much then for the argument that I should have estimated the probable cost of moving freight between Manitoba and Montreal, at through rates. As to the second argument that 3c. per ton per mile would be too much, I would answer first that the lowest charge in Great Britain is about 4c. per ton per mile ;* in France, $3\frac{1}{4}$ to 4 ; in the United States—which I repeat manages her

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* There are about 16,000 miles of railways in Great Britain, which cost on an average £36,000 sterling per mile, or for the whole about £570,000,000 sterling, of this amount 240,000,000 is share capital, 180,000,000 preference and guaranteed, 150,000,000 loans and debentures. The different roads carried in all during the year 423,000,000 passengers, besides season ticket holders ; of freight they carried 106,000,000 tons of coal and other minerals, 73,000,000 tons of general merchandise ; the locomotives travelled 190,000,000 miles, and earned 5s. 4d. sterling per mile for every mile run, or in all £23,300,000 for passengers, and £29,000,000 for freight ; about 50 per cent. of earnings going for operating expenses and the other for profits, giving on an average about $4\frac{1}{2}$ per cent per annum. Over £50,000,000 sterling of the railway capital of Great Britain has never paid one cent of profit. N. B.—Any one who is fond of figures might exercise his skill very profitably in trying to find out the the true cause why railways in this country have been such complete failures. He might begin, for example, by showing the number of miles of railway per million of the population in this country and in Great Britain ; 2nd, the tons of freight and number of passengers carried per mile in each country, and the amount of money earned respectively; 3rd, the amount of railway business done per individual in the two nations ; 4th, the difference in the cost per train mile in Canada and in England, and the reason for the difference ; 5th, the average *extra* locomotive power required in Canade per 1,000 tons in comparison with England or Scotland, &c., the cost of the same, also the expense of removing snow, &c., the loss caused by reduced speed, loss of time &c., during the five winter months, &c., &c. He will find, 1st, that we have as near as may be *double* the number of miles per 1,000 of our population ; 2nd, that for every mile of road in England they carry 30,000 passengers per annum, in Canada the number is be-

roads cheaper than any other country—it is (including *through freights* on nearly one thousand million bushels of grain), 3 6-10th, and if any one believes that we could manage a railway between British Columbia and Ontario for a less figure, "I envy him his faith," as Mr. Cartwright remarked of another subject. 1. In the next place I would point to the Grand Trunk, originally built as a first-class road, running through a remarkably easy railway country, and doing as large business as it can accomodate. In short, running through a well peopled and prosperous country, and counting the through traffic, doing a business equal to the export, import and local traffic of the whole 4,000,000 of the Dominion, viz: carrying over 2,000,000 of passengers and 1,800,000 tons of goods per annum, yet the road—though charging considerably more than 3c per ton per mile for local traffic—has never paid one cent on the cost of construction. Nay, more, it has not been able even to maintain its permanent way, or even supply adequate rolling-stock from its earnings.* 2. The Northern Railway has paid interest on barely one-half the cost of construction. Indeed, the only Railway in Canada that has paid decent dividends is the Great Western, and its dividends have been very fluctuating and uncertain, as may be seen by the last report, which puts them at 2½ per cent. per annum for the last year. 3. The Directors of narrow guage Roads, at their last meeting, declared that all their *calculations* and *expectations* had been *falsified;* and that they were not only not able to pay interest on the share capital, but that they had no hope of doing so; while one of their prominent men—Mr. Worts—afterwards declared in the St. Lawrence Hall, that the $15,000 he had invested in one of the roads was not worth 15c, yet the

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tween 1,400 and 1,500. In Great Britain the freight carried is about 15,000 tons per mile, in the Dominion about 1,000 tons per mile, &c. Taking all these points into consideration, he will, I am convinced, be very chary in expressing surprise that Mr. Brydges, for instance, found it impossible to make the Grand Trunk a paying road. I think the astonishment will be—as it has long been with me—that the said gentlemen could keep the road in operation at all under the circumstances.

* I am well aware that it is customary to account for the none paying condition of the Grand Trunk, by referring to the waste and extravagance of those who built it; but that idea is manifestly absurd, for so long as a road cannot pay *operating* expenses, it can make very little difference whether the original road-bed cost $10 or $100,000—except in so far as it increases the first loss. Others, again—for instance the *Globe*—maintains that the road is a failure because it attends too much to through traffic, and neglects to cultivate the *local* or way freight. That argument will have force when the writer sits down and shows first how much *extra local* freight the Grand Trunk would get by acting according to his instructions. 2. By showing how much money each engine and car earns per twenty-four hours in carrying local freights, and comparing it with the amounts earned in carrying at through rates. The *real* cause of failure in the Grand Trunk is that the local traffic is too *small* in *proportion* to the *length* of the *line*, just as the Grey and Bruce Railway is a commercial failure because its manager calculated the freight rates in proportion to the *cost* of the *road*, in place of in proportion to the *length* of the road, and cost of *operating*. For a road the length of the Grey and Bruce, the fare ought to have been 4 to 4¼ cents per ton per mile.

narrow guage roads were got up with special economy, and cost their shareholders less than $9,000 per mile; they run through one of the best settled and most productive parts of the Province, and charge 3c per ton per mile. 4. It is well known to all who take an interest in such matters, that neither the Grand Trunk nor Great Western could be kept in operation if they depended entirely on Canadian traffic. Lastly. No Railway can now be built in Canada, or even the United States, as a mercantile speculation, they must be very largely endowed by Government or local bonuses, &c., which, to me, is irrefragable proof that the Railway system cannot be operated in the Dominion, (and in very few parts of the continent,) so as to pay current expenses, and if you want still further proof of my position, you, sir, can find it in abundance in the records of your own office.

For the sake of argument, however, let us suppose that by the exercise of extraordinary forethought and financial wisdom, that by a combination of the highest order of commercial and engineering skill, it will be possible to build the Canada Pacific Railway so economically that it will be practicable to carry the produce of the few thousand farmers, &c., scattered along its route at the lowest through freights now charged by the great competing roads running through the Western States, viz., $1\frac{3}{4}$ to 2c per ton per mile—and it is universally admitted by the most skillful Railway managers, that it is quite impossible to carry freight at a less charge. Now, even in that case, what chance would the settlers of Manitoba and the Saskatchewan have of becoming prosperous or wealthy men? Why, it is only necessary to place the figures beside the rates paid by the older Provinces, say from 8 to 10 per cent., to see how utterly hopeless must be the case of the man who depends upon a railway 1,200 to 1,400 miles long to carry his produce to market. Indeed, both reason and experience join in proclaiming with a voice which cannot be misunderstood, that either the Railway must carry all manner of produce at one-third the present (lowest) rates; the farmer must find a local market for all his surplus, or, failing that, the lands of the Red River and Saskatchewan Valley, &c., must and should remain an untilled wilderness for generations to come; a land wherein the wolf may bring forth her young, and the buffalo roam in comfort undisturbed, save by the whoop of the red man, or the crack of the hunter's rifle—the Canada Pacific Railway to the contra notwithstanding.

Hitherto, however, we have been dealing in supposition, calculations, &c., we have been endeavouring to show, from the nature of the case, what must be the condition of farmers growing crops 1,200 or 1,500 miles from the place where they are to be consumed. Let us now come to facts, to figures, to the everyday experience of the producers who have to send their products long distances by railway; and what do we find to be their state and circumstances? Just what from a fair, honest and intelligent calculation of the capacity of the Railway system we would have expected, viz., a state of comparitive poverty, cursed with a

plethora of food, and denied almost everything else in the shape of comforts and luxuries, such as are absolutely necessary in our present state of society, for the maintenance of decency and respectability. We see the States of Illinois, Michigan, Missouri, Wisconsin, Iowa, and Minnesota, &c., in a condition of most excited agitation in regard to railway tariffs on cereals between the west and the seaboard, the entire west is in a state of ferment ; representatives are harassed with deputations of farmers, the Legislatures are flooded with bills and petitions, the newspapers teem with articles ; and the public halls are kept vocal with speeches on the subject of " Railway Extortion," " Legalized Robbery." Conventions of farmers are held in every town and city of the west, they combine in lodges called granges ; which associations are now numbered by the hundred thousand, and their members by the million all in defense of their rights and interests against, and in denunciation of the (fancied) encroachments of what is called the railway despotism. Freight rates are so high, and crops are so abundant that in many parts of the Northwest they are actually burning their produce for fuel as they cannot ship it at any price. To sum up in a few words, it is declared on the authority of the head of the " National Granges" that *three-fourths* of the *farms* in Illinois and other parts of the West and Northwest, are mortgaged ; and the farmers otherwise over head and ears in debt ; a state of affairs which is truly alarming and gives good cause for the " Grangers" agitation of the railway question ; it also calls for the immediate and serious attention of every man calling himself a statesman ; a remedy must be found and that soon or the vaunted prosperty of the great West will become a thing of the past and the free, intelligent and hardy tillers of the soil sink (in fact they are now sinking) down into mere helots, " white slaves," toiling night and day for coarse food and scanty shelter ; thus becoming hewers of wood and drawers of water to the other and more prosperous members of the community, in place of being as they have been hitherto the most prosperous and independent members of society. The American farmer living not more than one hundred miles from Chicago has to pay three-fourths of his grain crop to have the remaining one-fourth carried to market ; so that it often pays them better to burn it for fuel than to exchange it for wood or send it to eastern markets. Yet he pays but 1½c per ton per mile and the distance to New York is less than 900 miles, or 300 miles less than from Manitoba to Toronto or Montreal.

"That this is a very unpleasant commentary on our means of transportation" says the *Scientific American*, " cannot be denied ; the cost of food here in the east is notoriously high, yet such are the rates of freight that it is a better paying operation to burn the food for fuel than send it to eastern markets for sale ; nothing can more forcibly proclaim the necessity of some cheaper and more expeditious method of transit than canal or railway carriage."

The Chicago *Tribune* says :—" What is needed is a cheaper freight

east of Chicago—than in the opinion of our best railway managers it will ever be possible for *any number of railways* to the seaboard to give," and this cheaper means of transit must be found or the prosperity of the West and Northwest will gradually cease, till war in Europe or some other unusual circumstance creates a great demand at unusually high prices; indeed, if the present over production goes on for the next five or ten years the farms and the farm produce of the West will be almost worthless; notwithstanding that we have over 10,000 miles of railway in the West for which we have paid three hundred millions of dollars and the gross profits on which does not give 4 per cent to the shareholders." The same paper in a recent article again refers to the cost of transportation from the West to Eastern markets, it says: "Corn is offered delivered at the railway stations 100 and 150 miles from Chicago at 15c per bushel; oats, 8c to 9c; wheat, at proportionately low rates as compared with what it brings in the Liverpool market, and from this is still to be deducted the cost of moving the grain from the farmers crib to the railway stations, assuming, says the *Tribune*, the distance from the farm to the railway station to be on an average fifteen miles, it will cost the farmer the value of time and labour of one man and a two horse team an entire day to deliver a thirty bushel load of corn at the station; at 15c per bushel the entire proceeds of the corn, the use of his team and labourer for the day will be $4.50, not equal to the price he has to pay for one set of shoes for his horses, it will not pay the tax on two pairs of blankets, nor on ten dollars worth of any woollen goods he requires for his family."

That is how farming pays in the amazingly fertile lands of the Western States where the soil is said to be so rich as to require little else but the sowing and the reaping and that too within a hundred miles of the city of Chicago—one of the greatest grain markets in the world—how then will it pay in lands so distant from the Atlantic sea ports as our Northwest?

What products could the farmers of Manitoba—not to mention British Columbia—raise that would bear railway charges from fourteen to eighteen hundred miles? Echo answers, What?

If it is a fact (and alas it is an ower true tale), that the farmers of the West and Northwestern States of the Union—although possessed of the most fertile lands on the continent—find it a hard and constant struggle to keep their heads above water (although living in a rude and most inexpensive way, denying themselves nearly all the luxuries and many even of the comforts and conveniences of life); owing to the enormous proportion of their produce exacted by the railroads for carrying the remainder to market? What means are you going to adopt to make the condition of the settler more tolerable in the Canadian Northwest? or rather by what magic are you going to make his position equal to that of his American cousin—miserable as that is—seeing that he will be hundreds of miles further from the Atlantic seaboard than his neighbour?

If his position is to be anything better than a constant and hopeless struggle with poverty and debt, you must either find for him a home market—which is impossible—or you must build and maintain at tremendous sacrifice to the general public—a railroad for his accommodation ; and you must not only make and maintain the road, but you must also carry his produce at less than one-third of the lowest charges now made for similar services, or it will be impossible for him to compete in an already overstocked market owing to his greater distance from that market. Now, in either case you will be simply paying him a bounty for going into a particular branch of industry, which is already sadly overdone ; and on what grounds, social, moral, political, or commercial, you will be able to justify your conduct to the people I am altogether at a loss to imagine. If cereals were a commodity of limited production, and attended with peculiar danger and difficulties in their growth, there might be some shadow of justification, but as it is, the idea is simply ridiculous and to put it in force as is proposed, would be to commit an act of grave injustice against every other branch of business in the country, and every other class of the people. In fact all manner of farm produce has fallen so low throughout the entire west and Northwest that the Agricultural journals are gravely recommending the farmers to form a "Union" like the mechanics, and by joint action reduce the production of all kinds of grain crops, by nearly one half the present amount, arguing with good show of reason that they will get just as much for the short crop as for the large, while they will save the labour.

Indeed, they show very conclusively that the farmers away back from the Atlantic seaboard are the *worst paid* and *hardest worked men* in the *entire community*. The *Country Gentleman* for December, 1872, makes the following remarks on the subject :—"Another mistake is a constant change of location. What a man makes by the cheapness and fertility of the western lands, he more than loses in the want of the eastern markets. In this connection I believe that the *homestead and cheap railroad lands* are a *curse* to the *country*, because they encourage men with no capital to leave a section where their labour is needed and well remunerated, and settle upon these lands, and being driven hard by their necessities, they toil night and day, exhausting the virgin soil, vastly increasing the crops of the country, but decreasing prices, being worse paid than they were in working for wages in the East, and injuring the whole farming fraternity, while they benefit only the middlemen, railroads, eight hour mechanics, &c. The latter class may oppose such advice ; but if it is true that the labourer is worthy of his hire, the farmers are greatly underpaid, while the other class receive more than their due."

The truth of these remarks are fully sustained by the following quotation :—"A newspaper of Iowa city gives rather a discouraging account of what the farmers are doing, or rather not doing in those "diggins." Here is the price current : A pair of winter boots costs *two*

loads of potatoes ; a night's lodgings, one load of oats ; the wife wears five acres of wheat ; the children each *ten* acres of corn ; the price of an overcoat is a good four year old steer ; a Sunday suit, twenty fat hogs ; the farm, too, wears a mortgage that is worse than hardpan to the soil ; and the annual tax rots the roof faster than the rain."

Or, as one more example of the utter inability of a railway or railways to assist the farmers of the far West, take the following from the *Scientific American* :—

"I wish to correct an error in your article "Burning corn as fuel." You say the wood land is sadly depleted, and convey the impression that that is one reason why we are burning our corn. Now, you are mistaken, the sole reason we burn it is that we have millions of bushels that we can neither sell, nor feed to stock. We have wood, we have coal, we have land as fertile as any east or west, and we can raise any amount of grain. What we need is a *market ;* it takes about *five* bushels to pay for sending *one* bushel to where it can be used. The *railroads promised* to help us if we would help them ; but they have been an *injury* so far, and they will be so in future, unless *controlled* in some other way.

Tremont County, Iowa, March, 1873. H. D. G.

Or take the following, as another example of the extreme *dearth* and excessive *cost* of the commodity, the production of which we—a "Free Trade" people—are about to encourage by an expenditure of some two or three hundred millions of dollars :—

"A car load of corn was shipped a few weeks since to Philadelphia from the interior of Iowa, via the Philadelphia and Erie Railroad and its connections, and consigned to Messrs. Stauffer & Seyfert, commission merchants. The freight charges, commissions, and other expenses amounted to $233.70, and the receipts $223.70, leaving a deficit of $10 to the shipper, in addition to the value of the corn at the point of shipment !"

Verily, logic is inexorable ; for example, it is in the highest degree wrong—nay, absurd—to encourage manufactures by means of protection —in Ontario and Quebec—although it is well known that excellency in manufactures and commerce is the only road by which nations have hitherto risen in the scale of being, or become famous in art, literature, science, or philosophy. Why is it wrong to protect manufactures ? Because a certain bundle of assertions, dignified with the name of science, says that "nations, like individuals, should *buy* in the *cheapest market ;*" yet it is meritorious in us to spend an amount of money which, I repeat, is absolutely beyond our grasp to comprehend, for the sole purpose of increasing the production—or manufacture, if you will—of *cereals*, an article which is already produced in over-abundance, and can be bought and sold at the present time for considerably less money than we could possibly manufacture it for in our North-west or Pacific Provinces. But, then, it is not done as *protection* to agriculture. Oh ! no, it is done for the purpose of *developing* our resources in the North-west, &c. I

trust, sir, you see the difference in the cases ; for my own part, I am sorry to confess I am a little hazy about the exact distinction.

Seriously speaking, sir, I am aware that you and the gentlemen who now act with you, were opposed to our undertaking the enormous obligations with which we are at present loaded ; or, at least, you were opposed to the *terms, time, &c.*, of the obligation, and, consequently, I acquit you so far. What I am inclined to quarrel with you for is the —to me—monstrous and unreasonable assumption, or doctrine which you preach, viz., that your Government is bound to carry out the engagements made by your predecessors in regard to the North-west, &c., even though the credit and resources of this country should be permanently injured, if not ruined, in the effort. Now, sir, I, as a citizen of this country, one whose interests are bound up in its welfare, beg to *protest* in the most emphatic manner against any such doctrine ; it is but the old axiom of absolutism—"The King can do no wrong"—in different words, then it was *absolute obedience* to a *man*, now to an *idea*. In both cases it is equally eroneous. You will forgive my freedom of speech, if I charge you that your sole duty as Premier of this great Dominion, is to rule the country according to your *own ideas* of right and justice, and for the welfare of the entire people, irrespective of political effect.

I come now to the main object of this communication, viz., to show the possibility of superseding the railway by an entirely new style of transit, "which will be as great an improvement on the railway as the railway was on the stage coach, and the canal of fifty years ago—a system of transit which will do for the American continent and people ;" that which the railway system did for the smaller nations of Europe, viz, satisfy the great immediate want—*cheap, safe and expeditious transportation.*

This may, at first sight, seem a somewhat startling affirmation, and very likely your first feeling will be that of incredulity ; the incredulity will lessen, however, as you reflect that we are living in an age of continual progress—of rapid advancement to the higher and the better in every department of life. It is, therefore, hardly reasonable to suppose that the mechanical and *inventive genius* of the world—the genius which has made all other progress possible and easy—is going to come to a *dead halt* on this particular subject. We are perfectly safe in saying that every invention "has its day ;" every advance—however mighty and far-reaching it may be in its influence on the world—is but *one rung higher* on that ladder whose top is hidden in the clouds of the future, far beyond the reach of this and many ages yet to come. You may depend upon it that when the *inventors* of our young Dominion come to thoroughly realize the magnitude—the immensity of our resources, our coal and iron, our gold and silver, our marble and other building stones, our magnificent forests and inexhaustible fisheries scattered over thousands of miles, and the *utter impossibility* of making those riches *practically* available by means of the railway—they will make the most

strenuous exertions to develop and bring together our various elements of wealth and power, so that each may enjoy the riches of all, and that all may share in the blessings of each.

It is utterly incredible that an educated, intelligent and enterprising people, possessing a land of almost illimitable extent and the most varied resources, with hundreds, nay thousands, of miles separating their principal cities and provinces, are going to remain much longer contented with the snail pace of our present railways—creeping along at a rate of twenty miles an hour (a large portion of the year not so quick), when even in the "old land"—the dear old mother of mighty nations—whose extent and dimensions are but as a hand's breadth in comparison with ours, they fly at a pace of fifty, sixty, or even seventy miles an hour.

The day for miracles is not yet passed; faith can still remove mountains, either spiritual or material in spite of the cowardly counsels of "doubting Thomases." *

"The eye is never satisfied with seeing, nor the ear with hearing," the mind is forever longing after something new, something different and better than the present; and of all the desires of the heart at the present time—at least on this continent—I am not far wrong in placing among the most ardent, the wish for swifter, cheaper, and safer means of locomotion.

From the earliest times of which we have any record man seems to have cherished with peculiar pleasure, the hope that he would yet triumph over the laws of nature, and be able to transport himself over the earth, as swiftly as the eagle speeds through the air; it is a hope we find embodied in a thousand forms, as instance the "wishing cap" of the geni—also the broomstick on which the witches of our great grandmothers were supposed to ride through space swift as the lightning's flash; it is a hope which has formed the theme of the poets song and the seers prediction, and although it has been partially fulfilled in the velocity of the rail car and the locomotive we still call for greater expedition, and we shall not be disappointed; for our all-wise and beneficent Creator has so ordered it, that the genius of the few is ever able to satisfy the reasonable requirements of the many. It is only necessary to feel the want, to have the mind awakened and fully convinced of the necessity of receiving the new truth, and the revelation will surely come; for the

* "Faith is and ever has been the mainspring of man's power, in all his efforts, whether dealing with the natural laws of the universe, or the glorious truths of inspiration as revealed in the Book which tells of man's immortality—his splendid hereafter in the mansions of his father; without faith man is helpless as the new born babe and hopeless as the nameless orphan, thrown upon the tender mercies of a cold and heartless world. Let who will cavel and sneer (in this sneering age) I assert it as a fact, capable of a boundless proof, that faith—intelligent and sincere—in one form or other is the foundation on which has been reared, nearly all that is great and worthy in the past history of the world, and that just in proportion to the active, intelligent faith in the man or nation will be their success in rising nearer and nearer to the glorious perfections of their father, God.

aggregate of human power is almost as limitless as the desires and necessities of man.

Now, sir, taking all things into consideration, I have no hesitation in expressing the opinion that your Government will not be justified in building our great national highway to the Pacific on the present *railway system* until it has been proved conclusively and irrefragible that it is the *absolutely best system* of *transit* which it is possible for the genius of man to devise; and that can only be done by giving a fair, full and impartial consideration to the system I am about to propose, and also by putting it to a thorough and practical test. The question being now raised, it is quite evident that you cannot escape the *grave responsibility* of deciding either that the railway system is perfect, and the *finality* of man's invention in the matter of transport—which would be an absurd assumption—or you must try the new plan, or *prove* it a *failure* by showing that it is *opposed* to the well known laws of *mechanical philosophy*.

Let us look at this very important question then a little more closely than is the general habit of people when dealing with anything new and untried, and see if we can decide definitely whether or not we are justified in looking upon the railway as the *ne plus ultra* of man's mechanical genius in the matter of land transit.

In the first place, what is there about the railway system which could warrant any ordinarily intelligent man in thinking that it could not be superseded? It is but the *creation* of a *man*, a man to who—with all due difference to the opinion of Mr. Smiles—was no superior mechanical genius; consequently, like every other work of the human intelligence, it partakes of its inventors imperfections, and is therefore liable to be superseded by something better.

I do not say this for the purpose or by way of disparaging Mr. Stephenson's work—far be it from me to try and diminish by one iota the credit justly due to the memory of the founder of our railway system—we are only too ready to forget our best benefactors, and need no inducement to stimulate our ingratitude. Mr. Stephenson gave to the world—or rather he *forced* it to *accept* one of the grandest mechanical combinations ever devised by man—a mechanical contrivance which has saved it countless millions of money, and advanced it further on the path of progress than otherwise it would ever have reached. It is therefore impossible for us to bestow too much honor on his memory, so also is it beyond the power of the most malignant critic to diminish his credit.

My sole object in any remarks that I may make on the *defects* of the railway system is to get you to *realize* the possibility of a change. My aim is to brush away the cobwebs which "use and want," natural prejudices, and the halo that a most wonderful and long continued success has warped about your reason. In a word, I want to get you to think, consequently to *doubt* and *debate*, if I only succeed in getting you to use your own brains, my point is gained; for you will soon see for

yourself that there are many great and glaring defects in the railway system as a means of transit,—particularly for a country like North America, where the distances are counted by thousands of miles, and the climate is of the most variable and extreme description—and the inference is plain that wherever there are defects there must be room for improvement. The London *Engineer*, and other able authorities, declare in the most emphatic manner, that the present railway machinery is *monstrously disproportioned* to the *useful effects produced*, nine times out of ten in which it is set in motion, a statement which admits of easy proof. For example, an ordinary passenger train on the London and Northwestern Railroad (English) will be composed of engine and tender, weighing forty-two tons, five passenger coaches, each sixteen tons—eighty—or, in all, one hundred and twenty-two tons, number of passengers (average) fifty-five, now, take the passengers to weigh fourteen to the ton, and you have in all four tons ; or, in other words, to accomodate fifty-five passengers, weighing four tons, you have a train of one hundred and twenty-two tons, or *thirty tons of dead weight* to every *one ton paying weight.* If any one can call that less than monstrously disproportioned, I would like to see him. Yet that is the proportion every day in the year, on one of the best managed and most important railways in England—a road which carried over 12,000,000 passengers during the last six months, and dispatches daily no fewer than 320 trains. Even on the less substantial roads, and with the longer cars of this country, the proportion of dead weight is as much as 2,000 or 3,000 pounds per individual, or fourteen to one, the proportion of nonpaying to paying load in the case of mineral and general freight is but little better, being in England as much as 7 to 1, and in this country about 5 to 1 ; and this *one defect* of the railway system ought of itself to be sufficient to show to any thoughtful and observant mind that such a system is anything but perfect in its operation, and must ultimately be superseded by the growing intelligence of man. Let me now state a few of the other defects *inherent* in, and *inseperable from the railway system* as a means of transport—especially on this continent of *magnificent distances*—so that you may be in a position to understand the *radical difference between*, and the *respective merits* of, the railroad and the system of transit which I propose as a substitute for it. The first, and in my opinion the greatest, defect of the railway system is the *limited* power of the locomotive, and the practical impossibility of increasing that power beyond the present standard. This is a defect of the greatest magnitude, and, like all other evils, either moral or physical, it gives rise to a host of others.

In the first place, it necessitates the rails to be laid perfectly, or as near a dead level as possible, as a rise of even *one* foot in one hundred *deprives* the engine of full half its power (Mr. Stephenson calculates the loss at two-thirds), and the engine continues to lose power with every *inch* of rise in the road-bed, until it is brought to a stand-still, at a com-

paratively gentle incline ; as a matter of trial, it has been found that an engine that would take a load of 420 tons at sixteen miles an hour on a dead level, would not take more than 136 tons up an incline of one foot in a hundred ; to take a load up an incline of only *thirty* feet to the mile, you require to use three times the steam, and consequently fuel, which would be necessary on a level.

I repeat that the necessity for a level road-bed, is an evil of the greatest magnitude, as it consumes nearly three-fourths of all the money, and about the same amount of the time now spent in making railroads in all parts of the world. In the second place, the locomotive must be made of great *weight*, because its power to pull a train depends upon the adhesion (or friction) of the driving wheels to the rails ; and as a matter of course, the friction between the drivers and the rails must depend upon and be in proportion to the weight on the wheels, so that other things being equal, an engine of 150 horse power, weighing 35 tons, will do more work than one of 300 horse power, if it weighs only 30 tons.

For years past, the locomotive engine has appeared to me somewhat like a giant without legs, or with the legs of only an ordinary mortal. You may have the great powerful body, capable of putting forth almost any amount of strength, but from want of power in the limbs to give effect to the action of the body, he is reduced to the level of an ordinary jack. There are all the *inconveniences* of the giant ; he requires the room, the food, and attendance of one, yet he cannot do the work, the fault being in the limbs, consequently you cannot *blame* him ; you might just as sensibly ask, or expect an elephant to pull down a house while he is swimming in the water, as expect a locomotive engine to develop, beyond a certain and very *limited* amount of power, while it is set to work by means of smooth driving wheels acting on smooth iron or steel rails, it is, of course, capable of displaying great power (according to its weight), while acting in the usual way, just as the elephant could pull more while swimming in the water than a donkey could while hauling on land ; but neither the elephant nor the engine would be getting fair play, neither of them having a proper resisting medium on which to act, consequently they could not get a proper foothold.

I am well aware that our present locomotives lose comparatively little power, as their boilers, cylinders, &c., are made so as to work up only to their weight or traction. What I wish to bring out is that the locomotive—from the fact of its being confined to the weight carried on the drivers for traction—is kept down within very narrow limits ; as there can be no doubt whatever, that but for that circumstance, we could have an engine of one thousand horse-power which would not weigh more than our present one hundred and fifty horse-power locomotives. Moreover we could graduate the power of our engines according to the load to be carried, and not as now have to send a machine capable of hauling 200 or 300 tons to take a load of 40 or 50 tons.

Archimedes said, "that he could move the world if he had a lever

long enough and a fulcrum on which to rest." You perceive that there are two prerequisites to his performance. 1st. The lever. 2nd. The fulcrum on which it is to act, but suppose for a moment that after he had got his lever he had found upon trial that his fulcrum was capable of resisting only a mere fraction of the power necessary to move the world; or which he could put forth by means of his lever—in that case he would be in a position precisely analagous to that of the modern "locomotive engineer."

His lever is his engine, and he knows that there is practically no limit to the strength it could be made to exercise; but alas, his fulcrum is but a very poor affair, it soon begins to yield and so he is compelled to make his lever to accommodate itself to the weakness of the fulcrum or road-bed. As it is exceedingly important that you should thoroughly understand what I mean—in regard to the engine being limited in power—I will, at the risk of being thought tedious give you another illustration. Suppose, for instance, that you wanted to take a load of wheat over the ice in winter by means of a sleigh, would you not take care, before starting, to see that your horse's shoes had been calked, and why? Because, without them, he would have no proper foothold on the ice; he would slip and slide and lose more than half his power. And what would you think of a man who, in place of having his horse properly roughened, should reason thus: "The horse must wear iron shoes, as a natural result he must slip on the ice; if he slips, it is evident he must lose half his power; consequently we must use two horses while traveling on the ice for every one necessary on land?" Why, you would very probably say the man was a fool; and that he was, by his stupidity, adding materially to the price of the produce, or substracting from his own profits, according to the demand for his wheat.

In the railway system, however, we go a step further than merely neglecting to calk the horses' shoes, for while putting the load on runners we actually put the horse, or locomotive, on runners also, thus totally ignoring the plain, obvious fact, that for the very reason that a smooth iron or steel rail forms the *best* possible road on which to *move* heavy loads, it must, of necessity, be the *worst* possible road on which to *develop* the *power* of the *engine*, seeing that the load to be moved and the power to do the hauling, require *conditions* the very *reverse* of each other in the road—the one the *absence of friction* and the other the *presence* of that *condition or force*.

It does seem passing strange that, during all these years, railway engineers have never got the length of providing one road for the *engine* and another for the *traffic*; and the omission, I believe, can only be accounted for in this way, viz: Before the introduction of railways—but while they were being agitated—it was contended by the many that it was impossible for an engine to haul *itself* along a perfectly smooth rail, much less pull a load after it. (Hence we find among the early attempts at railway locomotion rack rails and cogged driving wheels,

&c.) So that when it was proved by Trevethick, and after him by Stephenson, that an engine with smooth wheels could not only haul itself along a smooth iron railway, but could also pull a load after it, it seems to have been taken for granted that the problem of locomotion was *solved* and the railway system perfected. It then became the practice among engineers, acting upon the advice of their master (Stephenson), to keep down the grades as low as possible, and increase the weight of the engine, rather than to try and find a more effective mode of working them. And the immense success of the first railways, the wonder and admiration they created, the benefits they conferred upon the country, and their great and manifest superiority over all previous modes of transit, all combined together to crystalize, as it were, everything connected with there construction and operation into *facts, hard as adamant* and irresistable as prejudice. So that it would have seemed something like sacrilege. Certainly it would have been accounted *tremendous presumption* in any one to have attempted to alter or supersede the existing railway practice as taught by its founder, Mr. Stephenson. Hence the evils arising from this want of power in the engine, and the great injury wrought to the permanent way, &c., by its excessive weight and ugly motion, though long known and deeply deplored by the *thinking few*, have, at last, come to be looked upon as *incurable* and a necessary portion of the Railway system; and so we have settled down calmly and contentedly into the new groove cut for us by the master hand (Stephenson), happy in the thought that we have got perfection, at least as compared with our fathers. And now that Great Britain has spent nearly six hundred millions sterling—the United States considerably more—(other nations in proportion)—on their railways, that is sheer nonsense to talk of a change, except, perhaps, in the matter of gauge, though even that was fought against with the most persistent determination by many of our most eminent authorities, thus practically proving that which we are ever willing to deny—viz., our belief in the oft quoted aphorism, "Whatever *is, is Right;*" and I would just like to remark (incidentally, of course,) in regard to the said quotation, that, so far as the practical opinions and beliefs of 999 out of every 1,000 of the world's inhabitants are concerned, a more profoundly correct saying was never promulgated either by poet or philosopher—notwithstanding all that may be said to the contrary.

But to return to our subject, viz., "the want of power in the engine while acting on the rails." There were many causes at work—such as the cheapness of labour, fuel, iron, &c., &c.,—also the short distances between towns and cities—which caused this evil to be but lightly felt on the majority of British railways (they are beginning to feel the want now, though, as proved by their having to drive *coupled engines* with all their "fast heavy trains.") But we having copied—with almost slavish fidelity—her railway system and practice—though with conditions and necessities as *different as can well be imagined*—find, what are compara-

tively insignificant evils to her, immense obstacles to us; this is shown by the fact, that although the English merchant may have to pay—on account of the defects under discussion—from 4c to 4½c per ton per mile for his goods in place of 2c, which otherwise would be sufficient—yet, from the fact that he seldom requires to freight more than *forty* or *fifty* miles, he finds the additional 2c but a very trifling impost after all, so small, in fact, as to be hardly worth noticing. But when you take the case of the Canadian merchant freighting from Montreal to Toronto at 4½c per ton per mile, in place of 2¼c, you can easily see how differently the evil works in the different countries; to the English merchant it makes a difference of only 80c or 90c on each ton of goods; to the Canadian merchant it is *seven or eight* dollars; in the majority of cases, the difference in freight charges would make a large profit on the goods carried;* consequently, in a country of such immense distances as Canada, or the United States, it becomes a matter of *vital importance* to avoid even the *smallest defects*, as the defects get exaggerated according to the *length* of the *line*, until at last they become insurmountable obstacles. Another defect of the railway system is caused by the fact that *in practice* it is *financially* if not mechanically *impossible* to *make*, or if made to *maintain*, a perfectly *level* road-bed. The grades on our new railways are such as would make Mr. Stephenson, was he alive to see them, hold up his hands in astonishment.

The very best of railways are never really in *plain*, seldom in *line*, often *loose* at the joints, and so long as they are made after the present fashion, they must continue to be defective. So long as railroads are made by fastening rails to ties or sleepers, *placed directly* on the *surface* of the *ground*, they must remain subject to many causes of destruction, let the road-bed be ever so well laid and deeply ballasted. The first heavy rain-storm that comes will wash away some of the sand or ballast from under the ends or middle of the ties, and they become depressed in parts; or a severe frost comes after a heavy rain and expands the ground, and the sleepers are thrown up out of their proper line, the result being that the road is rendered uneven throughout its whole course. Now, whenever an engine and cars pass over such a road, the wheels rise and fall

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* To the farmer living in the North-western States, &c., the difference is a matter of vital importance, and represents the difference between prosperity and poverty. "Five cents per bushel on corn, &c., more or less, (according to the Chicago *Tribune*) between the farm and the sea-board, will make the difference between a good round profit, or the complete loss of the years of labor; or, in other words, it will take about thirty millions of dollars from the cash value of their products for the year, and five hundred millions from the cash value of their farms."

"It seems strange, no doubt, to those who do not know that a charge of one-twentieth of a mill per 100 lbs., in the charge for transportation per mile, may take hundreds of millions from the value of farms. It can neither be comprehended nor intelligently directed without a full understanding of the conditions under which agriculture exists in the North-western States, and of the power which the railway has exerted, and still wields for the development or destruction of that great industry." (From Railroads and the Farms, in the *Atlantic Monthly* for Nov., 1873.)

with the very *inequality* of the road-bed, and the cars acquire that abominable thumping, bumping, and rocking from side to side and from end to end, motion which we have all experienced on the best of roads. And this lateral and vertical motion of the cars is not only exceedingly *uncomfortable* but decidedly injurious both to passengers and freight, while it ruins the road-bed and rolling stock ; indeed it renders the keeping of a good, firm, and level permanent way an almost impossible task, as may easily be seen by the following : "A locomotive engine running over a bad or uneven road-bed, at a speed of 25 miles an hour, will STRIKE every *inequality* with a *blow* equal to that of a *twelve ton hammer*, or *sixty* per cent. *more* than the normal weight on the engine. The driving wheels have been known to *leap* a distance of *fifteen* inches over a *depression*, and come down on the following projection with an almost inconceivable force." And not only the driving wheels, but every wheel of every car in the train, acts on such a road just like so many trip hammers set to work to break up the track in the shortest possible time. (See foot-note.)

One consequence of this is, that the engineer in building a railroad, has got to calculate the *strength* of his road, not only to sustain the weight or pressure of the loads it is to carry, which if the roadbed was perfectly firm and strong—and the cars had only proper, that is sliding motion—is all he would require to provide for ; but he must make ample allowance for the terrible destruction wrought by the vibration of the cars and engine, and the higher the speed the greater the *intensity* of the blow struck by the wheels ; hence the reason why on poor roads with limited traffic the trains must go at a *slow pace*, a circumstance which tells against us in Canada very severely indeed, condemning us to creep along at a rate of 18 to 20 miles an hour, when, from the great distances between our principal towns and cities, and the great length of the Dominion, we ought to fly with the speed of the wind—when it is blowing a hurricane,—and our inability to do so is to my mind, another fact proving that the railway system is not alike applicable to Canada

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* A MUCH-NEEDED IMPROVEMENT.—*To the Editor of the Globe.*—SIR,—The present is decidedly an age of progress. We have now only to feel a want or recognise an inconvenience till some one sets himself at work to provide a remedy. Won't some genius, then, contrive to build a freight car that will carry its load of ten tons lightly, elastically, and not like so much lead to go thumping and pounding over the rails, crushing them to pieces, breaking the trucks, straining every bolt and timber, and too often seriously damaging the freight. Certainly something of this kind is feasible.

It is the freight trains that wear out our railroads. Every loaded car is a ten-ton trip hammer to break the rails, strain the spikes, shiver the wheels, and in many cases injure if not destroy the freight. Frail and brittle materials can hardly be packed so as to prevent them being broken ; others are compressed, such as sugars, much to their injury ; tea becomes pulverized, so that it is found almost impracticable to bring it over the Pacific road from San Francisco. With cattle and swine we are told that at every rough place, over which the car thumps, the poor animals groan and flinch and become foot-sore, and full of pains and fever, disease and death.

MERCHANT.

and England, nor capable of yielding equal advantages to countries so diverse in circumstances, climate and finance. *

I can fancy you now saying to yourself, "If the *fault* lies in the permanent way or roadbed, can we not so increase its strength and solidity, as to put ourselves on a footing of equality with England and other European countries, and so travel at a correspondingly high speed?" The answer is *no*, our *climate* is against us, our heavy and continuous snows and frosts in winter, our thaws and freshets in spring, &c., places us at a disadvantage which no money expenditure we can ever afford will counterbalance.

In England, before the railway had been ten years in existence, it was seen, to use the words of the "English mechanic," that if we could only make a *really permanent roadbed*, one which by any *ordinary* amount of expenditure, would keep in *place* and in *line* with the *rail joints*, *firm* and *solid*, we would thereby *double* the *life* of the *rails* and *rolling stock*. Consequenlly we find that for the last 30 years the most intelligent and thoughtful railway engineers have concentrated their entire abilities on the task of forming a really good and *durable permanent way*. They have tried all kinds of experiments, using every description of support—stone, iron, wood, &c., and have sunk untold millions in ballast, &c., and yet after all, the verdict pronounced by the "London engineer," is that "the present *permanent way* is about the *most unpermanent* thing upon earth, it is never in plain, seldom in line, generally *loose* at the joints, *always causing a fearful expenditure of power without any good results.*"

During all those years it has of course, been taken for granted that the railroad having become an established fact, carried out in practice in almost every country of the world, at a tremendous expenditure of time and money, that therefore it was bound to *stand to all time*.—Nine hundred and ninty-nine out of every thousand of the world's inhabitants felt *just* as *certain* that the system of carrying goods in panniers on horseback, the stage-coach, but above all the canal, was sure to last forever, without change or modification.—Indeed, so strong was, and is the feeling of the perfection and permanency of everything connected with the railway, that the proposition merely to *contract* the *distance* usually left between the rails, was battled against by the great *majority* of *railway men* with a determination and eloquence of argument that was simply ludicrous. It was declared unhesitatingly and emphatically by the most eminent *railway authorities* in Canada and elsewhere, that the *idea* was *impracticable* in either a *mechanical or economical sense*, so that

* It is supposed to have been this excessive motion of the cars which caused the fearful accident near Wigan, England, last week, an accident by which twelve lives were lost and many injured. Indeed, there can be little doubt but many of the unexplained mishaps, by which hundreds of lives are sacrificed every year, are the product of the same cause. If by any means the wheels are prevented from falling back on the rails in their right position, (and the smallest thing will do it), the whole train rushes to destruction total and complete.

we owe the Toronto, Grey and Bruce, and the Nipissing narrow guage railways solely to the boundless energy, pluck and foresight of Mr. Laidlaw, (a man whose value to a young country like Canada is absolutely priceless), and the few congenial spirits whom he was able to inoculate with his own enthusiasm, and they have, as usual, shown the *utter worthlessness* of the *opinions* pronounced by "*practical men*," by making the narrow guage a success. Now, under such circumstances, it is hardly to be wondered at that the *idea* of superseding the railway itself by a something better, a something more in accordance with the progressive spirit of the age, and the necessities of different countries, should never once have entered the minds of our practical railway engineers, indeed it would have been very wonderful if it had done so, as it is very seldom that men make original improvements or inventions in their own particular business or profession.

Notwithstanding that I have already expended more time in my necessarily discursive description of a few of the more prominent defects inherent in and inseparable from the railway as a means of transit than I at first intended, I will, for the purpose of impressing them the more firmly upon your mind, recapitulate them in a few lines, adding one or two more which tell against the railway, particularly in Canada and the North and the North-western States of America. 1st then, there is the financial, if not physical impossibility of making, or if made, maintaining a good solid permanent way except at an extravagantly high figure, such as only countries having large traffic to carry for short distances, such for example as England, can afford to pay. 2nd defect, having to make the road-bed as near a dead level as possible, so as to compensate for want of tractive power in the engine, a defect which absorbs nearly three-quarters of the money spent on railways. 3rd. The tremendous blunder of making the engine depend for tractive power on the same plain as that upon which the load is hauled, seeing that the load and the engine require conditions the very *reverse* of each other in the roadbed, the load the least possible friction, the engine a large amount, of that condition or force. That such a palpable and obvious blunder has been allowed to exist all these years without seeming even to have excited any particular comment, appears to me to argue either extreme poverty of invention, or inconceivable thoughtlessness and want of originality in our railway engineers. 4th defect, is the excessive weight of the engine and cars in proportion to the loads carried. 5th. The great amount of lateral and vertical motion always present in a running train, ruinous not only to a roadbed and rolling stock, but exceedingly disagreeable and injurious to the passengers and freight, &c. 6th. The danger to life and limb from the cars leaving the track—trains being thrown from the rails by the simplest accident, such as the breaking of an axle, a small piece coming off the flange of the driving wheel, a broken rail, the spreading of the rails, an obstruction on the track, &c., &c. ; in short, the hundred and one accidents which have and must continue to occur, while

there is no power to hold the engine and cars to the roadbed, but the *coneing* of the wheels and the small flange now in use.* 7th. The long time and large capital it takes to complete even a short line of railway. 8th. The liability of the traffic on our railways being stopped or greatly impeded for at least three months out of the twelve by snow.

As a matter of fact, the greatest objection of all to the railway as a means of transport in Canada and the United States, arises from the inability of the locomotive to contend with the fearful snow drifts that occur in all parts of the country during the winter months; the loss,

* "There is an old fancy that soldiering is the most dangerous business in which man can engage, but take it all in all, war is not so deadly as railway travelling. The entire number of soldiers killed in the two years' war in the Crimea was 2,555. Our railways, as a regular thing, do nearly as much killing per annum. Not a very complimentary thing this to the genius of the age. The railway machinery, so to speak, is worked at such a high pitch as to have got beyond any ordinary means of control; in its vastness and complication it has outstripped human intelligence. Already the public are so much alarmed that many, to our own knowledge, will not risk themselves on board a train. What a bitter satire on the vaunted improvements of modern times."—*Chamber's Journal for April*, 1874.

And that the public have good cause for their alarm is proved by the lists of accidents which appear every day, though as a matter of fact, the public have been systematically deceived by the railway companies on this head, and it is only now that the truth is coming out, for example the Lancashire and Yorkshire Company, returned for 1873—39 killed, 73 injured; the real numbers were found to have been 54 killed, and no fewer than 1,367 injured, or for the whole country 1,110 killed, and 27,000 injured; in the half-year ending April, there were 500 killed and 14,000 injured on the railways in Great Britain, while only 3,640 were injured, and 162 killed in all the factories and other workshops of the Kingdom. In the United States so numerous and aggravated have the accidents become of late, that it has been proposed in the New York State Legislature to make the companies responsible for the value of every life lost on the railways of that State. During the month of December there were no fewer than 103 accidents of all kinds on the railroads of the United States, killing 37 and seriously injuring 114; in November the killed were 37, injured 114; October, 29 killed, 102 injured, and so on throughout the year, or for the ten months 489 accidents, killing and maiming upwards of 1,000 persons, not to mention the immense amount of property destroyed. In Canada, if the proportion is not quite so large, any one who remembers the Shannonville disaster on the Grand Trunk, and the Komoka tragedy on the Great Western, will be satisfied that they are at least enough to induce all caution. Now the query arises what can be the cause of this fearful increase in the accidents, particularly in Great Britain? Just this, the business of all the principal roads has been *doubled* within fourteen years, the consequence is that they require to dispatch a train every ten or fifteen minutes, freight and passenger, just as they come. Now only fancy, an interval of ten minutes between two heavy express trains, running 38 or 40 miles an hour,—is it any wonder there are accidents; is it not a miracle rather, that there are so few. But you say why not build more roads, and so be able to regulate the business. The why is very plain, railroads don't pay, not even when actually doing twice as much business as they were designed to carry—the fools and speculators that build the present roads (in Canada as well as Great Britain), being cleaned out; the men who have the money take warning by their fate, and refuse to burn their fingers for other people's benefit, and so the killing and destruction will continue until we get more sensible roads, or the Governments are willing to pay the piper.

inconvenience, and expense to the proprietors of the roads, as well as the public, from this cause, is a something altogether incredible to any one who has not looked into the subject for himself.

For example, since the 13th of December, 1872, to the middle of March, 1873, the railways of the Lower Province (including the Intercolonial—a road specially built at a cost of millions to avoid the inconvenience of the snow, as far as it is possible to do so) have not been able to count on regularity of movement for two days together, the track having been snowed up as long as eight and ten days at a time, as late as the first of March, so that the Lower Province Members of Parliament were delayed for days on their way to Ottawa. Moreover, what traffic was moved was carried at greatly increased cost to the Companies and the Government. As for the Grand Trunk (*the* Railway of Canada), the London (English) *Standard* says : "The traffic returns for the week ending the 28th December, show a *decrease* of £12,960 ($64,800)." The cablegram adds, "that in consequence of the severe frost and heavy snow, the *freight traffic* is nearly *suspended ;* in Montreal, since the 21st ult., the thermometer has stood 19 above zero, and often 20 degrees below that point."

Again, "the traffic receipts on the Grand Trunk Railway, for the week ending 18th January, amounted to £30,130, and for the corresponding week of last year £35,795, showing a decrease of £5,695. The aggregate receipts, since the 1st of January to date, amounted to £76,-493, against £102,520 for the corresponding period last year, showing a decrease of £26,027 "—or, say $130,000. Now, when you add to the above $195,000, the amount paid for cleaning the track, extra engines required to move what traffic was carried, &c., &c., (recollect that it only *covers* a space of *one* month, while the *loss* must have gone on for nearly *three*,) you can form some idea of the immense difficulty created by the snow. Indeed, it is *no exaggeration* to say that the snows and frosts reduce the effective power of a railroad in Canada fully 30 per cent.* Mr. Brydges, Manager of the Grand Trunk, stated some time ago in a speech he delivered in Montreal, that it was quite impossible in the months of January and February for railroads in Canada to be operated with anythinng like *regularity* or *speed ;* and that it would continue so until our climate changed. At the beginning of January, orders are always given to conductors to run with the *greatest caution* during the winter, and to make no attempt in extremely cold weather to run on time.† Such is railway locomotion in Canada, and I ask any

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* N. B.—We are comparing winter with winter, to show the effect of an *unusual* amount of snow. If we were to compare the winter with the summer months, the contrast would, of course, be infinitely greater. For instance, it is reported that the Grand Trunk took no less than $250,000 in one week this spring.

†From the wording of the above extract, many persons might believe that Mr. Brydges wished us to understand that the irregularity of speed, &c., &c., was the result of extra caution ; but such is not really the case. It would be physically impossible for any man to keep time on the Grand Trunk Railway during the

sane man if I am not correct in saying "that the railway is not *adapted* to a country like this, nor capable of yielding the service required of it; and that if we intend to maintain proper and continuous communication with our fellow-subjects of Manitoba and the Pacific coast, we must devise and put in operation a system of transit very different from the railroad." In fact, the man who would dispatch a train, or risk himself on board of one on a journey from British Columbia to Ontario in the depth of winter (unless there were regular *settlements* every thirty or forty miles along the route, from which assistance could be had in case of need), must either be a madman or a fool.

Since writing the above, I have seen the report of an interview between Mr. Potter, President of the Grand Trunk, and the correspondent of the Toronto *Globe*, in which Mr. Potter says: "The fact of the matter is, our working expenses are enormous, the long winters and the severity of the climate is so great, that it would *have been money in our pockets* if we had *closed the line during the winter months of this last season of* 1872-3, the cold has been so intense, the weather so unfavorable, and the damage done to our rolling stock during the last six weeks so great, that it will cost us thirty thousand pounds for repairs." Further on he declares that the local or *Canadian traffic* of the Grand Trunk would not, and never did, pay *working expenses*, "and that even the Great Western (the *only paying road in Canada*) could not possibly pay working expenses from *local traffic*," which is, to me, *conclusive*, *irrefragable proof* that the *railway system of transit* cannot be worked with a profit in Canada at the present time.

Having thus explained a few of the defects inherent in and *inseparable* from the *railway* as a system of locomotion, especially in Canada or the United States, I will now give a sketch of the system which I believe is destined to supersede it, merely prefacing my description by the statement that no invention of this (or, in fact, any other) kind is *perfect* at its inception or first trial; there are a hundred matters of *detail*, *modification*, and *organization*, which can only be perfected after trials and experiments.

The first necessity in an invention like this is to make certain that your *original idea*—the foundation on which you intend to build—is *scientifically correct*, that it is in perfect harmony with the well-established *laws of mechanics*. The second is, simple and abiding faith in its *utility*, and your *own power* to make the *idea* blossom out into a *reality*, an every

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winter, unless he used *double* the *locomotive power* he was in the habit of employing in the summer; and the reason is very obvious: the engine depends for traction on the *friction* produced between the drivers and the rails. Now, a slight fall of snow, a thin film of ice, or even a heavy dew on the rails, will diminish the friction or traction from 60 to 80 per cent.; hence you will perceive there is just one out of three things to be done in winter: either the locomotive must start with *one-third* the ordinary summer load, or starting with a full load, say from Toronto, leave a portion of it as it goes along, acording to the state of the rails; or do, as is now done, viz., keep the ordinary load and *lower* the *speed* as the friction decreases.

day fact, and I can assure you that there are very few *mechanical impossibilities* when taken in that way. Take as an example of what I mean, the invention of the "Bessemer process for making steel,"—one of the most important inventions of modern times. Mr. Bessemer says, "Many experiments were made in different iron works, according to my plan as explained in my patent, but they all turned out failures, so that the great expectations at the beginning gave place to incredulity; *every one avowed the thing would not work*; I myself found practical difficulties. Instead, however, of answering the many objections of the newspapers, I tried experiments, and found out the cause of failure, and succeeded perfectly in making steel by my method, and now brought my invention in its new and *perfected* form before the public; but unbelief had only increased. 'Ah, that is the thing,' they said, 'which made such a noise three years ago, and turned out a failure.' They considered my discovery as a meteor which had flown through the metallurgical sky, and left only sparks behind. Nobody wanted to hear any more about my invention, and I had endless difficulty to convince a single iron maker of the advantages of my plan."

Just the usual history of all important inventions. First, it is an *idea*, a suggestion of the fancy; then comes faith in the *truth* and *utility* of the suggestions, and lastly, reason and experience gets to work, and through many failures (it may be) works out the *idea* into a *fact*, the *fancy* into a *reality*, the world—even the most intelligent portion of it—*persistently* refusing to believe (although, as in this case of Bessemer's, with all the nccessary *data* before them, on which to form a correct judgment), until compelled to yield by the stern logic of accomplished fact; consequently, you must expect to find many apparent difficulties to the carrying out of my proposed "system of transit," and to have many objections suggested to you by others—although, for my part, I have never yet found an engineer or mechanic who could or *would* state an intelligible objection to my plan; in fact, it has been quite the contrary, and so unanimous has been the commendation of the idea, that I have been sometimes tempted to think they were hardly sincere.

However, in dealing with objections when they do come, I beg of you to recollect that the first and *main point* to be decided is, is the *idea*, the *principle* of itself *feasible*, is it in accordance with the *laws* of *mechanics*—not so much whether it is carried out in the most complete and perfect form, and to enable you to judge of its *feasibility*, and whether it is in accord with the well-established principles of mechanical philosophy, we will first look at the *idea* upon which the *railway* is founded and built up. Mr. R. Stephenson (son of the originator of the railway system) says: "The general principle of railways may be regarded as the *adaptation* of *mechanical contrivance* for the *diminution* of *friction* in the ordinary appliances of locomotion, and consequent *reduction* in time and space, *proportioned* to the degree of perfection attained in the means employed."

Hence you will perceive that the whole question of *superiority* in

different methods of transit, or rather (in different kinds of roads) resolves itself into the *diminution* of *friction*. For example, a horse or an engine will draw $3\frac{1}{4}$ times as much on a macadamized road as on gravel or dirt, $4\frac{1}{2}$ times as much on a *hard pavement*, and 18 times as much on an iron rail—the advantage of the rail over all other methods of transit hitherto proposed is therefore very apparent. In the case of railways, however, and any method of transit proposed as a substitute for them, the power of the engines used, and the cost of *building* and *maintaining* the road-bed, also the *weight* of the engine and cars in proportion to the load carried, must be taken into account.

GOUDIE'S PERPETUAL SLEIGH ROAD.

The roadway which I propose as a vast improvement on the railway will best be described by the drawings to be found in the front of the book. Figure 1 is an elevation of the road and cars (showing it as an elevated road). *a a* are posts or uprights of wood or iron, 18 inches, more or less, in diameter, sunk in the ground beyond the reach of frost, &c., and leaving 2 feet, more or less, above the level of the ground. *b b* are longitudinal timbers laid upon and bolted to the uprights *a a*. *c c c* are steel wheels or rollers (coned or cylinderical),* moveing freely in journals resting upon and fixed to the longitudinal timbers *b b*.† The steel rollers *c c c* are fitted into boxes (not shown in the drawing) which keeps the greater portion of them continually covered with solid or other lubricant. The bearings on which the rollers *c c c* revolve may have a cushion of rubber or other elastic material between them and the longi-

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* It will be obvious to any one who gives the subject a moment's consideration, that the wheels or rollers *c c* may be made of a great variety of forms—spheres, spheroids, cones, cylinders, &c., &c., and except for the bearings, of different materials. By preference, however, I would make them double cones and hollow, so as to contain their own lubricant, the material to be hard steel or chilled iron for the bearings and face, and hard wood for the body. The great advantage to be gained by the double cone is that it forms a V shaped groove, in which the tube runner of the sleigh can slide along with the *least* possible *friction;* it would also form a perfect *guide* from which the runners could not escape. We thus avoid the necessity for, and the very considerable loss of, power which would be occasioned by the use of outside guide-wheels plying on the longitudinal beams (although, as a matter of precaution, I would have such wheels on every sleigh and engine). The advantage gained by making composite rollers—wood and iron—is, of course—to Canada particularly—of great importance as a saving of expense (no roller needs more than two or three pounds of steel).

† In building a "Sleigh road" for very heavy traffic, such for instance as the carriage of canal boats, barges, &c. &c., in place of fixing the rollers so as to turn on their axes in the longitudinal timbers *b b*, I form them in pointed groups and leave them free to roll round a solid centre, or in grooves, made for the purpose in the said timbers *b b*, thereby reducing friction to a minimum; in ordinary cases, however, the gain would not be worth the extra cost.

tudinal timbers *b b*, to which they are bolted, so as to absorb any vibration that may be caused by the cars or engine, also for the purpose of rendering the *road noiseless*. *d d* is the centre road on which the driving-wheels of the locomotive run ; it is about 18 inches, more or less, *below* the *level* of the rollers *c c c*, so as to allow the *bottoms* of the sleighs to hang down between the timbers *b b*, thereby preventing the possibility of the sleighs leaving the track by accident.

Fig. 2 shows a plan of the road laid upon the surface of the ground in the same manner as an ordinary railroad. *a a* are the cross-ties or sleepers ; *b b* are the longitudinal timbers laid parallel to each other and bolted firmly to the ties, *c c* are the steel or other rollers. The rollers *c c* rest upon and revolve between *double* timbers as shown in the drawing ; they are also supplied with lubricant from a box not shown, and rest when necessary upon springs or cushons. Fg. 5 is a section of the runner on which the car is placed ; *a a* are India rubber or metal springs placed between the bottom of the car and the runner, to *absorb* whatever *vibration* (if any) may be created by the train while in motion ; *b b* are the binding bolts ; *c* is an oil can and broom which sweeps the track clear of any obstruction and oils the rollers *c c c* if necessary, N. B.—The broom &c., is only wanted when the track is left *uncovered* which need never be done, as one of the great *advantages* of this system of locomotion is, that the *track* with its rollers *c c* may be kept completely covered over and protected from snow, dust, water, &c., and even from sight almost as thoroughly as though they were locked up in a box, and that in the simplest manner —though simple as it appears I had been studying the subject for months before the idea occurred to me—for example, you first lay your track (with the rollers all fixed) under the surface of the ground, and then cover each side-piece with its rollers, with a separate arch (or other structure) which projects over and above the rollers in such a way as to leave a clear space of two or three inches between the covering and the rollers ; all that is then necessary is to *curve* the *standards* which connects the *runner* with the car, to the shape or *form* left between the cover and the rollers, vide the drawing figure 8. The *runners* of both engine and sleighs are hollow, to enable us to keep up a circulation of cold water (or other fluid) and thereby prevent heating on long journeys. Figure 6 is a section of the driving wheel of the engine ; it is about 18 inches more or less broad, and 6 feet more or less in diameter, covered with India rubber or other elastic material of a suitable thickness. The roadbed consists essentially of a series of steel or other rollers placed upon proper supports, such as upright pillars, longitudinal timbers, or fastened to *steel rope* by means of wooden or other blocks, &c., &c., the rollers are placed in parallel rows, with 4 feet more or less, between each roller, and 5 feet more or less, between the rows ; each roller revolves freely on its axes in a box or other receptacle which keeps it covered with lubricant, thereby enabling the runner

of the sleigh to pass over it with the least possible friction; or the rollers are made hollow as before explained, and consequently contain their own lubricant, which would require to be renewed once or twice a year, the centre space between the row is levelled to make a smooth even surface on which the driving wheels of the locomotive may work. In case of an *elevated* road or one intended for great speed a plank road (*d d* in the drawing) is built in the centre upon cross ties bolted to the uprights *a a* as before explained—or better still, it may be made to rest *upon independent* supports, thereby preventing all jar or shock to the road carrying the traffic.

Now for the motive power which will pull us along; it will consist of a locomotive engine, so modified in its arrangement as to have the driving wheels in the centre of the track, and under the body of the machine; it will also be supplied with runners the same as the sleighs, the runners resting upon the rollers *c c c* for the purpose of balancing it. The runners of the engine are made *changeable*, so as to throw *more* or *less* of the *engine's weight* on the *drivers*, according to the *burden* they have to *pull*. As I have shown, the driving wheels are of the elastic type, such as are now used for traction engines on the common roads.*

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* Although I have so far referred to only one method of working this kind of roadway, viz., by a locomotive engine supplied with elastic drivers operating on the earth, or on an artificial track composed of asphaltum, concrete, wood, &c., &c., it must not be supposed that I am confined solely to that style of supplying power; on the contrary, I can conceive of no less than ten different ways in which I could apply the steam engine to work such a roadway—or a railway. Hence the reason I have expressed so much astonishment at the want of thought or ingenuity in our railway engineers, who still operate our railroads as their originator did—no matter the country, place, or circumstances—amid the arctic snows of Canada, or the tropic heats of India, along the level prairie, or up the steep mountain side, the same locomotive must toil. If it is a level, all the better, we can take a good load, or go at a good speed; if an incline, then we must just do the contrary; but to talk of fitting the engine to the ground it has to travel over, why, that is rank railway heresay: the thing has never been done, and hence it cannot be done, &c. And you need not be in too big a hurry to condemn or laugh at such logic, for I could take a *bet* that you, my dear reader, have either *thought* or spoken in pretty much the same style before now.

I can, however, only give the bare outline of threee or four styles of operating the road which might be adopted: 1. The centre track might be made in the form of a groove, say 6 inches deep and 12 inches wide, and the driving wheel being covered with rubber or other elastic material, would be kept in the groove by the engine's weight, or made to work tight; in that case we could have almost any power of engine, independent of its weight. 2. The track could be formed by a solid beam of wood, say 8 by 12 inches, and the driving wheels supplied with a flexible double flange, which would grip the beam in pretty much the same way as we catch with our fingers. 3. We could form the centre track with cross-ties, so that it would look something like a *ladder*, and the soft elastic face of the driving wheels would be forced in between the rungs, and so give a tremendous hold. This style would also be *independent* of the *weight* of the engine—a matter of the greatest significance—and so on; at the same time, neither of these methods are necessary, as the *friction* produced between the elastic drivers and the roadway—either wood or earth—would be as much as we could possibly use up, while it has the great advantage of being simple and inexpensive.

The break power may consist of a certain number of flat iron shoes, faced with thick India rubber, or other elastic material, the said shoes to be pressed to the earth or the centre plank road, by means of screws, levers, &c. ; or it may consist of iron sheers *faced* with *rubber*, to catch the longitudinal timbers *b b ;* that, however, is a matter of detail, which will have to be settled by trial.

The object of this system of locomotion, as you have, no doubt, already perceived, is to substitute a *sliding* or sleigh motion for the circular or wheel motion now in use. So that a ride in a car, on this plan, will more resemble a sail on a perfectly smooth sea, or a sleigh ride over well packed snow, than the jolting, thumping, swaying motion of our present railway cars.

To get a thoroughly correct idea of this system in operation, you must imagine yourself on board the "Bella," an ice-boat which last year flew over the frozen bosom of the Hudson River, with a fair wind, at the rate of nine miles in seven minutes, thus beating the express train, against which she was running, by nearly two to one. Indeed, the ice-boat has the credit of suggesting this system of transit, which I propose to introduce, as it was while watching with intense admiration, some ten years ago, the swift and graceful motions of the ice-boats, as they went sweeping over the glassy surface of Lake Ontario, that the idea first sprung up in my mind, that if it were only possible to form a "permanent way" as smooth, level and firm as the frozen lake, we would have *perfection*, or as near it as man could ask in a *roadway*. The system I have now explained is the outcome of my cogitations on the subject, and it is almost needless for me to say that it is simply a mechanical substitute for the frozen river and the ice-boat, though unlike most other imitations, it will be found very much superior to the original, inasmuch as the artificial *roadway* has a *motion* as well as the sleigh or boat, while the ice is stationary, and *only* the *boat moves* ; furthermore, the runners of the ice-boat cut deep into the surface which supports it, and thereby creates a great deal of unnecessary *friction*, while the runners of the sleigh scarce touch the surface of the wheels or rollers *c c* (which form the road), skimming over their greasy faces with such celerity as to leave, "like the baseless fabric of a vision, not a '*trace*' behind."

And if it is a fact (and no one can deny it) that an ice-boat under sail has carried four men at the rate of 85 miles an hour, while the runners were cutting so deep into the ice as to almost blind them with the showers of broken ice, what speed may be expected from a sleigh running over *revolving steel rollers*, kept continually covered with oil, so that the runner of the car can barely kiss their circumference, the sleigh being, of course, propelled by a powerful steam engine, with, in many instances, the sail in addition? So far, I have only referred to the steam engine as the moving force on the new road; at the same time, I wish it to be distinctly understood that for *long* journeys (say across continent), and where cheap freight is (as it must always be) a

matter of vital importance to producers and the public, that *wind power* should be used, wherever practicable; with the *railway* it is simply impossible, but with the "sleigh road" it will be found entirely practicable, profitable, and easy; so small is the force necessary to move, say, 200 tons, on the sleigh road, that for at least one hundred days every year there will be found sufficient wind on the route to the Pacific, to drive a 200 ton load at 40 miles an hour. A good sailor can always make the ice-boat go nearly *double*—some maintain at three times the speed of the wind. (N. B.) I wish no man to take my word for it, he can easily calculate the friction for himself, and then ascertain the general force of the wind in that country, and form his own conclusions on the subject; for myself, I can only say that I have expressed *no hasty surmise*, but what I believe to be a truth.

The simplicity and great advantages of such a system of locomotion as I have described, must be apparent, I should think, to any one who takes the trouble to comprehend the principle on which it is based. In the first place, there must be great saving in building the road as compared with a railway, a saving of not less than *seventy* per cent. This saving is made principally because of the absence (comparatively speaking) of grading, grubbing, and *ballasting*, also ditching, draining, &c., &c., the posts or uprights which support the rollers *c c* being made longer or shorter, according to the inequality of the road. 2nd, there will be a saving of at least *seventy* per cent. in the amount of iron used, which, according to the present price of iron, cannot be less than $7,000 per mile. 3rd, owing to the absence of lateral and vertical motion, and using cars only about *one-third* the *present weight*, no expensive bridging will be necessary; common trellis work, or rather in chains, formed by joining the blocks of timber necessary to support the rollers *c c* by strong steel rope, we will have a structure amply sufficient in all cases—even for the widest streams—more particularly as the *driving wheels* of the *engine will be lifted from the road* in *passing bridges* or other hollows, so that the train will slide over sweetly and smoothly by its previously acquired *momentum*,* thus avoiding all possibility of vibration or concussion. "And it will doubtless be admitted as a general principle, both as regards heavy loads and high speeds, that it is the concussive action of train transit, that sets up, maintains and magnifies, disentegration, dislocation. and wear and tear, that this action is at a maximum wherever the rigidity of the permanent way is the greatest and that it is minimised by elasticity."—*English Mechanic.*

4th. There will be perfect safety to life and limb—as the cars cannot leave the track *by accident*—a circumstance of the very first importance as it is from this cause that nearly all the terrible railway accidents occur; as instance the fearful destruction on the Great Northern (Eng-

* The engine is fitted with an automatic apparatus which, the instant the driving wheel is eased from the road, shuts off steam and applies a powerful break, thus checking its speed until it again touches ground, when the break is removed and the steam let on.

land), and at Shannonville, on the Grand Trunk, etc., etc. 5th. The pleasant sliding motion of cars, will allow of the passengers sleeping, reading or writing undisturbed by the dreadful thumping and swinging motion now experienced on the railways, while the absence of the terrible noise now endured will permit *conversation* to be carried on with *comfort* and *convenience*. 6th. The great speed that may be attained with perfect safety—as much as eighty to ninety miles an hour—is undoubtedly one of its very greatest advantages, particularly to a country like Canada, which now stretches from ocean to ocean. 7th. The greatly diminished weight of cars and engines, owing to the absence of platforms, wheels, &c., &c., will cause a very considerable saving in the cost of rolling or rather sliding stock as compared with railways—nearly one half; but in altering—which *must necessarily be done*—the present railways to the new system we could utilize all or nearly all the present carriages by simply lifting them off their platforms and putting them on runners—they would, of course, be much heavier than those specially constructed for the new road—but might for a time be made available rather than incur the expense of entirely new coaches. 8th. The fact of the road being elevated three or more feet above ground will give it great advantages, in overcoming all manner of obstructions, such as snow, water, &c., an advantage which can be thoroughly appreciated by any one who has had occasion to travel during the winter months in Canada, the West, or North Western States of America. Another very great advantage of this mode of construction is, that in passing through towns and villages. &c., or over highways, public crossings, &c., the posts or uprights, (*a a*) can be carried up so high and placed so far apart from each other, that the train could go thundering along over the heads of everything with perfect safety. Or the uprights (*a a*) could be brought so near the level of the road, the longitudinal timbers or bracing (*b b*) being dispensed with; the wheels (*c c c*) being placed directly on the tops of the posts (*a a*) that all manner of traffic could pass in and out between them with perfect freedom, thereby saving the cost of bridges, gates, or crossings, &c. In fact for this among many other reasons, the "Sleigh Road" must supersede all others for city and street traffic.

The form of roadway, however, which I would specially recommend for street traffic, would be sunk flush with the crown of the street, leaving only two small grooves visible on the surface, the longitudinal beams carrying the rollers (*c c*) taking the form of a leanto or inverted V, with the apex cut off, so as to leave a space for the runners of the sleigh to pass through. With such a form of roadway there could be no possible obstruction to ordinary street traffic, as all vehicles have, or ought to have, tyres much wider than the space necessary for the sleigh runner, consequently they could neither catch upon nor sink into the grooves.*

* The only question which will arise is, as to the said grooves getting filled up. For my part I consider such a thing as very unlikely. 1st. The longitudinal beams

Now it must be apparent to you that such a road would cost but a mere fraction of the amount usually spent on railways—even of the slimest description. The cost per mile of "Goudies Sleigh Road" would be—for a general traffic road, that is one capable of accommodating a traffic as heavy as that carried by any railway on the continent—at present prices about $6,000—that is provided you had to buy all your timber at regular market values, but as the majority of new roads in Canada run through magnificent forests your lumber would cost only the expense of cutting it. Consequently you can reduce the above estimate by over $1,000 per mile.

The cost per mile for the permanent way in round numbers may be stated thus :—

2,700 posts, 15 inches in diameter by 6 feet, at 30c each ...	$810
1,350 cross ties, 12 inches by 6 and 6 feet long at 20c.....	270
21,120 feet of lumber (beams) 12 by 6	1,600
4,280 do do do	342
For lumber.....	$3,022
3,520 steel rollers (weighing with their supports) 4 lbs at 10c per lb	1,408
Bolts, spikes and other sundries.....	200
Building the road.....	500
Unforseen sundries	100
Wire rope for strengthening the timbers (*b b*) and forming bridges *.....	400
Wire for telegraph (small copper wire).....	150
Total	$5,780

to which the rollers (*c c*) are attached are at least 15 inches deep, and there will be a space below that for drainage, so that in all there will be a space at least 20 inches in depth, and 8 inches in width, below the rollers, into which dust, stones, water, &c., can fall (as a matter of course nothing could remain on the rollers, or if it did it would be cleaned off by the first sleigh that passed), and I will leave it to your own common sense to say how long it would take to fill up such a chasm with dust, or how often it would require to be cleaned out. Again, each sleigh will have a small flexible broom in front of the runner to clear out any obstruction that may have found its way into the grooves, or the sleighs may be furnished with small wheels—having flexible paddles—which work in front of the runners, casting out everything that may have found its way in ; in short there are a hundred devices which could be adopted to keep the space clean. But what about the snows of winter say you ? My only fear is that the average depth of snow is not sufficient to pack the space between the beams (*b b*), and keep the rollers thoroughly covered ; if it is, I will be pleased, for it will save the wear of the rollers, also the lubricant, while offering very little more resistance to the sleigh than the rollers would. Indeed, my first idea of the sleigh-road was a series of troughs or boxes, laid in parallel rows the same as the rails, and kept filled with solid ice ; the boxes were protected from the snow the same manner as proposed for the sleigh-road, and the ice was kept smooth by flooding when necessary, and such a road would be of incalculable value in winter.

* By resting our longitudinal timbers (*b b*) on first-class steel rope—which I contend should be done—we could dispense with three-fourths of the upright posts; it would also add immensely to the strength of the road and enable us to cross the fearful chasms to be met with on all parts of the proposed Pacific Railroad route, and to bridge which in the usual way, would add enormously to the cost of building a railway.

Or in all very little more than half the amount now spent for rails alone; yet I hold that I have allowed considerably more than the real value of the articles named, and more than would be required; the only item that may seem small to many is the amount for telegraph, but it must be remembered that a great advantage of my system of road building is, that the telegraph wires can be laid inside the longitudinal beams, (completely out of harms way), not only saving considerable expense in building but also avoiding the continual break-downs which occur from the wind, snow, etc., etc., and enabling us to use small copper wire (which would not cost $50 per mile), and yet more than doubles the efficiency of the service.

Now just contrast for one moment the above with the estimate which has been accepted as the most favourable offered for the construction of the road bed or permanent way of the "Kingston and Pembroke Railway"—a barely second-class road at that—viz., $22,000 per mile; or, with the amount spent or to be spent on the Intercolonial Railway, viz., $48,000 per mile. A sum beside which my estimate looks utterly insignificant, yet I hold that it will be found sufficient in all ordinary cases, but, for the sake of argument, suppose we double it, and allow an extra $1,000 per mile for bridges, &c., the amount will still be little over $10,000 per mile as the cost under the *most unfavorable circumstances.*

Let us now contrast the working capabilities of the two systems, and their cost for maintainance and operation.

For example, the Grand Trunk, which cost over $80,000 per mile, is taxed to its utmost capacity in carrying 1,800,000 passengers and 1,400,000 tons of freight per annum, or say 6,000 passengers and 5,500 tons of freight per day of 24 hours, the locomotive being capable of taking a load of 180 to 220 tons gross, or 80 tons net, on grades of one in a hundred, or take the estimated amount of work which the narrow-guage railroads (costing some $16,000 *per mile*) are capable of performing, viz., 400 tons of freight and 800 passengers per day of 12 hours, the 17 ton engine taking a gross load of 135 tons (or net 85 tons) up grades of one in a hundred at 20 miles an hour. Now, we will suppose for the sake of argument, that the amount of friction on the "sleigh road" will be quite equal to that on the railway, (although we know that it is according to the laws of friction less than one-half), and that consequently it will take as much power to haul a ton on the one road as on the other. That being the case, the relative working capacity of the two systems must be decided by the tractive power of the engine, the amount of *dead weight* carried, and the *speed* which could be kept up *as a rule*, without *injury* to the *permanent way*. The locomotive depends for its tractive power on the *adhesion* of the *driving wheels* to the *rails*, and the adhesion is in proportion to the weight carried on the drivers—which must of course, be in proportion to the size of the cylinders, &c., &c.—thus a 35 ton engine will have say 17 tons on the drivers, and 600 lbs. per ton of that amount

may be taken as the *measure* of the *adhesion* to the rails, thus giving an effective *tractive* or *hauling* power of a little over 10,000 lbs. The locomotive to be used on the "sleigh road" as already explained, is furnished with *elastic tyres* (that is the driving wheels are covered with very thick India rubber or other elastic material), and travel on the *earth*, on a wood, asphaltum, or artificial stone roadway made for it. Consequently, you can see at a glance, that as the tractive power of a locomotive depends upon the *friction* between the driving wheels and the road on which it travels; the "sleigh engine" must have much the greater power, as there must be infinitely *more friction* between a *rubber tyre* acting on the earth, plank, or other mentioned roads, than between a smooth steel tyre turning on a smooth steel rail. It fortunately happens, however, that we are not left to conjecture as to the difference, as Messrs. J. & T. Dale, of Kirkcaldy, Scotland, who are extensively engaged in the manufacture of road locomotives with elastic tyres (such as those proposed), have, after a series of exhausting trials, determined the exact amount of *traction* given by each engine from 4 horse-power up to 25 do., and we find that a 13 ton locomotive furnished with elastic tyres, gives a *tractive* force of 16,700 lbs., when acting on the ground—and we know, as a matter of fact, that it would give about the same acting on wood, &c.—but as in the "sleigh system of transit," the locomotive is *balanced* on *runners*, having the *driving* wheels directly under the centre of the engine, its *whole weight* can be thrown on the driver when necessary, (in the ordinary locomotive little more than *half* the weight can be put on the drivers), thereby greatly increasing its *tractive* power, so that if a 13 ton engine balanced on wheels in the ordinary manner gives 16,700 lbs. traction, the same *weight* of engine would, on the new system, give in round numbers say 20,000 lbs.; hence you see an engine weighing only 13 tons, actingo n the new system gives nearly double the *traction* of a 35 ton locomotive acting on the railway.

I wish you to *mark* this fact *very particularly*, as it is really the foundation on which a considerable portion of the "new system's" superiority rests. For example, I have shown that one great *defect* of the railway is the *limited power* of the engine, and the *practical impossibility* of *increasing* that power beyond the *present limit*. As for every additional horse power, we would require to add one-third of a ton to the *weight* of the engine—a weight of engine which, carried much further, would destroy the strongest road ever built, in two or three years.

Let us now contrast the two engines and their powers on their respective roads. 1st. The railway locomotive of the *first* class weighs, with tender, 42 tons, and is capable of hauling a gross load of say—at the outside—230 tons, at 25 miles an hour, on a road with a ruling gradient of one in a hundred—a more *favourable* grade than is likely to rule the Canada Pacific Railway.

The sleigh locomotive of the first class will weigh, with tender, say 23 to 25 tons (having 22-inch cylinders, and working steam at high

pressure, so as to use up the higher traction of the drivers), and be capable of hauling a gross load of 1,000 tons, at 35 to 40 miles an hour, on a level sleigh road.

And you are aware that the great advantage of the sleigh road is, that it can be laid level just as easily and, in the majority of cases, more cheaply than with a grade ; or the same engine will take a gross load of 800 tons up a grade of *one* in *forty* at the same speed, viz., 35 to 40 miles an hour.

Indeed, this style of engine has great *advantages* over the railway locomotive in *ascending grades* and working *sharp* curves, as may easily be seen from the fact, that the force of traction on a railroad must be increased *three-fold* to ascend an incline of *one* in a hundred, while on a common macadam road, it will not require to be increased *one-third ;* that is, the railway locomotive will lose *two-thirds* of its *power* in ascending an incline, which the sleigh engine will mount with a loss of less than 30 per cent. This will be more easily apprehended by recollecting that the friction of iron on iron (or the wheels on the rails), is stated by M. Morion at ·14 ; iron on wood, ·62 ; soft rubber on wood may be stated at ·99. The limiting angle of resistance of iron on iron is 7·58 ; of iron on wood 31·48 ; of soft rubber on wood, ·90 ; while the *rigid* wheel *base* of the sleigh locomotive is not one-half that of the railway engine, consequently it can round curves of one-half the radius.*

The evil effects arising from the fearful amount of *dead weight* carried on all railways may be very clearly seen by again returning to the case of the Grand Trunk.

We have shown that the Grand Trunk was taxed to its utmost capacity (in the year 1872) to move 1,800,000 passengers and 1,400,000 tons of freight. Now, let us see what was the real—the gross—weight sent over that line to accommodate that amount of traffic. In the case of the passengers it must have been about two and a half million tons, and for the freight, not less than eight millions. In other words, to accommodate the 6,000 passengers, (weighing about 400 tons,) carried daily, there passed over the line a gross weight of not less than 9,000 tons of cars ; while 30,000 tons of carriages were required to move 5,500 tons of freight.

Or suppose we state it in this way :

To form a train capable of accommodating, say 150 passengers, on railroads, you will require (in Canada or United States) 3 carriages, each weighing 20 tons, a baggage car, 14 tons, locomotive and tender, 42 tons, in all 116 ; or at the rate of 13 tons dead weight to *one* ton paying weight, provided that the cars are full ; but as the rule is that they are seldom more than two-thirds full, the proportion is nearer 25 tons dead

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*We are able to double the power of the engines while decreasing there weight by adding a portion of the weight we save in *wheels*, &c., to the boiler and machinery, and working steam at a much higher pressure than is usual on a railway—and, perhaps, by using compound engines.

weight to one ton paying weight, and that, too, without making any allowance for sleeping and Pullman palace cars, &c.; or if you wish to dispatch 50 tons of merchandise, you will require a train of at least 250 tons. Now, let us contrast the weights of trains of a similar description on the sleigh road.

The passenger train on the "sleigh road" would consist of three cars, each weighing five tons; one baggage car, three tons; engine and tender, twelve tons; in all thirty tons, or a little over three tons dead weight to one paying—we are allowing *extra* weight for all the *cars*, while the twelve ton engine is powerful enough to take *eight* cars in place of *three* at sixty to seventy miles an hour, or four cars at any speed which may be desired up to the working speed of the machinery.

Freight trains on the "sleigh road" will be made up of seventy-five parts paying weight to twenty-five parts dead weight; in other words, the freight car will weigh about five tons, and transport fifteen tons of goods, so that a seventy-five horse power locomotive will be able to carry *two hundred* tons of freight on the "sleigh road" at forty miles an hour, for every *sixty* tons which the *one hundred and fifty* horse power locomotive now carries on the railroad at twenty miles an hour; consequently, if the friction on the "roller road" was double (while it is less than one-half)—nay, even if it was *four* times the amount of that between the rails and wheels of the railroad and the locomotive, the advantage would still be with the "sleigh roads"—*immensely* in favor of it in every particular—further, this *immense reduction* of dead weight in proportion to paying weight, would render the "sleigh road" by far the *cheapest*, even if it cost three times the *price* of the *railway* to build it, in place of costing, as it does, less than one-half of the cheapest railways in operation. Now, sir, I need hardly tell you that I am fully conscious how startling my assertions must seem to the majority of my readers. I am also well aware that very few men are, by nature, close reasoners on new subjects; we are all more or less unwilling to bestow either time or attention on any subject or idea which seems to run counter to the whole teaching of our age. It is so much easier to say "Pshaw! nonsense; do you mean to tell me that if what you say is true, that we would not have found it out long ago? You may tell that to the Horse Marines," &c., &c. It is so much easier, I say, to act thus, than to sit down and give a fair, full, and minute consideration to the subject in debate, that ninety-nine out of every hundred, even of the men from whom we would expect better, generally do it. I will, therefore, even at the risk of being thought tedious, prove my assertions. 1st, even if it takes *four* times the power to pull a given load on the "sleigh road" that would be required on a railway, the advantage would still be in favor of the "sleigh road," and I prove it thus: for every ton of goods carried on the railway, you on an average carry seven tons of carriage; according to the London *Times*, &c., for every passenger carried you require *two* tons of wood, iron, &c., in the form of carriages; and according to the Massachusetts Railway Commission, the proportion of *dead* weight in the United States is as high as

thirty to *one*. On the "sleigh road," for every ton of goods carried you have 500 lbs. dead weight, and for every passenger you would have less than one-fifth of a ton; consequently, as *twenty-eight* is to *one* in the case of freight, and as *eight* is to *one* in the case of passengers, would be the advantage of the *sleigh* road over the railway.

But you may answer me, "that may be all true, *provided* you *can* carry passengers and goods with the weights mentioned, but so far, you have merely taken it for granted." Well, my answer is, "what man has done, man may do again," and we find that our *great* grandfathers built stage coaches weighing barely 16 cwt. (or minus the wheels, barely 9 cwt.), in which they bowled along the most abominable country roads at the rate of 8 and even 10 miles an hour, with two tons of passengers and nearly as much baggage. 2nd. An ordinary well-made "country wagon" weighs 800 lbs. (minus the wheels 500) and yet jogs along over roads on which the wheels rise and fall often as much as 3 and 4 inches—with loads of 3,000 and 4,000 lbs. 3rd. Take a second-class passenger car on the narrow-guage railway, capable of seating 30 persons, and you will find the weight 4 tons 17 cwt., take away the wheels and axles, also the platform to which they are attached, (weighing about 2½ tons) and you will find the remainder 2 tons and 12 cwt., &c. Now add to all this the fact that each of the vehicles named are subjected to the most *destructive* of all motions, "perpetual *concussion*," —indeed their progress is just a series of jumps—and must be made of great comparative strength to resist the continual vibration to which they are subjected. On the contrary, progress by "sleigh motion" is a simple sliding along the surface without shock or jar of any kind whatever, taking all which into consideration, I think you will admit that I have allowed ample weight for my cars, &c. Indeed I have not the least doubt but that I could greatly reduce the weights, with perfect safety to goods and passengers. I further assert "that the sleigh roads could afford to carry passengers and freight at less than one-third the amounts charged by rail even if they cost double the amount to build them;"—this is brought about by a number of advantages. 1st. Because the immense reduction in *dead* weight. 2nd. By the superior power of the engines and consequent reduction in engineers, firemen, roadmen, &c., needed to operate the road, in proportion to the traffic carried; for example, a "sleigh locomotive" weighing say 23 tons—300 horse power nominal—could take a heavier load than any two ordinary railway locomotives, while the whole *additional expenses* would be the *coals burned*. 3rd. The road is practically *unlimited* in *capacity*, the engine—from the enormous traction or friction produced between its elastic drivers and the road prepared for them—may be made of any desired strength so as to pull any conceivable load. Again, the railway is absolutely useless in a hilly country (the best laid railway operated by the most powerful locomotives would not have an advantage of 20 per cent over the common horse road on a grade of one in ten, if it was possible to operate it at

all on such a grade, but it is not possible, as the limiting angle of resistance is 7.58.) The sleigh locomotive that is provided with elastic drivers on the contrary could, and as a *matter* of *fact* one of 6 horse-power has ascended an incline of one in twelve, with a six ton load with the most perfect ease. But let us return for a short time to a further consideration of this most important defect of the railway system, and try to find out what are the consequences of having to carry the enormous amount of dead weight which I have already shown is carried on all railways either for passenger or freight traffic ; in the first place you wear down your road bed and rolling stock—in the case of passenger traffic—ten times as quickly as you would, if you did not require to carry it ; with mineral and other freight seven times, or at the very lowest calculation six times as quickly ; in other words you require to renew—in the case of roads doing a heavy traffic every three years—in the case of roads doing a *moderate* traffic every five years, while outside life of a rail—even on the most insignificant of roads is not over ten or twelve years. Consequently every mile of roadway has got to be rebuilt on an average every five or six years, in place of once in 25 or 30 years. In the second place, you use from seven to eight times as much fuel, oil, and other sundries, and maintain a staff of four to five men for every one who would otherwise be required ; and lastly you can do less than one-fourth the business which might otherwise be accomplished. In short as seven parts out of ten of the *labour* expended on the *maintenance* and *operation* of railways is labour *absolutely wasted*, you require to charge $10 for service which otherwise might be rendered for $4 ; and that one fact ought, of itself, to convince any thoughtful mind, that the railway system is certainly a very imperfect and expensive mode of transportation and cannot be destined to live forever.

The other element which as I before remarked plays a very important part in the economy of railroads is speed ; need I say that a railroad that maintains a speed of forty miles an hour for passengers, and thirty for freight can do *double* the work of one which maintains—like the Grand Trunk—only half that speed. Consequently, if we can maintain that speed on the " sleigh road" without causing extra expense for permanent way, etc., we have by that single advantage, double the effective power of any railroad in existence, for the expense for maintenance and repair of the permanent way, rolling stock, etc., of a railroad, is in an ever increasing ratio in proportion to the speed ; thus if you can maintain your permanent way, etc., for say $1,000 per mile, while going at twenty miles an hour, it will cost you at least $2,000 if you keep up a speed of thirty miles an hour, and so on in something like that proportion ; hence it is that with poor roads we must have low speeds ; as I have before explained it is the immense *vibration* or lateral and vertical motion of the cars and engine that renders the maintenance of good speed impossible, for the higher the speed the stronger the blow struck with the wheels, and the quicker the road goes to ruin. Now with the "sleigh

road" we *get rid* of the *vibration* of the cars, and as there are no *points* or *wheels* with which to strike the road, the difference in velocity of the "sleighs" have no *prejudicial* effect on the road-bed or permanent way. On the contra, the higher the velocity of the cars or sleighs the less the effect on the road, as may be demonstrated in skating; for example, you have no doubt noticed that a man could—if going at a very high rate of speed—skate over a piece of ice which would not bear the weight of a child if standing still, (the reason is easily explained in a philosophical manner, but too long for insertion here)* enough for us to know that the higher the speed the less the damage to the road-bed and rolling stock, etc., a fact of the very highest significance and one which would of itself justify the substitution of the sleigh or sliding motion for the circular or wheel motion, if it had no other recommendation whatever. Of course I am perfectly aware that a *theoretically perfect railway*, that is, one absolutely straight in plain and level in section, etc., would not be liable to some of the objections I have urged, but it unfortunately happens that perfect railways do not exist in practice, and consequently we cannot take them into consideration.

And here allow me, most respectfully, to remind you that I have made no use of the "Inventors' License" to exaggerate the *defects* of the railway, or *enhance* the *merits* of the system I propose as a substitute for it, as I am fully convinced that no good end is to be gained by so doing. I have aimed to state only facts, and facts which could be easily verified by any one at all acquainted with railway matters; I therefore beg your very serious consideration of the subject, for on it, to a very great extent, depends the *prosperity* and *development* of our young and prosperous

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*J. H. P. says: It is generally believed that a railroad bridge is less liable to give way when the passing train moves slowly than when under full speed. Is this correct? Boys sliding or skating over thin ice rightly judge their safety to depend in a great measure upon the celerity of their movement. Grant that a bridge has one weak place, one place weaker than any other of the same bridge; and that a train has one car or combination of cars heavier than any other car or combination of cars of the same train; and further, that there is one point (center of gravity) in that heavy car or combination of cars where the strain or gravity is greater than at any other point. Now, as it is the last straw that breaks the camel's back, so by parity of reasoning it is that point of greatest strain or gravity that causes the bridge to give way at the weakest place. Again, grant that a bridge never falls to pieces all at once, but that in the order of time one part—pin, brace or beam—breaks first, then another part, then another, till the final smash, each break occupying, succeeding, and being succeeded by an appreciable moment of time; and further, the more rapidly the train moves, the more evenly the greatest strain will be distributed over the bridge and the less time it will have to act upon the weak point; and it follows, other considerations being out of the question: That the more rapidly the train passes over the bridge, the less liable will be the bridge to fall. Is this correct? A. *This theory would be correct, if a train passed over the track as a boy glides over the ice on skates.* But the train, on account of *inequalities* in the *track* and *uneven speed, is constantly striking blows as it moves along; and the faster it moves, the more rapid and violent are the blows.—From the Editorial Correspondence in the Scientific American.*

country. In fact, unless we can adopt and carry out some such system for *contracting* the *immense distances separating* the *different parts of our widely extended Dominion*, it will be found to have been anything but wise policy on our part to have made the sacrifices we have made (and will have to continue making) to extend the limits of our country from the Atlantic to the Pacific Ocean.

What does it profit us of Ontario to know that at the eastern extremity of our Dominion, there are boundless resources of coal, iron, wood, stone, lime, &c., &c., while from the difficulty and expense of getting at them, we are compelled to pay eight dollars a cord for wood, and import our coal from a *foreign country*? Practically speaking, the said resources might as well be in Timbuctoo, or under the jurisdiction of the Emperor of China.

What use is there in telling the habitant of Quebec that in British Columbia he can find gold fields rivaling the richest mines of California or Australia—(one mine at the extremity of the Cariboo Road having yielded 328, 215, and 256 ounces of gold in three weeks, respectively; another at the William Creek, yielding in two weeks 448 ounces, and the Ballarat 167 ounces in a fortnight)—when he knows that it would take him *years* of *hard labor* and *close economy* to earn enough to pay his fares to our western "el dorado," and that even if he was there, he would find that the absence of proper means of transport had so enhanced the price of all the necessaries of life, that his glittering gains would slide through his fingers as swiftly—to use a Yankee expression—as "*greased* lightning!" It is the old story, "be ye *warmed* and *filled*, notwithstanding ye give not the things needful for the body." To the great bulk of the people, our wonderful resources are about as *real* and *beneficial* as the great diamond fields of Arizona, and yield about as solid satisfaction as I used to extract out of the information which my dear mother used to impart to me so often in the days of my childhood, viz., that there were *lots of gold waiting* for me in the bank, and that I would get it just as soon as I had discovered the *key* that would open the vaults. So with our great undeveloped riches, they are like the gold in the bank. There cannot be a doubt but that they are there, but "helas, helas," we have not got the key to open the doors, and so, practically speaking, they might as well *not be there*, so far as nineteen-twentieths of the inhabitants of the Dominion are concerned.

In fact it looks very like a "huge joke" the idea of our having paid the money we have and undertaking the enormous obligations which we are in honor bound to carry out in some shape merely to acquire the political headship of Manitoba and British Columbia. When we consider the thousands of miles of unpeopled and in many parts inhospitable wilderness which separates us and them, rendering anything like a true union of feeling or interests absolutely impossible. As for commercial and industrial intercourse that cannot possibly exist under such circumstances. But you may tell me that all that will be

changed as a matter of course, and that a real and practical union will be effected as soon as our great Pacific Railway is built, that in it the people will have found the *key* wherewith to unlock the hidden riches of our young but lusty land. Now that is just the point I cannot see; indeed I maintain as a plain matter of fact, that even if that railway was built and in *operation to-morrow* we would be a long way indeed from anything like a practical union, either in the social, political or commercial sense of that term.

However strange it may seem, it is nevertheless *true*, that we would be in a *worse position*, relatively speaking, so far as the means of intercommunication and our facilities for transit are concerned (and it is only constant, harmonious, social, political, and commercial intercourse that can fuse the different races and tongues of our Dominion into a people) than our fathers in Great Britain were before the shriek of the first locomotive had aroused the sleeping echoes of field and forest. Ponder well *that fact*, they with but very short distances to travel, not *tens* for our *hundreds*, could yet jog along at the rattling pace of *ten* miles an hour in the stage coach, with all its excitements, its adventures, its exhilerating novelty of scenery, we *mured* in a *box*, every bone racked, choked with dust, bewildered with noise, unable to hold social communnion with our neighbor, read, write, or sleep with any comfort, and with hundreds, nay thousands of miles to travel, can only crawl along at *twenty* miles an hour and many times not even that. The difference in speed certainly seems hardly worth the immense outlay we are asked to make for it; the time surely is full ripe for a change. Again, why is it that whenever it is proposed to gather up the disjecta membra, which forms that mighty whole—the "British Empire"—and weld them into a compact and *solid* body, with but one brain to think, to plan, to originate, one heart to feel, one voice to speak the right and denounce the wrong, and with one strong right arm powerful enough to uphold the interests of humanity in every region of the world, or strike to the dust who'ere might dare dispute our sway? How is it, I say, that when men who can *see further* and feel stronger than their fellows—men who can feel a *wave of power* thrill through every fibre of their being by the ideas conjured up with the words *Patriotism* and *Home*, make such a proposal, that they are met with derision by the great men who hold the reins of power in England—none "smiling louder" than some Canadian statesmen "*falsely so-called*."

Principally because of the *immense distance* which separates the parts *from each other*, and all from *centre*. They declare and try to prove that the law of "national cohesion" does not act at such tremendous distances, and consequently that it is absurd to fly in the face of nature by trying to make it do so.

If they are right, what becomes of the Canadian Dominion? Why it must of necessity fall to pieces, for there cannot be a doubt of the fact that a man could leave any seaport of Britain by steamship, in

which he would have a comfortable bed, well furnished table, plenty of room for exercise and amusement, etc., and be in any port of Ontario or Quebec in nearly as short a time—in winter much sooner—than the man who leaving Nova Scotia by railway car (in which he would have a wretched makeshift of a bed, *no meals*, "no nothink," in short but misery, noise, confusion and *weariness indescribable*,) would reach Victoria, British Columbia, and not only would the passenger leaving Great Britain do the voyage in nearly as short a time and with infinitely more comfort, but he would do it for *less money*, if by cabin for about *two-thirds*, or by steerage a little more than *one-third*—judging by the tariff of the "Union & Central Pacific Railway."

Now such being the case, and you know well that it is so, proves conclusively that even if the Canada Pacific was built and joined to the Intercolonial, one portion of the Dominion would be practically further separated from the other than Great Britain is from the American continent, and *vice versa*.

What then, is to be done, if we wish to maintain the integrity of our young Dominion? If we are determined to rule a Dominion stretching from the Atlantic to the Pacific? a Dominion which may in the year 1973 number 40 millions of people, all speaking our tongue, governed by our laws, and formed on the model which we are creating, at this moment. We must, first of all, build a highway across the continent, by which, we will be able to carry freight at *one-fourth* the sum now charged by rail and with at least *three times* the *speed* now maintained. We must be able to travel from one point of the Dominion to the other, at a speed of at least 60 to 70 miles an hour. (If it was not for fear of frightening you, I would here record my prophecy that the *ordinary* express speed on our great highway, will be at least 80 to 100 miles an hour, and at charges of less than half a cent per mile.) I will do more than make the *prophecy*, for I hereby offer to make the road if you are prepared to grant my terms.

For the sum of $30,000,000 and *thirty* million acres of land, I will build a "Perpetual Sleigh Road" from any point in the Province of Ontario to any point on the Pacific coast, which road will be capable of accommodating more freight and passengers than is now carried by *any* railroad in Canada, or than could be carried by any railroad which would be built on the same route to the Pacific. I will build it on *any route* chosen by the Government of Canada; commence at any time agreed upon, and guarantee to have the road finished, thoroughly equipped and in operation in one-half the time which it would take to build and put in operation a railway, (a board of competent engineers mutually chosen to be the judges of the time). I will further guarantee to maintain in good condition the said road, and operate it regularly *summer and winter;* maintaining a minimum speed of thirty miles an hour for freight and forty to fifty miles an hour for passengers, at 50 per cent less than the *lowest* possible railway (ordinary broad gauge as proposed

for the Canada Pacific) charges. I will bind myself to dispatch at *least three* trains, capable of carrying 2,000 passengers and 3,000 tons of goods each way per twenty-four hours, at a minimum speed of forty miles an hour, or as many more trains as may be required to give the *fullest* accommodation to all freight or passengers offering.

Or I will agree to hand over the said road fully equiped and stocked into the hands of the Government, on receiving an additional twenty-five millions of dollars and a small royalty to be afterwards agreed upon. The terms of payment to be at the rate of $15,000 per mile for each ten miles of road as it is completed, until the $30,000,000 shall have been paid. Fifteen million acres of the land grant to be paid in the same way; the other fifteen millions being allowed to remain in the hands of the Government for five years after the completion of the road, as security for its operation according to agreement.

The Government shall be allowed absolute freedom in dealing with its alternate blocks of land until there is a population of at least one hundred thousand people settled on the lands of the road or in its immediate neighborhood—after that, Government lands will be sold at an upset price of not less than $2 per acre.

The "Perpetual Sleigh Road" being an entirely new invention, the Government shall vote $150,000 to build a test road, the money shall be expended under their supervision and control in building not less than twenty miles as a single or ten miles as a double road, the Government to provide right of way and choose the route, position, etc., also to find the engine and cars, but the whole expenditure not to exceed $150,000, in the event of success (of which no sensible man can entertain any doubt) the $150,000 shall be accounted as part of the thirty millions.

Or I will undertake to build the *Test Road myself*, provided the Government *guarantees* me the contract on the terms mentioned, should I prove the road capable of doing all I have claimed for it, which is, that the road can be built for one-third the amount usually required for railways. 2nd. That it is possible to operate the road for less than one-third, and maintain it in good working order for less than one-third the usual railway maintenance accounts. 3rd. That it is easy to keep up three times the average *speed* of *railways* in Canada with the most perfect safety and comfort. 4th. That the charges for freight and passage need not be more than one-third the present tariff. 5th. That such a road will not only be infinitely safer, quicker and cheaper for passengers, etc., but it will also (owing to the absence of lateral and vertical motion, etc.) be *noiseless* and consequently infinitely more comfortable. 6th. It may be laid in one-third the time (or even less than that) necessary to lay a tip top railroad and in almost any kind of country. 7th. There need be no stopage in winter owing to the snow, etc.

8th. The sleigh-road, although laid on the *broadest* gauge (thus allowing ample room in the cars), may be made with *sharper curves* than is possible even on the *narrow* gauge railroads, owing to the fact

that the *rigid* wheel base is not so *long*, having only *one* pair of *driving* wheels under the centre of the engine; and the sleigh-*runners* being provided with *self righting joints* (I mean by self-righting joints, joints that will spring back to their original position on removing the force which has made them take a curve).

9th. Owing to the difference in *tractive* force of the different engines (the engine on the sleigh-road having *three* times the tractive power of the locomotive), we could ascend inclines at full speed, and with ordinary loads, which the locomotive could not possibly mount under any circumstances, &c. Indeed, so numerous are the advantages of this system of transit, that it would seem useless and tedious in me to name them. No one who studies the subject even for an hour, can fail to find them for himself, or avoid perceiving their force. Is it necessary for me to point out the great results that must follow the adoption of such a system of transit as I have described?

It will, at a stroke, as it were, of the magician's wand, *contract* the *immense distances* which *separates* one portion of the Dominion from the other, bringing the Pacific Provinces as *near* to the seat of Government as the city of London or Quebec is now, thereby compressing the whole into a compact and governable compass, and doing more to consolidate and secure the *stability of the Government and institutions of our country than any other agency possibly could.* It will work a complete and perfect revolution in the communications of the country; such a great and beneficial change in the means of transit that you will be filled with astonishment. It will develop the resources and increase the productions of the Dominion to an almost incalculable extent, rendering every field and valley, mine or forest of Manitoba and the North-west as valuable and accessible as though that lay but 100 miles from the city of Toronto or Montreal, thus enabling the imigrant to farm his land at a *profit to himself and the country*, and bringing in to the markets of the Dominion and the world the productions of an almost illimitable extent of country, which, for productive power, is unrivalled on the continent, and capable of supplying Great Britain, as well as Canada, with all the necessaries of life for ages to come. It will reduce the price of food, fuel, &c., fully 30 per cent. to the consumer, while it increases, through the diminution of freights, the profits of the producer.*

Let us but complete our sleigh-road, and send in people (which we will then be able to do at *small cost*), and every article of food will be reduced in price, and housekeeping rendered easy; once we have completed the system, substituting the new style for the Intercolonial, Grand Trunk, &c., and building a new road across Newfoundland, which

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* It is said by the *Chicago Tribune* that a reduction of 6c. per cental on the freight of corn, &c., would add 25 per cent. to the value of every farm in the west and north-west of America. How great must be the difference when, by the adoption of the sleigh-road, the reduction will be 16c. or 18c. per centat.

must be done. We will have the coal, the iron, the stone, etc., of Nova Scotia; the fish, etc., of New Brunswick; the timber of the Ottawa, the corn of Manitoba, and the gold of British Columbia laid down in Ontario and Quebec at little more than it takes to produce them; while they will have our farm produce and our manufactured goods in return at the same rate.*

So swift, cheap, safe and comfortable will this mode of communication be found, that I am persuaded that I speak only the words of "truth and soberness" when I declare that thousands of our fellow citizens, who now spend their summer holidays in foreign countries, will be able to take a trip to the Atlantic or Pacific Ocean (still within the bounds of their own country) for less money (and with infinitely more comfort) than they now spend to go to Portland, Boston, &c., &c; while our food supply will be greatly increased, diversified and cheapened. Just look, for instance, on the thousands of mackerel, herring, salmon, white, codfish, &c., which cover these stalls; they are still *scintillating* with all the glorious colours of the rainbow, so quickly have they been transported from their native waters in Nova Scotia, New Brunswick, &c. Formerly our fresh sea fish came from the United States packed in ice. Or view the pigs, sheep, poultry, &c., huddled together in this corner; every one of them has been fed in our "Far North-West;" while these mighty oxen, munching so peacefully, twenty-four hours ago, they were browsing in the now far off Valley of the Saskatchewan. There again are stalls filled to repletion with fruits and vegetables from the sunny slopes of the Pacific and the West India Islands. The latter came by steamer to Halifax; thence by "Sleigh Road" through our own country, and not as now, through the United States. But not to Canada alone will those now distant countries send their boundless productions, the fruits of their fertile prairies; the millions of Britain will yet rejoice in their prosperity, and eat the fatlings of their flocks and herds.

Ten years from to-day, if we only do our duty, not a town or city of the old land but will be able to present to the people markets filled to overflowing with Canadian produce of every kind, so that the name of our Dominion will be as a household word. Canadian beef, mutton, poultry, cheese, and butter will be the common food of the people, or the fault will be ours, for by *building at once* our great highway to the Pacific upon the sleigh system, carrying the other end down to the sea-

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* One of the greatest drawbacks to the permanent prosperity of the Provinces of Quebec and Ontario is the absence of coal; and how serious it is may easily be seen by recollecting that the city of Toronto alone pays over $250,000 per annum to the United States for that article. Moreover, every year will intensify the evil; population will increase; wood will become—indeed it is now—scarce and dear, until I am persuaded (unless a remedy is found such as will enable us to use our own distant supplies), the drain of treasure will become an intolerable burden on our finances.

port nearest to Great Britain, we will not only be able to fill up the Great North-West with people, but we will also be able to carry their produce at such freights and with such speed as will enable them to command a paying market for everything they can raise, either live stock or cereals. Moreover, if we are the first to build, we will command the whole of the almost illimitable trade of the Western and North-western States, such as Iowa, Minnesota, Wisconsin, Illinois, Missouri, &c.; and in that case the business of the road would be enormous, enabling us to charge the lowest possible freights.

I am well aware that these statements and assertions will be received very differently by different people. By one class they will be received with exclamations of surprise; "How strange no one ever thought of it before," etc., etc., and it does really seem strange no one ever thought of it, especially in Canada, where we are so accustomed to the sleigh or sliding motion. But the wonder soon dies when we begin to think how *few* and *simple* are the *ideas* or inventions on which *rests* the *glorious* fabric of our modern civilization; when we begin to realize the fact that our whole progress in the arts of civilized life are based or built upon at the outside some dozen of original ideas: 1st, the smelting of metals; 2nd, the making of glass and its kindred, pottery; 3rd, the art of spinning and weaving; 4th, the clock or time measure; 5th, mariner's compass; 6th, the use of separate types in printing and the printing press; 7th, the steam engine; 8th, the steamboat; 9th, the locomotive and rails; 10th, the electric telegraph; 11th, photography and its kindred arts, etc., etc. Take away the first six, and what would become of our civilization; nay, deprive us of even the first three, and our progress as civilized beings would have received its death blow, never to recover until the lost inventions were found, yet each of those discoveries or inventions were thought to be *verg simple matters*—ideas which might have been hit upon by any one and of *no particular account*—that was when they were *believed in at all*.

Another and by far the largest class will meet my assertions with ridicule and contempt, asserting, with the utmost assurance, that if there was really anything in it, that it would have been thought of long ago, by some great man, etc., etc. In that case I console myself by the reemembrance that the proposal of Mr. Stephenson was received in the same way, that even in the British House of Commons he was called a *maniac* because he gave it as his opinion that cars might be moved over a railway at a speed of ten miles an hour by means of his locomotive, while one of the most eminent engineers of the day was heard to exclaim that if a locomotive was made to draw without *cogs* he would undertake to eat the engine and the rails into the bargain, a vow which it is almost needless to say he never fulfilled.

Mr. Stephenson's plan was pronounced by the entire scientific and engineering world of his day, to be the most *absurd scheme* which it ever

entered into the head of a *madman* to *conceive,* and that he himself was an ignorant boor and a pretentious charlatan who ought to be put down, &c., &c. The late Earl of Derby also declared in the House of Lords "that he would *eat* the boiler of the first steamship that ever crossed the Atlantic," *(but he didn't do it.)* Even the great Sir H. Davy, when asked his opinion about the feasibility of lighting houses with gas (a subject on which it was natural to suppose he could give a *correct* judgement), after *mature consideraiion,* declared "that you might as well expect to bring down the *moon* and *stick it in a candlestick.*" And so it has been with every invention or improvement ever proposed; they are always met with the deadly opposition, not only of the *ignorant* and the *thoughtless* but of the generally intelligent and the *professionals,* who seem to think that we have got to the end of all knowledge; they look upon it as an insult to their superior attainments, for any one to suppose that there can be anything with which they are unacquainted, or any improvement which they are incapable of originating. * They very gravely inform you that the age of great inventions is now passed, and that we need look for no more improvements such as will revolutionize the business of the world, forgetting all the while that the very same argument has been in use ever since man commenced to make discoveries, and has been hurled with all the vehemence of prejudice and ignorance against every invention, the fruits of which we now enjoy with as much *sang froid* and sense of right, as though we had assisted in every possible way to bring them into existence instead of having persecuted their authors to the very verge of madness.

And now, sir, have I said enough to convince you of the wisdom and propriety of putting "Goudie's Sleigh Road" to the test of experience; if not, what is there that I have left *unsaid,* that you would like me to explain, please to let me know, and I will try to put it right, for with a full appreciation of the great responsibility resting upon me, and the important issues depending upon your action, and my success or failure, I am determined to leave no stone unturned to convince you, to get you to bring your common sense, your reason, to bear on the subject, and let them decide the value of my system of locomotion; the chances are so many that you will allow "use and wont," "fear of responsibility," "prejudice," "the policy of *laisser faire,*" or more likely still (and

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* "When I was building my first steamboat in New York," remarked Fulton, "the project was viewed by the public either with indifference or contempt, as a visionary scheme. My friends, indeed, were civil, but they were shy; they listened with patience to my explanations, but with a settled cast of incredulity on their countenances. As I had occasion to pass daily to and from the building-yard while my boat was in progress, I have often loitered, unknown, near the idle groups of strangers gathering in little circles, and heard various inquiries as to the object of the new vehicle. The language was uniformly that of scorn, or sneer, or ridicule. The loud laugh often rose at my expense, the dry jest, the wise calculations of losses and expenditures, the dull, but endless repetition of Fulton's folly. Never did a single encouraging remark, a bright hope, a warm wish, cross my path. Silence itself was but politeness veiling its doubts or hiding its reproaches."

yet more unfortunate), the advice of "the *eminent practical man*," to be the judge; that I am compelled to continue my argument, to marshall every item of evidence, to bring up every probability of succes, I must get you to *flood* the subject with the light of *your own* experienced intelligence, so that you may be able to *sift* and *weigh* the *value* of any *professional opinion* you may think of appealing to for a judgment on the scheme, so that you may not be swayed and influenced by a *name only*, as you must otherwise be. I have tried first to get you to see the *necessity* and admit the *probability* of superseding the railway by showing you how defective it is in its practical operation, and that it is *absolutely limited*—so far as really *useful* work is concerned—to a distance of some 800 miles, just one-third the length of our Dominion—and as a natural consequence it can never form a true bond of union between our scattered Provinces. I have also shown you in a way which I consider perfectly plain and easy to be understood, that neither our manufacturers, merchants, or mechanics could profit to any appreciable extent by such distant possessions as Manitoba and British Columbia if confined to a railway for transit, as the freights added to the price of manufactured goods would so enhance their value, that the people would buy only such as were absolutely indispensible, or such as they could not possibly produce at home. Again, it should never be forgotten that the producer can only pay for the goods he buys by the produce of his fields, his purchasing power therefore, must be regulated by the price he gets for his labor, and as I have shown that in by far the largest portion of the country to be traversed by the Canada Pacific Railway he will receive less than *one-third* the amount he would receive in Ontario or Quebec, it follows as a matter of course, that 300,000 farmers scattered over the Northwest, will be barely equal to 90,000 settled in the older Provinces near the seaboard, in the amount of business they could give to merchants, manufacturers and mechanics, and also in the amount of taxes they will be able to pay—(it must not be imagined that the extra fertility of the soil will do much to restore the balance, for, as a matter of fact, the average of Ontario is better than any one of Western States). Moreover, it must be distinctly understood that the causes at work now for limiting the business done with the older Provinces, will continue to increase with the age of the settlements, and just in proportion to the increase in population, will the business done diminish, that is relatively, for with a *small* population it is impossible to manufacture anything but the *commonest* and rudest class of goods; but as the people increase in numbers, towns and cities will spring up to supply the wants of the inhabitants. The local manufacturer living in and consuming the produce of the country, and protected by the enormous freights, loss of time, &c., &c., in bringing goods from the older Provinces, will be able to *drive* us *out of the market* just as it ought to be getting *valuable* to us; indeed, the only commerce between us will consist of that small class of goods usually imported from foreign countries,

such as tea, coffee, sugar, spices, &c., &c. If any one is inclined to doubt my statements, let him go to the trouble of analizing the internal commerce of the United States, make due allowance for the different circumstances of the case, and then draw his own conclusions. Now such being the case, allow me to ask you what recompense the merchant, the manufacturer, the mechanic and laborer is to receive for the sacrifices you now require them to make? Do you imagine that it will be a sufficient return to a man who has to labor ten hours a day for six days in the week, to provide food, clothing and shelter for his family, to tell him that for the $200 he is now asked to pay to the Canada Pacific Railway that he will have the *sentimental* pleasure of declaring, like St. Paul of old, "I am a *citizen* of *no mean State*?" Can you believe for one moment, that such an idea will be looked upon by any man possessed of a grain of common sense as satisfaction for his money? What satisfaction can a man who finds it difficult enough to provide himself with a new suit of clothes when he badly requires them find, in knowing that by allowing himself to become responsible for some $200 or $250, he has assisted in scattering over our grand Northwest some thousands or hnndreds of thousands of farmers and other settlers; who, owing to their distance from foreign markets, find it a hard and constant struggle to provide themselves with the commonest necessaries of life; and who, consequently, can be of no benefit to him either directly or indirectly. In truth and verity they will owe you and him but small thanks, for they would have been richer and happier men if they had paid no attention to your bright promises, but remained in the older Provinces in place of going to the West, and thus trying to glut an already overstocked market with grain, &c., &c. You may depend upon it that the sober after-thought of the intelligent people of this country will demand more tangable recompense for their money; they want to see the country *increase* in *population* and wealth; they want to see manufactures flourish, food cheapened, and fuel laid down in every portion of the country at such figures as the labourer can afford to pay, and be able to provide an ample store against the cold of winter; they also want to see house accommodation improved, enlarged and cheapened, so that the *humblest labourer* in the land, who does his *honest best* in any department of the *general workshop* of the *country*, will *receive his fair share of the good things produced*, and in spite of all the political economists in the world, and in *defiance* of all the *systems* of *free* Governments ever devised, (the only object of which seems to be to allow the *weak*, the *foolish* and the *criminal* to do whatsover seemeth good in their own sight so long as the *present* and *direct* fruit of their actions do not obtrude themselves too openly in the eyes of that—in great part—incomprehensible mass of *police* regulations called law), the people will ultimately show that it is the *duty* of the *Government* of a country to see to *those things*, Mr. Bob Lowe to the contrary, notwithstanding: they want to see the different portions of their widely-scattered country welded into one and made a compact whole, and its people harmonized in their vari-

ous relationships to each other, so that we may become one people indeed and in truth. They want to see the country attain the first place in the race of civilization and progress, so that their sons will be able to shout with the sterling ring of exulting triumph in their voice, "I am a Canadian," for such objects as these they are willing to make all necessary sacrifices, and *feel pleasure* in *making them.* But will the building of the Pacific Railway be likely to help forward their ambition? I think not, nay I am certain it will not, it will (should it unfortunately ever be built), be an incubus on the financial and commercial heart of the country; a clog to future exertion for many years to come. But you may tell me that my arguments would prevent all extension of our Dominion whatever, and would prohibit the building of railways more than 600 to 800 miles from any *seaport*, &c. I am perfectly willing to admit the truth of the assertion, for I cannot for the life of me see the wisdom of a man who, having but a limited income, pays £150 per annum for a *large house*, one half of which he cannot occupy, when he could get another in every way as comfortable, convenient and healthy, and quite as large as he required or would require for many years to come, for £50 ; no more can I see the wisdom of us extending our Dominion to the Pacific if we are to be confined to the old methods of transit ; indeed, I unhesitatingly affirm that if we have to build an ordinary railway, and are confined to its use in our communications with the Pacific Province, that our confederation with British Columbia was an act of supreme folly, and that we ought (even at risk of losing the Province), to insist upon a modification of the terms. I also affirm as a *fact*, that farmers more than 500 or 600 miles from a good permanent market, *cannot farm* at a *profit* either to themselves or their country, no matter how rich and productive the land may be, as no stuff they can raise will bear *railway carriage* for that distance and leave a fair return to the labourer.

What more is wanted to show you the folly of building a railway to the Pacific, that I have not adduced? or what more is wanted to show you the wisdom and propriety of making trial of the system I have proposed? What proof is wanted? What doubts or difficulties have suggested themselves or been suggested by others, that could for one moment justify you in refusing to try my plan, before committing our country to the gigantic expenditure of time and money implied in commencing the Pacific Railway? I beseech you by the responsibilities of your high office ; by what you owe to the people who have placed you in power and trust ; by what you owe to yourself in the present and your good name in the future, that you give this matter your most serious consideration. Take a lesson from the blunders committed by the Government of the "motherland," while dealing with just such subjects. They, by their senseless opposition to the railway system when first proposed, saddled the country by means of "parliamentary committees, &c." with a burden of many millions, causing every one who sends goods or travels by rail, to pay heavier charges even to this day, than otherwise

would have been necessary. Then, again, recollect how they *bungled*, what mischief they caused by their opposition to all *new inventions* in arms, in ship building, in barrack improvements, &c., &c. The "*Iron Duke*" himself was *decidedly opposed* to the "Enfield Rifle," as a substitute for "Old Brown Bess," alleging that the soldiers would waste their cartridges, &c. Had he succeeded in his opposition, it is universally admitted by those capable of giving judgment on the subject, that there would not have been an English soldier left to tell the story of our terrible disaster in the Crimea; the Enfield rifle saved our small army and enabled it to snatch victory from a far more numerous foe. The same opposition was given to the "Rifled Cannon," of Sir William Armstrong, &c.; or think of the ten long *weary years* poor Snider was kept hanging between hope and dispair before the War office would adopt his rifle, only taking it up after they had *killed* him by their *miserable senile vaciliation*, and the Austrian war had proved what a breach-loader could do in the hands of the Prussians; so to with Capt. Moncrief's gun carriage; he offered it to the War office in 1858, and was refused even an opportunity of proving its capabilities; in fact it was condemned as *absurd*, yet ten years afterwards they take it up, reward the inventor handsomely, and declare it to be one of the most important inventions of the day—in the interim, however, they have spent £5,000,000 sterling on fortifications, which they admitted would have been to a great extent, unnecessary, had they only adopted the invention when *first offered* to *them*. Or to come nearer home, some twelve or fourteen years ago I read an article in the London *Lancet*, by Sir Ronald Martin, descriptiye of the horrors our brave soldiers in India are compelled to suffer from the *heat*, and the terrible havoc which it caused in their ranks—they dying at the rate of 10 per cent per annum in some stations. I was so impressed with the horror of the thing that I could not get it out of my mind. I felt (and I was right in feeling) convinced that the British Government, particularly those in charge of the War and India offices, were *guilty morally*, and *really guilty of murder*, unless they *exhausted* every *resource* of *science* and *invention* to put a stop to the dreadful destruction of human life—to the fearful misery continuously endured not only by brave and hardy soldiers, but also by delicate *ladies* and *little children*. You may therefore imagine my astonishment on finding that they had never even so much as *made* an *effort* to assuage this most potent of all the agencies at work for the destruction of the British soldiers in India.* I immediately set to work and devised a scheme by which barracks, hospitals, &c., might be rendered cool, com-

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* I have no doubt the gentlemen composing the "Army Sanitary Commission," will take exception to this statement, declaring that the subject had engaged their attention for years before my communication reached them, and I do not doubt that such may have been the case, but what I assert is, that so far as any *practical results* were concerned, it might just as well never have had their attention. The Punkah, Tatie, and Thermantidote were in popular use more than a hundred years ago, and the same were the *only* contrivances in use up to the time of my last communication—if not to this present moment.

fortable and healthy, that is comparatively speaking, and with all the enthusiasm of a young inventor, I at once brought my scheme under the notice of the War office and the Government,—but as a matter of course with the usual result,—"It would receive due attention, &c ," and so the matter rested until the year 1864, when I first visited Canada. I then found that a large number of the officers with the regiments at that time stationed in Canada, had *served* in *India*, and I thought I would like to hear what they would say about my scheme for cooling barracks, &c., &c.; consequently, I prepared a small pamphlet discriptive of my plan, and brought it before them, the result being that it received the *unqualified commendation* of such men as Dr. Muir, C. B., Inspector-General of Hospitals; Col. C. E. Ford, Commanding the Royal Engineers in Canada; Major-General the Hon. J. Lindsay, Major-General Stisted, Lord Alex. Russell, Col. Dunlop, C. B., Col. Synge, Col. Packenham, and a host of others at that time serving in Canada.

I then renewed my application to the war office; backed as I was by such an array of eminent names, I thought there could be no possible chance of failure; but it was all *no use*, indeed my recommendations were the reverse of beneficial—had not the "*sanitary commission* already given *their opinion? How then, dare* any *officer dispute* their wisdom; and so the matter stood as before. In the meantime, however, the idea having got ventilated, it is being worked out in different places, (though in a very imperfect way), noteably in the case of the United States House of Representatives, etc., also in France and England, until the year 1872, when Dr. Gray, Surgeon to the New York State Lunatic Asylum, hit upon the scheme in precisely the same form as I had ten or twelve years before brought under the notice of the British Government, and he had it carried out in his asylum—one of the largest in the country—with the most perfect success, so that he has received, and thoroughly merits, says the *Scientific American*, "the honor of having *the best ventilated* asylum in the *world*. Even the *hottest* day of *Summer* he can, by simply turning a stopcock, reduce the temperature of that huge building to almost any degree of temperature he thinks proper.

And now, in consequence of that and a hundred other successes of my plan for cooling and ventilation, "the wise, original and learned sanitary commission" comes forward and reports that the scheme which twelve or fourteen years ago they declared to be impracticable, should be practically tested in India, adding, however, as an evidence of their very superior knowledge of the subject, "that so far as the *fan* is concerned that plan is not original.*

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* The following notice, cut from the medical column of "Public Opinion," April, 1874, gives a very fair idea of the scheme for cooling and ventilating barracks, hospitals, etc., in India, which, as long ago as 1860, I spent both time and money in trying to force the government to adopt, but in vain. Now the scheme is being universally carried out all over the continent of Europe, where it is hardly required, while India still swelters and pants, tied fast in the bonds of red tape, it being nobody's duty to apply new ideas. You will also mark that the plan is put forth as new, and of "German parentage."

But you may very reasonably ask me what all this has to do with the subject; I answer much every way, it is one of the thousand instances which go to show that the British Government has made itself a "laughing stock" and a byword among the nations, by its persistent refusal to "move on" until literally compelled to do so; it shows also that they have universally opposed all *new* inventions or ideas; and that they have been as universally *wrong* in their *opinions* concerning their *worth* and *practicability;* it also shows the *reason* why they have been thus continually in error, viz., because they hand over every new invention submitted to them to *committees*, or "Commissioners of *Experts;*" "*practical men*, whose business it is to judge of such things;" "learned men who know all about it you know," that is the secret.

They are afraid of responsibility; they don't like to run the risk of being laughed at (in the event of failure) as the dupes of "hair brained enthusiasts," and so they hand over their duties to *professional practical men*—who of all men in the world are the worst possible judges of anything new out of the ordinary course of every day experience. It is strange that it should be so, but so it is nevertheless, as is shown in the life of every invention of which we have any record; every one of them were opposed tooth and nail by your "*experts*," "*practical men*," and carried out in direct *defiance* of *their opinions*, by men who were willing to *trust* the good sense and ability of the *inventor*, very *reasonably* concluding that the *creator* ought to be the best judge of the *utility* of the *thing* he *had created.*

And as the "*practical*" the *professional* man's opinion is the rock on which you may very likely *strick*, and so run the risk of retarding the carrying out of a great improvement, I have taken this trouble to warn you of the danger of seeking it. I have taken the trouble to show you how *treacherous* and *untrustworthy* is the refuge, how it has *deceived* and misled *99* out of every 100 who have sought its guidance, blasting their high hopes and natural expectations with cowardly doubts and false counsel.

Yet it is so natural, and at first sight seems so in accordance with common sense and reason to expect that a man who has spent his life in cognate branches of business, or who has studied the science on which a

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"Hospital ventilation;" efficiency in ventilation, and uniformity in warming and cooling, with economy of outlay, and in maintenance, are the great disiderata in all hospitals, &c.; the best plan of realizing these, as claimed to have been proved in some of the most important hospitals in Europe, is the "German plan," in which fresh air is propelled along an air channel, by the operation of a suitable fan, into an air chamber containing a warming aparatus, where it is warmed and moistened, and then it is distributed over the buildings; an anemometer and a dynemometer placed before the fan indicate at any moment the exact amount of air supplied to the buildings; the amount in hospitals is 2,200 cubic feet (min.) per hour per bed, but is capable of being doubled. This quantity of air is furnished without perceptible draught, and at a temperature of 60° Fah.; in the summer the air is *cooled*, and in winter warmed; the vitiated air escapes by flues having a free access to the extrenal air."

particular operation is based should be able to give a correct opinion about anything which pretends to be an improvement upon it, that the temptation to consult them is very great indeed; to the majority of men it is altogether irresistible. Mark me sir, I don't say this with any idea of trying to dissuade you from consulting others; I know it would be absurd to do so; your position; the circumstances of the case &c., &c., require you to have professional advice; in place of fearing criticism I *court* it, *no matter how adverse*, and nothing will please me better than to meet all the practical and professional men in Canada in your presence, let us argue the matter, and you be judge as to who is right. There is nothing like conflict of minds for bringing out the truth in all its various many-sided aspects, and I have no objection to the fight; the danger in your case is, that you will allow a *name* to count for *argument*, and sneers and ridicule for proof in absence of the person most interested, and your genuine *practical* man is generally strong in that line, much stronger than in reason and wit, but however it may be, I am willing to stand the trial; nothing will please me better than to have the chance of convincing all, or being myself confounded.

Only think of the hundreds of railroads that are being projected or carried out in every portion of the country; not a town or village hardly but is voting its bonuses of thousands to one line or other. The whole country is aroused; a spirit of enterprise and *goaheaditiveness* is now abroad over the land, so that the sleepiest of villages as well as the most progressive of cities are at one on the point, each vieing with the other as to which will be the first to send the iron horse snorting along through field and forest, carrying in his train all the blessings of an advanced civilization, and chained though he be handicaped and weighed down by the absurd iron bar on which he is made to travel—and of which he can get no proper foot hold—he does his best and brings improvement in his wake.

I repeat, contemplate for one moment the amount of money that will be saved to the country by the adoption of the new system of transit —and the wonders that money could be made to work is improving and developing the physical and intellectual resources of the Dominion.

Within the next ten years it is safe to say that there will be spent within the Dominion on railways not less than $150,000,000 to $180,000,000—if not stopped by this system. Now suppose we save only half of that sum, we would save *two-thirds*—or say $80,000,000—then we would have the yearly saving of interest on that amount, not less than $4,000,000; then there will be the saving of *working expenses*, not less than $6,000,000 per annum, that is a capital sum of $80,000,000, and annual saving of $10,000,000, to which you have to add the amounts saved in freights, not less than $6,000,000 more, and all among a population of some four millions. It does seem almost too good to be true, yet the truth of my statements are easily *verified* by any one who will take the trouble to make the calculations.

Nor does the savings stop even here. We must take the canals into our account first.

You are just about to expend some $10,000,000 to enlarge the Welland, &c., and when the St. Lawrence and others which must follow in its wake are taken into the calculation, the whole amount to be spent on canals will not fall short of $20,000,000 ; there is also some $7,000,000 or $8,000,000 I think, of the Intercolonial Railway money still unexpended, which together will make say $27,000,000.

Now, I assert without the least shade of hesitation, that by the adoption of my system of "Sleigh or Roller Roads," the canals will be *rendered useless*, and all the money expended upon them absolutely thrown away ; this is proved by the fact that the great canals now in existence can barely hold their own in competition with the *slow speed* and *high tariffs* of the present railway system. For 14 years beginning with 1853, the tons of freight delivered by the Erie and Lake Champlain canals have varied but very little indeed ; at no time during that period was there any regular *increase* or *decrease*. In the year 1837 there was *more freight* delivered by the Erie than in 1866 ; meanwhile the crops of the West have increased to an almost illimitable extent, (all of which increase has been transported by railway), and the proportion going by rail is increasing in an even larger ratio every year, proving conclusively that shippers prefer to give higher rates so as to get *speed*, and so avoid the hundred and one accidents by heating, *water*, &c., also the chance of a *change* in the *markets*, (which often occur much to the annoyance of the merchant), between despatching the grain in the West and its arrival in the East. If any further proof is wanted, it is found in the fact that on all the Western railways there is a "credit mobilier" on a small scale, in the shape of a *fast freight* line, whose stock is held by the officers of the road, and who make large profits by despatching produce at *extra speed* for *higher rates* than the average. But the most conclusive proof that the days of *canal transportation* is now passed and gone—for all but the very heaviest and roughest class of goods such as coal, timber, stone, &c.—is found in the fact that it is proposed to dry up the bed of the Erie canal, and lay a freight railway in place of the water, the proposal having received the approval of almost every engineer—and forwarder—in the country. Indeed there cannot be a doubt that so obvious are the advantages of such a road over the canal, that the proposal would have been immediately carried out but for the well *founded* dread, that once the iron was substituted for the water, and all private opposition removed, the other railway corporations would get possession of it, and so be able to dictate their own terms to the unfortunate farmers and forwarders of the West ; but the very fact of the plan having been proposed and so unanimously endorsed by all classes, shows conclusively that canals, with few exceptions, must soon be numbered with the things that were ; and if such is their position when competing with the railway, what would it be if they had to face a system infinitely quicker and cheaper.

You may, therefore, add to the capital account $20,000,000 saved on canals, and $1,000,000 yearly in interest, making in all a capital sum

of $100,000,000, and a yearly saving of not less than $18,000,000 to $20,000,000. Looking at these figures, I ask you if I am unreasonable in asking you for $150,000 for a *test road?* Take the matter in the worst light you like, and suppose for a moment that the system turns out a complete and absolute failure, what would be the extent of our national loss; it need not exceed, at the *outside limit*, $10,000 or $20,000—it would not be $5,000, for you could build the road in such a position that nine-tenths of all the outlay would be for *material*, which could be all sold again at a *little loss.* If it is a success (nay! if it does one-half what I claim for it), the road is worth twenty times what it cost, and by its general adoption our country gains the amounts I have before specified. Are the chances so small that they are not worth the *risk?* Surely not. Why, you have expended *three* times the amount on many a paltry colonization road, over which no one has ever travelled. Look at the amounts you spent on preliminary surveys for the Intercolonial Railway. Nay, contemplate for one moment the amount spent on that road itself—a road which I believe (and in the expression of my belief I only echo the sentiments of those well able to judge,) to be almost useless to the Dominion, more especially in winter—just the time when such a road is wanted. Indeed, there is no possible doubt that ten millions of the money spent on that railway has been absolutely wasted. While you, yourselves, admit that it will be a heavy annual loss to operate it. Need I remind you of the amounts now being spent on the survey of the very road under discussion; or of the million and a quarter sunk in the Dawson road in the North-west? In all such undertakings there must be an element of *uncertainty*, and, consequently my *experimental* road in no wise differs from the many others which you are daily called upon to execute; or, if it does differ, it is in the *immense incalulable* benefits it is likely to confer upon the entire Dominion. It is needless, however, to waste more time in enforcing the claims of the "New System of Transit," it must now fight its own battles in the world. I have launched the *idea* upon the great ocean of human thought, confident that it will take root and bear fruit for the world's benefit. I have aimed to dispel the absurd illusion that the Railway is perfect, and the finality of man's invention in the way of locomotion. I have tried to break the spell which the wonderful success of Stephenson cast over the minds of our engineers, scaring them back from all attempts to supersede his work and I feel certain that the enchantment *is* broken, the spell *is* dissolved, and you may, therefore, rest assured that, even if I have not grasped the prize myself, the man is now living and of full age who will show to the world, that the Railway is, after all, but the forerunner of a more "perfect system of transportation;" a system as much superior to the railway—particularly as operated in Canada and the United States—as it was to the stage coach or the canal.

And now allow me, in conclusion to this long and in many respects imperfect communication, to say with all due defference that I do not come before you and your Government as a suppliant asking for favors; but

rather as one who would confer benefits on his fellow citizens. I offer to rescue them from the chance of financial ruin, or at least from very serious embarrasement and a fearful load of debt, debt contracted for the least useful of purposes, viz., in building a road on which few could afford to travel.

As a Canadian, I very naturally offer to Canadians the first chance of adopting the new system of transit, and in doing so I place within their hands the means of controling the vast and ever-increasing traffic of the Great West and North Western States of America. I present to them the power by which, if they are wise, they may create a great trans-continental trade, and constitute themselves the middle men between East and West, between Asia and Europe. Nature supplied us with the route, but she left it to us to find the mechanical contrivances necessary to make the route available. I have supplied the want, and now offer it for your very serious consideration, and I assure you that there are no other means at present known by which the Great Canadian North West can be made a really useful because easily accessible land, than such as I have explained ; and further, that no man who has thoroughly studied the railway systems of the world, and who has a clear and comprehensive knowledge of the requirements and possibilities of the great lone land, and the fortunes of those whom we expect to people it, will ever talk of a railway as the means whereby that country is to be made the refuge of the poor and struggling of all nations ; a land wherein all who are willing to put their shoulders to the wheel may hew out for themselves happy and prosperous homes ; homes into which the grim monsters, hunger, ignorance and crime need never come.

Again assuring you, Hon. Sir, that my first, last and only wish is, that you may judge wisely and act promptly on this most important subject,

I remain, yours very obediently,

D. R. GOUDIE.

YORKVILLE, ONT., May 10th, 1874.

APPENDIX.

When in the body of my letter I promised to give a specimen of the way in which the probable profits and advantages of any particular railway, are calculated by their advocates or promoters, I had no idea of being able to hit upon such an admirable sample, and one in every way so applicable to the case in point, as the one copied into this appendix. It appeared originally as an editorial in the *Manitoba Gazette*, and was immediately reprinted in the Toronto *Globe*, from which paper I have taken it. I print the article in full, because, in the first place it is a description of the present Government's plan for opening up communications with our great North-west, and is evidently inspired from headquarters; 2nd, because it is a good average sample of the way in which our newspapers treat such subjects, the accuracy of its information and the soundness of its conclusions being fully up to the mark of dozens of railway editorials I could quote from the Toronto press; 3rd, because it shews the way in which the few men who control the public press of the Dominion manufacture the article popularly denominated "Public Opinion," deluding themselves as well as the big, gaping, thoughtless, public with the idea that such works are desirable and certain to lead to the most beneficial results; 4th, I give the article in full, so that every one may judge for himself of the fairness and honesty of the remarks I make upon it:

"THE THUNDER BAY ROUTE."

(*From the Manitoba Gazette.*)

"As the season advances, the attention of the public is again naturally turned to the subject of routes by which we can move ourselves and our goods the cheapest to and from this Province. To this end steps have already been taken to place another line of steamers upon the Red River, in order that—competition being the life of trade—the present exorbitant passenger and freight tariffs may be reduced to something fair and reasonable. Still, this can at best be only a temporary expedient and makeshift, the hopes of the people naturally turning to the day when merchandise of all descriptions can be brought speedily and expeditiously through our own territory, and to this end all eyes are anxiously looking for the efficient utilization of the Thunder Bay Road. The Government scheme, as at present propounded to us, is assuredly the quickest and cheapest, notwithstanding the great exception that has been raised to it in certain quarters, where, perhaps, it might have been least expected. We propose, however, to prove our assertions by a few facts and figures; but, while doing so, do not let it be imagined that we are in favor of the available water communication being the *ultimatum* for all time to come, but we give the Government credit for being honest when it states that the water stretches will be used only to meet present pressing necessities, and that the construction of the railway will be proceeded with as fast as circumstances will allow. By going into the scheme a little in detail, we will be the better able to arrive at an estimate of how and where the Government expects to effect a saving at the outset; and though many maintain that canalling, etc., is only money thrown away and extra expense, if it is the intention to build the railway also, still, it cannot fail to be observable to any thinking man, not blinded with prejudice, that the money spent in this manner will not be capital sunk or lost, but pay a good dividend on the expenditure. However, it is not our intention just now to show in what manner it is so. Everybody knows that water has the advantage over rail in cheapness, and that where speed is not an object, a large amount of freight will always be sent in that manner. It is the intention at present to have two railroads on the Thunder Bay route, one of about 40 miles between

Lake Superior and Lake Shebandowan, and one of 90 miles between the North-West Angle and Winnipeg. The former will be over very rough ground with difficult grades, and its least average cost may be set at that of the general cost of railways in Canada, say $40,000, making its entire probable cost $1,600,000. In regard to the line between the Lake of the Woods and Fort Garry, it will pass over level ground in the highest degree favorable for the construction of a railroad—an alluvial plain country, where the bridging and grading required will be unusually little. Some low embankments in shallow swamps, with hard bottoms, will, however, be required, and its total cost per mile may be safely set down at $30,000, equal to $2,700,000 for the entire distance of 90 miles. The two railways at either end of navigation would thus involve an outlay of $4,300,000. Then we have 311 miles of water stretches that require to be improved by locks and dams; the total fall in the whole distance, as ascertained by surveys, is about 450 feet, of which 430 feet has to be provided for lockage, the balance being accounted for in the current of Rainy River and other parts. The following are some statistics showing the approximate cost per foot lift of some of the cheaper canals in the United States, including dams and all expenses connectedwith the original construction.

New Hampshire and Merrimac	$1,173
Delaware and Hudson	1,827
Morris Canal (New Jersey)	1,930
Cincinnati and Dayton	2,485
Philadelphia and Reading	4,098

"Therefore, if $2,500 per foot lift is allowed as the cost for the work under contemplation, it should be an ample allowance, covering the excavation necessary for the lock-beds, crib-work approaches, dams, etc., and would make the entire cost of the lockage at $1,290,000. Allowing for other excavations not included in the above, about $210,000, we have a total of $1,500,000. This, with the railway connections already spoken of, gives the total cost from Lake Superior to Fort Garry at $5,800,000. Thus we see that the construction of a railway the same distance of 441 miles (it would be probably be much longer) at say $35,000 per mile, would cost $15,435,000, so that the saving at the lowest estimate may be set down at $9,635,000.

"Now, we observe by a statement clipped some little time ago from the *Moorhead Star* that the number of pounds received at that point during 1873 for Manitoba was over 14,823,565 lbs., also by a freight bill before us, we see that the rate is $2.90 per cwt. from Duluth. Now suppose all that freight came by Thunder Bay, as undoubtedly it would, if the facilities provided were equal to it, and that the tariff were only half what it is from Duluth, that is $1.45 per 100 lbs., we should get a return of $214,941.70, which would be very nearly 5 per cent. on the money expended. Now, that is the amount of freight that can be depended upon, and is surely very good encouragement for the prosecution of the work, for if it is known that there is traffic to that amount already, it may be relied upon that it will not decrease, but will double and treble in a very short space of time to keep up with the rapidly growing requirements of the country.

"Supposing a scheme of railroad and canal, as above indicated, to be carried out, the transport of heavy freight, according to McAlpine's scale, which is generally adopted, would be nearly as follows from Toronto to Fort Garry:

94	miles railroad, Toronto to Collingwood, at 12½ mills a ton per mile	$1 18
534	miles of lakes, from Collingwood to Fort William, at 2 mills a ton per mile	1 07
40	miles by rail from Fort William to navigable waters of interior section at 17 mills a ton per mile	0 68
311	miles lake and river navigation, from terminus of Lake Superior railway to North-west Angle Lake of the Woods, at 4 mills a ton per mile	1 25
90	miles rail, North-west Angle to Fort Garry, at 15 mills a ton per mile.	1 35
1069	Total cost	$5 35

"The distance from Toronto to Fort Garry, by way of Detroit, Chicago, and St. Paul is 1,572 miles, and supposing the railway communication to be complete, the cost per ton, reckoned at 12½ mills per mile, would be $19.65. Nothing could show more clearly the vast superiority of the Canadian line in point of natural advantages.

"It will be very easy for the mercantile man to see from these figures what he is yearly losing by being compelled to freight through the United States, and the scheme that will relieve him the quickest from this incubus is the one that demands his support. If he has to wait till the whole railroad is finished, it will be some years yet before cheap freights can be looked for; but if, on the other hand, the Government scheme to be carried out, almost immediate relief will be felt, and the railroad in its entirety will not be hindered a day."

Now, the first point in this article to which I would like to draw your attention is the paragraph, "Still it cannot fail to be observable to any thinking man, not blinded by prejudice, that the money spent in this manner will not be capital sunk or lost, but will pay a good dividend on the expenditure; however," remarks our worthy and prudent scribe, "it is not our intention just now to show in what manner it is so." You will please mark the delicacy and tact with which our editor treats his opponent—provided any one will have the temerity to put himself in such an awful position—and the felicity with which he hits off his prominent characteristics—he must be either "not observant" or "blinded with prejudice." Now I would suggest, however egotistical it may seem in me to oppose my opinion against two such papers as the Manitoba *Gazette* and the Toronto *Globe*, that one might very reasonably doubt the possibility of such a route paying any dividend, and yet be an observant and thoroughly unprejudiced man; he might for example possess a more intelligent knowledge of technical subjects, particularly of railways, their construction and operation; he might also have had a greater natural aptitude for and given a great deal more time to the study of the causes which led to the peopling of the great West and North-West of the American continent, and so be able to form a more correct opinion as to the numbers who, under existing circumstances, would seek a home in the Red River Territory than even the editor of the Manitoba *Gazette*.

For my own part, I claim to be quite as observant and capable of judging the chances which the Thunder Bay route has of paying a dividend as the editor of the Manitoba *Gazette*, and I unhesitatingly assert that such a scheme of communication as he has described would not pay a dividend on the outlay; nay more, its entire earnings—even at his estimate—would not pay 25 per cent. of its current operating expenses; and if it was in his power to prove the contrary, it was his bounden duty to do so—indeed, it was *the* point—and to attempt to pass it over as he does, is simply to play Hamlet with the Royal Dane left out.

We will pass over his calculations as to the cost of the route, only remarking that his figures are based on the cost of roads built at a time when both labor and materials were worth little more than 50 per cent. of their present price; moreover, the position of the said railroads and canals, and their distance from necessary supplies would add at least thirty per cent. to their cost as compared with those named in his article, consequently, if you say $50,000 per mile for the railroads in place of $40,000—and $5,000 in place of $2,500 per foot lift for the canals, you will be a great deal nearer the true figures.

The next point claiming our attention is the paragraph in which he says "the amount of freight despatched from Moorhead to Manitoba per annum, amounts to 14,823,000 lbs., or say for short 7,000 tons—and pays $2 90 per 100 lbs. from Duluth. Now he says, "suppose all that freight came by Thunder Bay, which it would, and that the tariff was only one-half, or $1.45 per cwt., we should get a return of $214,941.70, or nearly *five per cent.* on the *money expended.*" Which is certainly, as he remarks, "very *good encouragement* for the *prosecution of the works.*" You will excuse me though, if I trouble you to observe that we get that neat little sum of $214,941.70, which "pays nearly five per cent. on the outlay," by charging only

$1.45 per 100 lbs., or say $29.00 per ton between Thunder Bay and Fort Garry, and getting the 130 miles of railway and 400 miles of canal, lake and river navigation *operated* and *maintained* by *magic*, for it must be observable to any thinking man not blinded by prejudice, that our admirable prospectus writer does not allow one single cent for working the road; indeed, such trivial things as working expenses are altogether beneath his notice, and after all he requires the whole amount (even at $29.00 per ton) to pay that five per cent.

In the very next paragraph our author says: "Supposing a scheme of railroad and canal as above indicated, to be carried out, the transport of heavy freight, according to McAlpine's scale, which is generally adopted, would be as follows from Toronto to Fort Garry:—

94 miles railroad from Toronto to Collingwood, at 12½ mills per ton per mile	$1.18
534 miles by lake from Collingwood to Fort William, at 2 mills per ton per mile	1.07
48 miles by rail from Fort William to the navigable waters of interior section at 17 mills per ton per mile	68
311 miles lake and river navigation from terminus of Lake Superior railway to north-west angle of the Lake of the Woods, at 4 mills per ton per mile	1.25
90 miles rails, north-west angle Lake of the Woods to Fort Garry, at 15 mills per ton per mile	1.35
1096	$5.35

In other words, our author says in the first place, the Government scheme of railway and canal communication with the North-west will when completed cost about $5,600,000. The present traffic certain to take the said route, amounts to about 7,000 tons per annum, and will at a tariff of $1.45 per 100 lbs., or $29.00 per ton between Thunder Bay and Fort Garry, yield a sum of $214,000, or nearly five per cent. on the outlay (always provided the road is operated and maintained by the Nymphs of the North-west. Hence, gentlemen, you see it is just as plain as the nose on your face, that the Government scheme is not only an admirable scheme, but it is also a *paying* scheme; consequently what objection can any "observant man" urge against it? In the second place he says, "so soon as the said route of railway, canal, &c., communication is completed, the tariff for heavy freight between Thunder Bay and Manitoba will be reduced—according to the universally adopted scale of the great McAlpine—to $3.10 or thereabout; consequently it is just as clear as mud that the Government scheme is an admirable scheme, and one from which everybody—particulary the Toronto merchant—is going to derive the greatest possible benefit, and if you are a genuine patriot you are bound to view it just so!

Now, in the name of outraged common sense, I ask what are we to think of the man who could sit down and deliberately write such arrant, senseless, and contradictory humbug? Or what shall we say of the influential paper which gives it the benefit of its circulation? Or what weight shall we attach to opinions on that or similar subjects when emanating from such quarters? 1st, he proves that the railway and canal will be profitable—paying nearly five per cent.—by charging $29.00 per ton between Thunder Bay and Fort Garry—and getting the road operated gratis—and in the very next breath he shows that the principal reason for constructing the road is that freights will be reduced as low as $3.10 between the same points, immediately the route is complete. Now, if it required a tariff of $29 per ton—without making any allowance for operating and maintenance expenses,—to pay "nearly five per cent. on the original outlay," how will the case stand when you reduce the tariff to three dollars per ton, and pay at least $500,000 per annum working charges? Or where are you going to get the money which is to "pay a *good dividend* on the *expenditure*?" It certainly is a great pity that we should be under the necessity of finding fault with our public teachers; but what are we to do, when we find such articles apparently so careful, elaborate, and satisfactory,

really so absurd, contradictory, and false—sown broadcast over the Dominion by our most important newspapers? especially when we consider the vast importance of the subject, and the urgent necessity that exists for informing the people fully of the enormous burdens which their governors are heaping upon them almost daily.

But let us return for a few moments to the calculation by which it is shown that ordinary freight could be carried by the new route between Toronto and Manitoba for $5.35 per ton; our author says that his calculations are based on the "McAlpine scale. which is universally adopted." Now, who "McAlpine" may be I don't know, nor am I at all anxious to find out, but one thing I do know, viz., that no such scale is generally adopted, either in Canada, the United States, England, or the continent of Europe, as the following extract taken from an editorial on "Transportation" which appeared in Harper's Monthly for April, 1873, will show —at least as regards the United States:—"Statistics derived from traffic reports show that the average cost per ton per mile by rail is three cents, by canal one cent, by river three mills, by Lake 2½ mills, by sea 1¼ mills." Moreover, it must be borne in mind that these figures are derived from roads and companies doing an immense business, and only covers the bare cost of transportation; but you perceive all freight sent from Toronto to Fort Garry by the Thunder Bay route, would require to be handled no less than eight times over and above the first loading, and the last unloading—which as a matter of course would make a very serious item in the cost of transportation by that route—yet our author does not allow one cent for any such purpose. It costs not less than $2 per car load, to load grain at the steam elevators in Chicago, and will cost that amount every time the grain is handled either in loading or unloading. Now, if it costs forty cents per ton to load and unload grain by steam power, how much will it cost to load and unload a ton of ordinary miscellaneous freight such as he refers to? Will sixty cents be too much —it could not be done for $1.00—if not, you must add that amount for every time the freight is moved—which on the Thunder Bay route between Ontario and Fort Garry will be five times, making for that item alone—calculated at the low figure of sixty cents per ton loading and unloading—$3.00, or sixty per cent. of the whole sum he calculates for moving the freight from Toronto to Fort Garry.

Railways, canals, &c., do, and as a matter of fact must regulate their tariffs by the amount of business done in proportion to the length and difficulty of their routes, as any one may ascertain for himself after a little inquiry—for example, by stepping down to the Northern Railway Station, he can find out easy enough that the lowest charge for general freight (such as referred to in the article quoted) will be three cents per ton per mile between Toronto and Collingwood—in place of 1¼ cents; he may also learn that the charge by boat between Collingwood and Fort William averages nearer *twenty* dollars per ton than one dollar and seven cents as given by our author; and it may be well to state just here, that it costs neither more nor less to navigate a steamer between the said points to-day, than it will when the Government scheme of canal and railway communication is complete; consequently, there are but two ways in which the present tariff can be reduced— 1st, by an immense increase of business, beside which the present trade of Manitoba (7,000 tons) would be the merest bagatelle; or 2nd, that the Government of the Dominion make good the difference between the tariff and the real cost of transportation.

Again, he will find that the cost per ton on the forty miles of railway between Fort William and the interior section, instead of being put at seventeen mills, ought—according to all rules governing railway transportation—be put at six cents per ton per mile, and so on with every section of the route.

For example, in the United States "inspection of the returns of 88 railroads at the east, 28 at the west, 11 at the south, whose statements for 1872 are complete, shows that those roads which carried freight an average distance of 10 miles charged an average of nine and one-tenth cents per ton per mile, and yet yielded only $1,112 net earnings per mile, or less than 2 per cent on the average cost, those moving freight an average of 20 miles charged six and eight-tenths cents per mile, and yielded only $970 per mile net earnings, all these are eastern roads running

through old and thickly settled districts. Roads moving freight 40 and over 40 miles may be arranged thus:

27	Eastern roads	moving an	average distance of	75	miles charge 3.13,	and earn $3,125
28	Western	do.	do.	116	do. 2.68	2,162
11	Southern	do.	do.	79	do. 5.67	1,886
61	Eastern	do.	do.	27	do. 5.95	1,815

It is consequently evident that railroads do, and must continue to charge in proportion to their length, and the amount of business done; it is also plain that a high tariff does not always mean a profit to the shareholders, for not *one* of the roads I have named can be said to pay, while the majority of them barely pay operating expenses.

It must not however, be supposed from the remarks that I have made on this scheme, that I am opposed to it, because I favor an all rail route; on the contrary, I considered that under existing circumstances, the Government plan of rail, canal, &c., is unquestionably the most serviceable and prudent, indeed I consider it the best in exact proportion to the amount of money saved in first cost and subsequent operation, as compared with an all rail route.

If I believed as our newspaper editors and politicians say they believe, viz: that the progress of Manitoba and the Northwest is likely to be as rapid and successful as that of Indiana, Minnesotta, Iowa, &c. then I would undoubtedly be opposed to the mixed route for the very obvious reason that the cost of transhipment, loss of time, and probable injury to the freight in handling, would far more than counterbalance any gain in first cost or current operating expenses; but viewing as I do the construction of either route—before there is the clearest proof or at least the strongest presumptive evidence—that it will be required and ordinarily producing within a reasonable time, as outrageous and senseless extravance, I must perforce favor the road that will be least costly. What I object to, is the nonsensical humbug, miscalculation and misrepresentation which runs all through the article. I am opposed to the attempt evidently made to cajole the people of the older provinces into the belief that they will derive benefit either directly or indirectly from the contemplated expenditure; or that such a route of communication could be made to pay more than the merest fraction of its current operating charges, until the population of Manitoba numbers over a million—a time which no thoughtful intelligent man who has watched the progress of Manitoba during the last four years will be inclined to place nearer than 30 or 40 years.

My contention is, that the taxpayers of the country should be told honestly and frankly, precisely how the case stands in regard to this and all other public works. How much they will have to pay now, how much per annum and for how long. It should also be clearly demonstrated—without any rhetorical flourishes about general progress, natural development, &c —what *benefits* they are likely to reap from this, and the other expenditures necessary for the so-called opening up of the Northwest? How much it will add to their income? By how much it will reduce the expenditure? What diminution it will make in their taxes? What increase in their comforts? And if it is impossible to show that the said and like expenditures will either increase the general income or diminish the general expenditure; that they will lend strength and stability to the Government, or add to the comforts and enjoyments of the laborer? On what grounds can the expenditure be justified?

I maintain and insist upon it with all the emphasis of conviction that if the rulers of a country decide to tax, or mortgage the property and labor of its inhabitants to the extent of 150 or 200 millions of dollars (or any other sum) for any purpose whatever that they are bound to show that the said inhabitants are certain to receive a present or future benefit fully commensurate with the sacrifice demanded, and it is not enough that the Government be able to hold out a hope or show a chance or probability of gain; there must be a clear intelligent conviction, such a conviction or knowledge as would justify or prompt a merchant to take the risk for his personal profit; and I further assert that when the responsible governors of a free people, act on a different principle (as they very often do) they violate the

plainest dictates of common sense, the first principles of political science, and render the word statesmanship, synonimus with ignorance, presumption and spoilation.

I repeat, no public work can be honestly and reasonably demanded at the hands of a Government, unless those demanding and proposing it are prepared to prove (not guess, hope, or believe) or demonstrate in such way as would satisfy the reason of a private speculator, if he was in a position to go into it, that the said undertaking will yield at least five per cent. on the outlay over all operating and maintenance expenses, &c. Of course, as I have before remarked, it is not absolutely necessary that the work should pay five per cent. in cash directly to the national exchequer—though as a *rule* it should do so—but it is imperative that it should return that amount either to the nation as a whole, or to a certain section of it; nor is it essential that the undertaking pay the full interest from the day it is finished—for Governments as a rule can wait—but in that case the unpaid interest must be added to the first cost, and future dividends cover both. Indeed, so clearly evident is it, that this is the proper test by which to try all public undertakings, that it must seem like a work of supererogation to insist upon it. Nevertheless, it is a fact, that there are not half-a-dozen public works in Canada to which the principle could be applied; nor are there two on the boards now, which tested by it, would stand any chance of being carried out. For example, I ask any man of average intelligence if—tried by this common-sense standard, this first principle of political science—it is possible to make out a case in favour of the enormous expenditures we are making in the North-west? in favour of our building the Canada Pacific Railway, the Pembina branch of ditto, the Trans-continental Telegraph, or constructing that *mechanical* and financial monstrosity, the "Baie Verte Canal," which the Hon. Mr. Scott told the Senate must be built, because forsooth a majority of the House of Commons had set their hearts upon having it? I insist that under existing circumstances, such expenditures are more stupid and criminal than throwing the money into the lake, because they will entail an annual waste of treasure to cover over the original blunder.

I am, of course, fully aware that in making the above statements, I am running counter to a very powerful current of public opinion, and to the very absurd and ridiculous ideas which generally prevail in regard to the railway system, viz.: that it is a sort of omnipotent genii which *creates wealth* no matter where it may be placed; ideas which found many influential mouth-pieces in Ottawa during the last session of Parliament. For example, it was asserted, and re-asserted, again and again, in the Senate particularly, and by men whom one would naturally have supposed to know better, that although a railway can neither provide interest on its first cost, nor pay even current operating expenses, it may still be very profitable to the country as a whole, and ought to be kept in operation at the general expense. Now, that is simply *Protection* in its most *injurious* and *aggravated form*, and bears absurdity on its very face. It means that we, the general public, are to be taxed a large sum of money because certain people chose to remain in a particular part of the country or to carry on an unremunerative business, for it is perfectly evident that if their section of country is a good one, and their occupation *remunerative*, they can afford, and should be *compelled* to pay for their own transportation; and if the country is bad, and their business *not paying*, then it is for their *own interest*, and most unquestionably for the good of the country, that they should be *forced to leave it.*

Let us try, however, and demonstrate more fully the *absurdity* of the above proposition, viz., "that a *non-paying* railway can be profitable to the State," by the case of Manitoba (though the demonstration will be equally applicable to the Intercolonial and other non-paying roads of the lower provinces.)

Suppose we have finished the railroad to Manitoba at an average cost of $50,000 per mile; that will give, as the cost of the whole line (1,200 miles), sixty millions of dollars; the interest on that sum at six per cent. will amount to $3,600,000 per annum; taking the operating and maintenance expenses at $5,000 per mile, the annual outlay will be six millions, which added to interest makes in all an

annual outlay of $9,600,000. Now, let us suppose that during the period the road is building, the population of the Northwest will increase at the rate of *thirty thousand per annum* (though we have no reason to calculate on *one-third* of that number), and that the road takes *ten* years to complete; in that case we will have 300,000 inhabitants; we will also suppose that there will be as large a breadth of land cultivated in proportion to population as there is in the west and north-western States of the United States, viz., three acres per individual; and also that the yield will be the same, namely, fourteen bushels per acre (of wheat); in that case the cultivated land would amount to 900,000 acres, and the yield 12,600,000 bushels of wheat (the *only* crop that could be raised with any hope of profit.) Now, let us suppose that two-thirds of that amount, or say eight million bushels are exported, the whole quantity would be worth in Montreal or Toronto at $1.20 per bushel, $9,600,000. And now comes the very natural query, how much has it cost to produce and bring to Toronto this nine million dollars worth of wheat? What was the profit of the farmer and of the railway company (or the Dominion)?

To begin with, the Dominion must have made the tariff of this road about *one-half* the *lowest* sum now charged by any railroad in the world, or the grain *could not have been exported from Manitoba at all*, we will therefore, suppose the rate to have been three-fourths of a cent per ton per mile or say 30c. per bushel from Manitoba to Toronto; that being the case, it is evident that if the wheat cost the 90c. per bushel paid to the farmer, the 30c per bushel paid to the railway, it also costs the *real expenses* of transportation, viz.: the expenses of the railway $9,600,000, less the $2,400,000 paid for carriage, or in all $16,-800,000, that is, the grain which is worth in all $9,600,000 in Toronto, cost to produce it in the Northwest, and bring it here $16,800,000.*

It must therefore be perfectly plain to any one capable of realizing or resolving the simplest arithmetical or mechanical problem, "that the total of the whole" is just this: that (as the Dominion taxes raised in the North-west will never—or at least not for thirty or forty years—cover Dominion expenditure in Do) we of the older provinces will be paying eight million dollars per annum to enable 300,000 people in the North-west to add to our exports eight million bushels of wheat, worth some nine million dollars; while the farmers for whom we will be making such *senseless* and unheard of sacrifices will be compelled to sell their produce *twenty* to *twenty-five* per cent. *less*—and consequently be that much worse of—than their brethren of Ontario.

But perhaps you say that is not a fair way of putting the case; that I allow nothing for other freight and passengers, &c., which is quite true; but it must be remembered that I gave nearly *double* the export of grain which could reasonably be expected from 300,000 people. However let us try it in another way, and the *only other* way in which it can be *tested*, viz., by taking the *average* amount of money which a given population (like circumstanced) is in the habit of paying

* When I observed the other day that our government had actually offered British Columbia to commence at once, and continue spending 1½ million of dollars per annum in that Province until the 500 miles of railway promised was comlpeted, I had to rub my eyes for some time to see that I was not really asleep, and had dreamed it; as soon however as I got my senses about me, I made the following calculations. The population of British Columbia is about 40,000—Indians and Chinamen included. The proposed expenditure devided by 10,000 (the number of men or families supposed to be in that Province) will give $150. Ergo we spend at the rate of $150 per annum for every family in that Province to provide them with railway communication; or suppose the whole 500 miles complete at $40,000 per mile (a low estimate) it will have cost $20,000,000. Now $20,000,000 divided by 10,000 gives $ 2,000 for every family in the said Province; therefore, every family in British Columbia will have cost us of the older Provinces $2,000, but that is not all nor even the *half* of it for once the road is built, it must be operated and maintained at the rate of not less than $4,000 per mile per annum, or for the 500 miles the neat little sum of $2,000,000, which added to the interest of first cost $1,200,000, makes in all $3,200,000 per annum, or at the rate of $3,320 per annum per family to supply railway facilities for 40,000 people, who under the most favorable circumstances cannot supply traffic to a greater extent than $7 per head, or in all $280,000 per annum. Would it not be far more sensible to pay every family in the place a $1,000 down and get them to agree to burn the ridiculous, nay *infamous treaty*, which seems to have been drawn up for the special purpose of ruining this Dominion.

for railway hire of every description; taking the case of Minnesotta, Iowa, &c., where the charges are more than double the amount it would be possible to charge on the "Canada Pacific." We find the average to be between $7 and $8 per head; now suppose we say for Manitoba and the Northwest $6 per head, how much better are we than by the first calculation? We are actually $800,000 worse, which proves conclusively that I have been liberal to the railway. In short try the calculation in any way you like, you can get but one result, viz., that we of the older Provinces will be paying $25 per head per annum for every man, woman and child in Manitoba &c. (even granting them to increase at the rate of 30,000 yearly) or at the rate of $10 *per acre* per annum for every acre of *cultivated land* in the Province to induce farmers to leave Ontario and Quebec where they are doing (or at least might do) well and are a source of *wealth* and power to the Dominion, to go to a country where their produce will bring from 20 to 25 per cent less than it would do here! Yet we are a common-sense people, a people who hate protection or bounties of any kind, and would far sooner see our country remain a little Province than have it made a mighty flourishing State by a nominal protection of 20 per cent on manufactures; yea, verily we are wise, and our governors have always been men of genius and ability, distinguished for their great grasp of commonplace, their powerful passions and vivid fancy, but slightly deficient in that cool, calculating common-sense so necessary in the ordinary affairs of life.*

In conclusion, I would beg to say that it is absurd to assert as many have asserted, that because I hold these opinions that therefore, I am opposed to immigration, progress, development, &c., &c., for the very *contrary* is the truth. I am and have ever been entirely in favor of progress and national development, and am exceedingly anxious to see our population increased; indeed no one can be more desirous of having the vast rescources of this Dominion developed than I am, and very few, I make bold to say have a clearer notion of their extent and value.

I have no fear of a bold, original, and enterprising policy on the part of the government; Canada is rich, immensely rich, rich in everything but men, consequently every effort is justifiable, every expense reasonable, up to $30 or $40 per immigrant, which will add to our population men and women of the right stamp. Canada could, I am fully persuaded—afford to spend $100,000,000 within the next ten years, and never feel the pressure, provided it was spent in *real development*, in promoting real progress, which means that 20 persons must be added to the population for every $3,000 spent in public enterprises—all I want is to make *sure* that our progress is real, permanent and beneficial to all, which is more than can be said for much of the past, in fact our efforts in the Northwest particularly, has always appeared to me like the economy of a lady friend of mine, who spent $3 in the trimming and making up of a jacket or cape, for which she had no earthly use rather than see a small piece of black cloth, not worth a dollar go to the rag bag. So we, having become the unfortunate possessors of a great country a thousand miles distant from our own, are compelled to ruin ourselves in trying to colonize it, although millions and millions of acres within one hundred miles of our principal

*"Oh," says Mr. Sharpsight, "what about the *transcontinental traffic* of the road?" That is just the query I would like answered myself, so suppose you sit down and try to find out what it will amount to, and then let me know your opinion; mine is that there will be none to speak of because the charges would be too high, there are not 20 million dollars worth of goods passing between the east and Europe or America that could afford to take the railway across the continent. Again, should any non-protection political philosophers feel like laying the flattering unction to their souls, that time and future increase of wealth and numbers in the Northwest will put us on the right side of the account-book, just let him. Make the following calculation: first place our annual loss, interest, compound interest, operating and maintenance expenses, &c., on one side, run them up for a period of say 20 years; then let him do the same with the trade and increase of population (taking any rate of increase that his own common sense and facts will justify) and let him strike a balance, and I will risk a nice little bet that we are worse off at the end of the 20 years than at the beginning. Indeed it is a *physical and mechanical* certainty that if ever the Canadian Northwest really becomes a prosperous and populous portion of the Dominion, it will only be after the railway has been superceded by a system of transit infinitely less costly in construction and operation, and greatly superior in *safety, speed* and *power*.

cities, and within 50 miles of our principal lines of railway, are as yet untouched by the plow, and our *cultivated* lands for lack of *labor* and *capital*, yield barely *half crops*, the average being in Ontario *fourteen* bushels (of wheat) to the acre, while in England and Scotland—with very inferior soil and climate—they get from *twenty-six* up to *forty* bushels to the acre.

We have an almost virgin country, a Dominion of unlimited resources, capable of supporting in affluence 100,000,000 of people; we are perfectly untrammeled, absolutely free in every respect, socially, politically and religiously. No *one* of the thousand curses which hang around the necks of European peoples afflict us. We have neither army nor navy to support; no landed and governing aristocracy to *provide* for such as in Great Britain, &c., consume the produce of 60 to 70 out of every hundred acres of cultivated land. We have comparatively few of that smaller aristocracy who live on the accumulated savings of years or on the interest of government debts, debts incurred not as with us for works of improvement but for purposes of distruction. We have few paupers or criminals, *and* if they are ever allowed to increase, or rather if they are not steadily diminished, our rulers ought to be horsewhipped once a month for the term of their natural lives. Nor are we afflicted with that immense army of partially employed and miserably paid men, &c., who are engaged in the thousand and one trifling and yet absolutely necessary occupations which are carried on in all old or densely peopled countries, a class neither pauper nor criminal, though only a shade above the degraded; in short we have nothing but blessings; indeed I hold that if ever a special opportunity was vouchsafed to any people, to enable them to work out the very highest form of social existence, that chance is now offered to us. If ever there was a people who could claim to be the chosen and favored children of the Almighty Father, surely we may claim that title; for what more "God and nature" could reasonably be asked to do for Canada, than has been done, I am at a loss to imagine; our chances, our opportunities have been almost infinite, and if we had only been blessed with a government equal to the occasion, we might have stood before the world to-day a nation of 10,000,000, superior in intelligence, morality, physical comfort and general culture to anything the world has ever seen.

Our greatest want has been, and our fervent prayer should still be for *statesmen*. Men capable of rising above party spirit, party tricks and exigencies, and taking their stand upon the firm foundation of honor, honesty and truth. Men able to realize the strength of our position, the greatness of our opportunities, and prepared to bring the people *up* squarely, face to face with their great destiny. We must have men of individuality of thought and originality of conception. Men who can *originate* as easily as they can *adapt*, and who can control and *educate* the public mind and will; in a word we must have as controler of the governmental machine, the power that springs from *internal conviction*, the promptings of native genius, rather than the talent born of much reading, long experience, native cuteness or low cunning, for statesmen like poets are ***born*** not made.

ADVERTISEMENT.

ONE HUNDRED DOLLARS REWARD.

IMPORTANT TO

Scientists, Practical Mechanics, Engineers, Inventors and Others.

The above reward will be paid to the person who will, within the next four months, prove in accordance with the conditions laid down, that

Goudie's Perpetual Sleigh Road

Is impracticable, and could not be carried out with any hope of *superseding* the Railway system, either in speed, power, or economy of maintainance and operation.

GENTLEMEN,—

In the letter addressed to our Premier, which forms the body of this pamphlet, I describe a new system of transit, which I call GOUDIE'S PERPETUAL SLEIGH ROAD, and for which I claim,

1st. That it is in every way superior to and is destined to supersede the railway as a means of transit, both for passengers and freight.

2nd. I claim that it can be made for less than one-third the average amount which has been expended on railways, and for less (to keep well *within* the mark) than one-third the amount which would be required to build the Canada Pacific Railway.

3rd. That it could be maintained and operated for about one-third the amount usually required for the maintainance and operation of the railway.

4th. That it could accommodate *double* the business, and keep up *double* the *speed* usually maintained on Canadian railways, or that would be kept up on the Canada Pacific Railway if built; that is, for every ton of goods which the ordinary 150 horse power locomotive engine now draws on the railway at twenty miles an hour, the 150 horse power locomotive could, on the Sleigh Road, take two tons a 40 miles an hour.

5th. The Sleigh Road could be built and operated in almost any kind of country—in a country where the railway would be absolutely useless—and in one-third to one-fourth of the time necessary for the construction of a first-class railway—such a railway as the Canada Pacific would be.

6th. That the Sleigh Road would be almost *absolutely safe* (it being impossible for the cars to leave the track by *accident*), and free from noise, while the motion will more resemble the sailing of a ship on a perfect calm ocean, than the thumping and bumping and swaying motion of the railway cars; it will therefore be infinitely more comfortable and healthy, enabling passengers to read, write and converse or sleep with perfect ease and safety.

7th. Such is the superiority of the motion, and the power of the engine—particularly when working with elastic drivers in double grooves—that if the Sleigh Road cost $150,000 per mile, while the railway could be built for $50,000, the Sleigh Road would be by far the *cheapest* in the end, owing to the smaller cost for operation and maintainance.

8th. Such are the advantages arising from the ability to use engines of *unlimited power*, and the great reduction made in the *dead weight*, that transportation by "sleigh road" would cost less than *half* that by rail, even granting the friction (loss of power) between the runners and the rollers to be double that between the wheels and the rails.

9th. By sleigh road we could haul loads of 500 and 600 tons, or 8 to 10 times the amount carried by rail; while the road could be made to carry canal boats, barges, &c., &c., with six times the present speed and at one-half the present cost.

10th. That the expense of changing any ordinary railway to the "sleigh system's need not cost more than $5,000 or $6,000 per mile—added to the price of the old material—a sum which would be saved in two years in the operating and maintenance accounts, while the efficiency of the road would be doubled, and the future expenses reduced fully 50 per cent.

11th. And *very important*, I claim that the Sleigh Road could be operated by *wind power* for at least *one-fourth* of the *year* quite as efficiently as the railway is now operated by the *locomotive*, thereby effecting an immense saving; indeed I hold that the road could be so managed that nearly all the heavy traffic, such as cereals, live stock, &c., between the great West, and the sea board; the coals, iron, lime, stone, plaster, timber, and heavy manufactures, &c., between Nova Scotia, New Brunswick, &c., and Ontario and Quebec, could be carried by that means, thereby reducing the cost in many cases fully 50 *per cent to the consumer.*

Now, gentlemen, it must be very evident to you that it is exceedingly important not only to myself, but also, to the country, that my system of Sleigh Roads should be adopted at once, and so save the immense sums being constantly thrown away on railways, or it should be proved to be impracticable and not capable of superseding the railway as a means of transit. I therefore offer a reward of $100 to the person, male or female, professional or non-professional, inventor or mechanic, &c., who will demonstrate in the clearest and most convincing manner by means of model, drawings, or in any other satisfactory way, that the claims I have advanced above in favor of my system are not justifiable and cannot be sustained according to the well known *laws of mechanics*; that in short the system of Sleigh Road is *impracticable* and could not be carried out with any hope of superseding the railway either in speed, power or economy of operation.

The offer will remain open for four months from this date, and the conditions necessary to observe in competing for the prize will be—1st. That the competitor must read my pamphlet through thoroughly and understandingly at least three separate times, with an interval of two or three days between each reading. 2nd. He must satisfy himself that he thoroughly comprehends the full scope of my scheme. 3rd. He must know enough of mechanical philosophy, and be sufficiently acquainted with the theory and practical details of the railway system—the cost of construction, operation and maintainance, &c.,—to enable him to judge intelligently of the correctness or otherwise of my theory, facts, assertions, &c., &c. 4th. He will then write out clearly and as concisely as he can, his reasons for believing me to be in error concerning the Sleigh Road, its utility, &c., and send the paper to me as soon as possible. If I consider his objections of sufficient importance, I will answer them within a week or ten days from their receipt; and should he not hear from me within ten or twelve days, or should my answer not succeed in removing his objections, he is then at liberty to notify me through the columns of the Toronto *Globe*, *Mail*, or the Montreal *Herald* or *Gazette*, (sending me a private note at the same time, saying in which paper his note has appeared), that he is prepared to compete for the prize; he will also send me at the same time the name of one or more gentlemen whom he is willing to accept as judges between us; the competition will take place before a committee of gentlemen whose professional reputation as engineers, and personal character as gentlemen, will be a sufficient guarantee for the impartiality and intelligence of their opinions; the committee to consist of not more than six nor fewer than three, and the competitors to have the appointment of two-thirds the number and myself of one-third. The competition to be by letter, drawings, models, &c., &c., or in any other way the competitor

may think fit, I reserving the right to reply to the demonstration or arguments of any of the competitors. The prize to be paid immediately the judges have pronounced their opinion that it has been earned according to the conditions stated.

N. B.—Should any one who would like to compete consider the above conditions or any of them unfair or giving an undue advantage to the inventor of the Sleigh Road, I will be happy to relax them as far as I reasonably can, with the main object of the challenge which is to *arouse public attention* and get the subject *thoroughly ventilated.*

The only conditions I cannot relax are—1st. That all objections be first sent to me personally—the reason for that being the impossibility of noting every *fact* in a pamphlet, or providing against every possible objection; 2nd. That all offers to compete for the prize must be made through the *public press*, the object of this is that the public may *know* to a *certainty* if any or how many are prepared to prove me a mistaken enthusiast, and my Sleigh Road an impracticable dream, and if none are prepared to prove it such, that the public may have a certain guarantee of its practicability.

I am aware that there is a very general idea abroad that although the great inventions of the past were opposed and their authors ridiculed and persecuted, that the world has learned too much since, and seen too many former impossibilities turned into every day facts to repeat the stupid mistake; that, in a word, the general intelligence is so great and the spirit of toleration so wide spread that the inventor has no longer anything to fear in bringing forth his projects but may rest sure that the public is willing to try all things, and hold fast that which is good, &c.

Now to try the truth of that idea it is only necessary to ask, what was the public, the professional and practical opinion concerning the making of *iron* ships; the reaping machine, steam ploughs, the sewing machine, rifled cannon, breach-loading rifles, or infinitely more important, Bessemer's process for making steel, Siemen's regenerative gas furnace, or what about the Atlantic telegraph or the Suez canal? In each and all the opinion or verdict was just what it would have been fifty years ago, viz: "*It can't be done.*" In every age and country man is the same being and with the same strong and persistent belief that whatever is is best, the good old way is so good that there can be no better; so every truth, every improvement that is an advance beyond the narrow sphere of every day experience is doubted, denied and struggled against with all the heat and vehemence of prejudiced ignorance, not because it is *false* but because it is *new*—because it is different from the old routine. It is only necessary to bring forward a plan different from any to which the world has been accustomed; a scheme without the recommendation of use and wont, a something which seems to *reverse* as it were the former order of things, and the shout is instantly raised it can't be done, "you're a fool, sir," said Humphry Davy, the great chemist, when a friend whom he met in the street told him that before long he would see the city *lighted* with *gas*,—"you're a fool, sir, it can't be done."

Or take my own scheme for "cooling and ventilating barracks, hospitals, &c.," in India, twelve or fourteen years ago, it was pronounced *utterly impracticable* by the medical and other experts forming the "Army Sanitary Commission." Eight years ago I was asked by the secretary of the same commission—*as a complete crusher*—how I could apply such a system to an Indian barrack where all the windows and doors were "kept wide open,"; and you will please mark that it never seemed to strike them that it would be possible to *shut* the doors and windows, such a thing would be absurd, the windows and doors always had remained open, consequently they must remain so; neither did it occur to them to ask *why* are they kept open? and will not this scheme remove the cause? No, that would have been a *new idea*, a thing they were not capable of, and now the scheme which they were so ready to denounce twelve years ago as *utterly impracticable*, is carried out in the United States, in almost every European hospital, in the great Albert Hall, the Alexandria Palace, London, and only last week I saw from the English papers that after every other system has been *tried* and *failed*, my plan has been carried out

even in the English House of Commons itself, but it has not yet found its way to India for which it was designed, nor do I get the merits of its invention.

I state these facts, gentlemen, simply to remove an idea which might otherwise gain lodgement in your minds, viz: that my offer is prompted either by over confidence, pride or bravado, and to show you that it is really the *only course* by which the plan can be brought prominently and at once before the public, and a practical issue raised. Necessarily, I throw down the gauntlet for it is one of the misfortunes of the inventor that he must always, at least in the first instance, blow his own trumpet; he may do it privately by button-holeing the rich and influential, or he may do it by means of printers ink, but one way or other he must of a necessity assert himself, as one who knows or can do something which the world needs to learn or get possession of, and which only he can impart. I therefore trust that all will believe that I am actuated only by the motives I have named, and that you will come forward and, as a charity to the inventor—who has spent long and anxious years, and a considerable sum of money in bringing his ideas into their present shape—if not as a service to the public,* win the $100 I have offered; I ask *no favors*, and I have lived long enough in the world to care very little for the "ha, ha, pshaw," style of criticism; I am myself at all times willing to hit hard at what I consider wrong or absurd, and I consequently respect the man who does the same, only strike fair, gentlemen, and not too many at a time, and you will have no cause to fear the flinching of

Yours very respectfully,

D. R. GOUDIE,

Inventor of Patent Sleigh Road.

Address—Box 48, Yorkville, Ont.

July 13th, 1874.

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* Or, if a still stronger motive is required to induce you to give the subject your very careful consideration, you may find in the fact that the amount of money which the Government deliberately propose to waste in the construction and maintenance of the worse than useless "Canada Pacific Railway," is amply sufficient to provide for the following objects:—(1) To provide for a protective duty, or pay a bounty of 20 to 25 per cent. on all kinds of manufacturing and commercial industries which cannot flourish without help. (2) To subsidize a first-class line of steamships to all the principal ports where Canada could do business. (3) To lend money to farmers, large manufacturers, and for the general development of the natural resources of the country at three and-a-half to four per cent. interest per annum. (4) To provide an absolutely free and liberal education for every child in the Dominion. (5) To grant a dowry of $200 to every child now in the Dominion (under five years) on reaching their majority. (6) To provide $200 worth of household furnishings for every couple married after 1878, who have lived ten years in the country previous to their marriage. (7) It will allow a life pension of £50 per annum to every man in the Dominion (now under forty years) on attaining his sixty-fifth year. (8) Forty dollars to every woman (now under thirty-five years) who may be left a widow after 1878, and a decent maintenance and education for every child left an orphan, or otherwise unprovided for. (9) It would enable the Government to lend every man whose income is under $800 per annum, money enough at four per cent. to provide himself a comfortable home, and so reduce rents all over at least forty per cent. In a word, it is enough, if sensibly used, to place the Dominion in such an advantageous position that in less than ten years her population, wealth, and power would be more than doubled, enabling us to take our true position in the great British Empire, paying cent per cent. with the people of the old land of that national debt which was contracted by our fathers as much as by theirs, and for our benefit as much as theirs; also our Army, Navy, and other charges general to the Empire, thus becoming a living, active member of that great people, who, in conjunction with our cousins (our brothers rather) across the line, are destined within the next fifty years to become *masters* of the world, at whose potent word the armies of Europe will dissolve like the baseless fabric of a vision, and all the horrible panoply of war sink into everlasting oblivion before the benign presence of smiling peace. Vide "Canada as she is and she might be."

EXTRACTS FROM A COMING PAMPHLET,

"CANADA AS SHE IS AND AS SHE MIGHT BE."

THE CANADA PACIFIC RAILWAY.

"So rampant and utterly unreasoning has party spirit become in this "Canada of ours" that no subject, however important, can be discussed with any chance of being judged on its own merits, and no man, however much he may deplore and abhor the same senseless and injurious partisanship, can escape the imputation of being actuated by party or selfish motives; it is, therefore, hardly to be wondered at that Canada has—on the Pacific Railway—become divided into two great camps—Tories and Liberals.

The Tories, almost to a man, declare that the Canada Pacific Railway shold be commenced at once and carried to completion as quickly as men and materials can do it; *not* because it is *wise* and *politic* to do so, or because it will be beneficial to the Dominion—for not one in fifty of the professional scribes who write so glibly about it has ever considered the subject sufficiently to have an intelligent idea of what he is writing or talking about—but simply because Sir John A. Macdonald promised to do it, and because they believe the other party don't intend to implement the promise—so very thoughtlessly made—consequently they see a chance to manufacture a little of that dirty, oftimes worthless and dishonorable stuff, called Political Capital.

The Liberals, on the other hand, declare their perfect willingness to build the road as soon as the engineers are in a position to do so; not because they believe it to be a wise and statesmanlike thing to do, but because the late government has bound the Dominion by a treaty which they feel bound to respect (the *real reason* being, however, that the leaders of the liberal party have for many years back been crying out for just such a road, and carefully educating the public to expect and demand it—indeed there can be no doubt that the present government and their party are responsible more than any other for the creation and spread of that miserable delusion, that nonsensical sentiment which called for and rendered possible our our confederation with British Columbia and the acquisition of the North-West, with all their attendant losses, dangers and expenditures—and now they are either not wise enough or strong enough to go back on themselves and frankly admit that their former advocacy of the above measures was a grave and most disastrous blunder, as it most unquestionably was."

"I wish it to be distinctly understood that all the arguments I have urged, or may urge against the folly of building a railway to the Pacific; our attempting to keep up communications with British Columbia and our enormously expensive attempts to colonize the North-West—resolve themselves into arguments against the railway system as a means of transit, and are of a purely physical, mechanical, and financial description.

For example: it must be admitted as a *fact* that no railway which we could or would build between Ontario and the Pacific could even, if working up to its full capacity—which presuppose a population of three millions—carry passengers between Toronto and Victoria in less than seven or eight days, nor for less than fifty or sixty dollars per head; nor could it transport freight between Montreal and Manitoba or *vice versa* for less than eighteen or twenty dollars per ton; it is therefore perfectly apparent that unless there is traffic sufficient in amount to give the road full employment at the rates named, that it must result in serious loss to the Dominion."

[OVER.]

THE CANADA PACIFIC RAILWAY—CONTINUED.

Again, it must be held as a *fact* that we could not build such a road under $40,000 a mile, or say, for the whole, $120,000,000, nor could we operate and maintain it at less than $4,000 per mile per annum; or say interest on first cost, $7,000,000, (a low estimate;) operating and maintaining, $10,000,000—in all, $17,000,000 per annum—that is a sum equal to the *entire income of* 60,000 *laborers*, or one-fourteenth of the *entire inhabitants* of the Dominion; in other words, to build, maintain, and operate the Canada Pacific Railway will—according to the calculation incomes made by our present Finance Minister—take at least five per cent. per annum of the *entire* income of the Dominion.

Now these are *fixed mechanical and financial facts;* facts which no amount of *talk*, supposition, or fancy pictures of future greatness can affect in any way, and they give rise to a series of very important questions: 1st, What extent of land would require to be cultivated along the line of road to give the necessary traffic, and what number of people would be necessary to do the cultivation, and how long would it take to find and place them there, calculating by past and present experience; 2nd, would it be profitable, or even possible to cultivate land at all, except for mere local consumption, along the line of the Canada Pacific? 3rd, if it be possible to cultivate land along the line of the Canada Pacific Railway, how much would the railway *add* to the value of the land per acre?

To answer each of these questions as fully and circumstantially as they should be answered, would take up altogether too much space, I will therefore only give the gist of the answer, and let each person fill up as their own common sense and information may supply the materials: 1st, then judged by the standard of the West and North-western States of the Union, there should be for each mile of railway not less than 15,000 acres *in farms*, or say, for the whole road, not less than 30,000,000 to 35,000,000 acres, which presupposes between 3,000,000 and 4,000,000 of inhabitants; 2nd, supposing it possible to farm for *export* purposes—which would be an absurb supposition—the cultivated land would be increased in value, according to the standard of Minnesota, $1.25 per acre; or, according to Wisconsin, Iowa, Missouri, or Kentucky, $2.15 per acre—(it is very important to keep in mind that the value of a railway to the farmer, etc., diminishes *rapidly* in proportion to its *length* from the Atlantic seaboard); 3rd, as to whether it would be possible to cultivate for export purposes on the line of the Canada Pacific Railway, it is only necessary to remark that the farmers of Iowa, Wisconsin, etc., *as a rule*, pay *three* bushels of grain to carry one bushel to market, while the railway carrying it, *as a rule*, makes *no profit;* 4th, as to the time it would take to find and transport to the North-West three or four millions of people, it is only necessary to recollect that it has taken nearly thirty years to add 800,000 to the population of the magnificent Province of Ontario, and that it was easier to find ten emigrants ten years ago than it is to find *one* to-day, and costs money in pretty much the same proportion, it may therefore be safely assumed, even by the most sanguine, that it would take between 80 and 100 years to find and settle on the line of the Canada Pacific Railway three or four millions of people.

But you tell me it is not so much the commercial as the *political* aspect of the road I should look at. My answer is, that I don't know any political necessity strong enough to justify the spending of *one-twentieth* of the entire income of the Dominion on a non-productive road. What, after all, does it matter to us what the few thousand people in the Pacific Province of the Dominion *think*, or what guarantee have we that, placed as they are and must remain, the building of the road would alter their opinions permanently. If the governments of this and the Mother Country consider the Pacific Province of sufficient value to justify the building of the Canada Pacific, their duty is very plain and easily carried out. I would simply inform the inhabitants of British Columbia, etc., that the Province is a part of the *Canadian Dominion* and of the *British Empire*, and consequently *belongs not to them*, but to the *whole* British people, and they must govern themselves accordingly; if the country don't suit them they can try another, but to imagine for a moment that they would be allowed to try any tricks such as secession, annexation, etc., is simply absurb; and I would most unquestionably put beyond the power of doing mischief the *first person* who would dare whisper dissent from my opinion; at the same time I would encourage and systematize emigration into British Columbia, taking care to send only *good and true men;* and I would assist them with no niggard hand when assistance was really needed, or likely to do good, until there was a respectable population in the Province of the Pacific, and then will be time enough to talk of building a railway.

GOUDIE'S
PERPETUAL SLEIGH ROAD.

FIG 1.

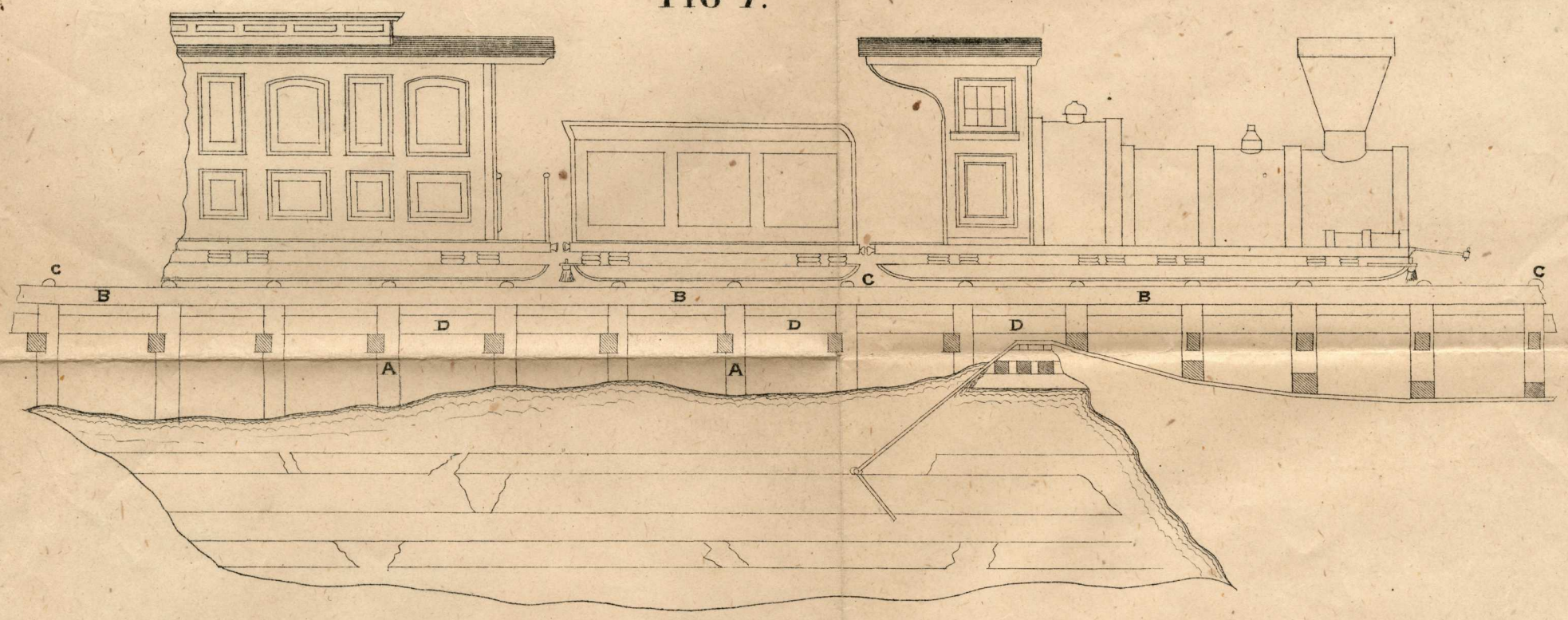
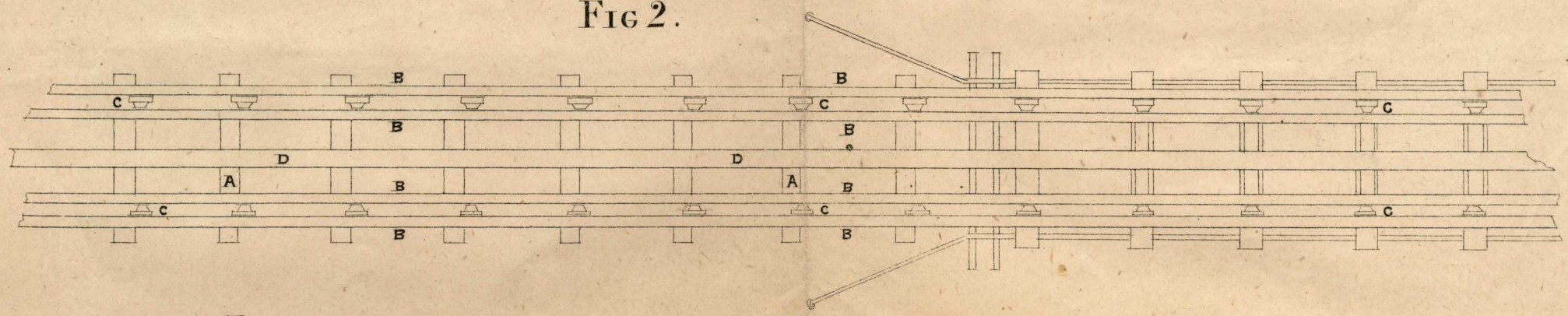


FIG 2.



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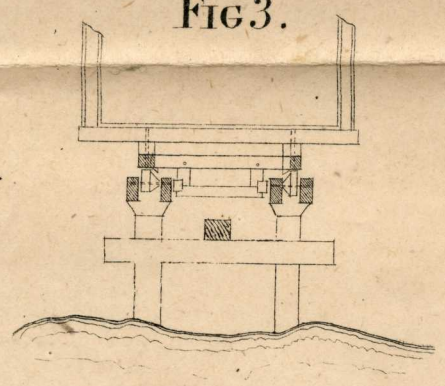

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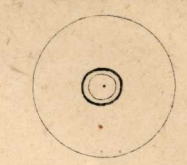
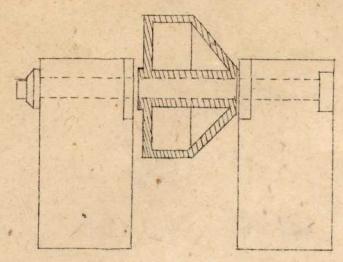


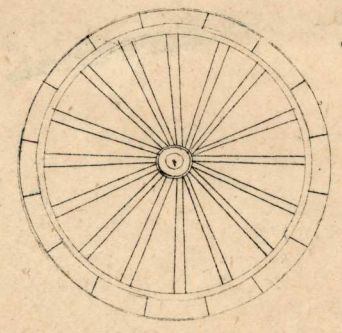
FIG 7.

FIG 4.



FOR DISCRIPTION
SEE PAGE 45.

FIG 6.



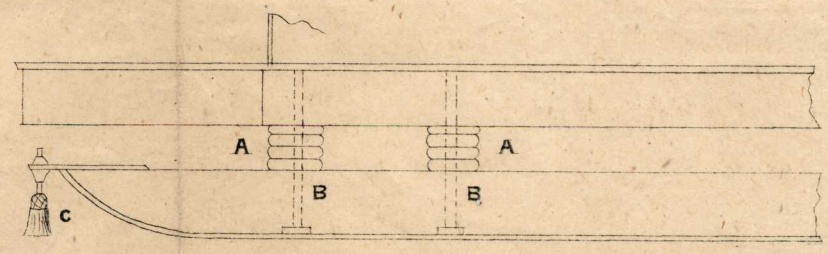


FIG 5.

R.H. Chidley & Co., Eng., 11 King St. West, Toronto.