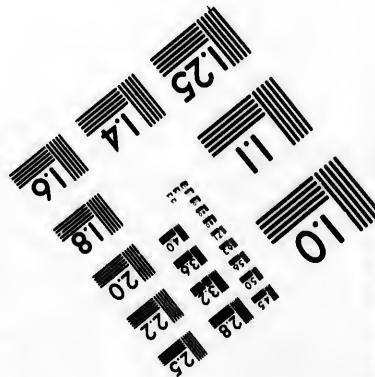
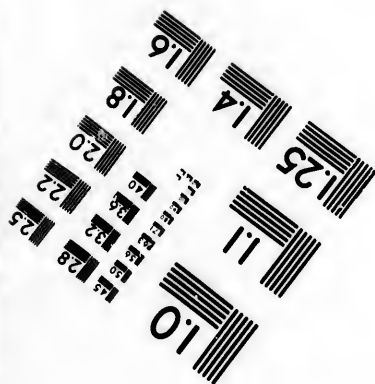
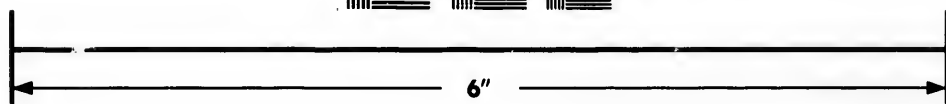
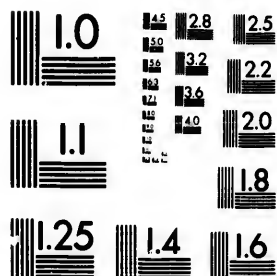


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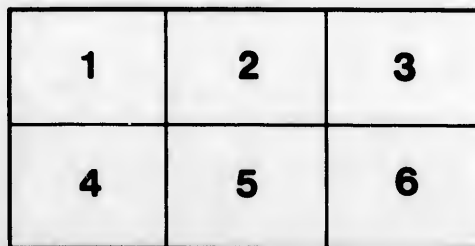
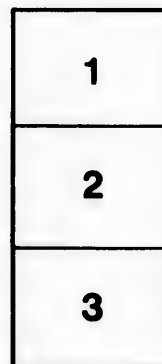
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REPORT

OF

CHARLES B. STUART,

CHIEF ENGINEER,

OF THE

LOCKPORT AND NIAGARA FALLS

RAIL-ROAD COMPANY,

TO THE

DIRECTORS.

SHOWING THE ESTIMATED COST, AND PROBABLE INCOME OF
THE ROAD, IF EXTENDED FROM LOCKPORT TO ROCHESTER.

JANUARY 1, 1846.

ROCHESTER :

PRINTED BY J. M. PATTERSON & CO., TALMAN BLOCK, FOURTH STORY:

1846.

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LOCKPORT AND ROCHESTER RAIL-ROAD COMPANY.

To the President and Directors of the Lockport and Niagara Falls Rail-Road Company.

GENTLEMEN—

In obedience to your instructions, I have carefully examined the route of the proposed extension of your road from Lockport to Rochester, and beg leave to submit to you some considerations, in reference to that continuation.

It is now some ten years, since the wants of the public seemed to point to the necessity of this work, but since the revival of the spirit of improvement in this country, new motives for its accomplishment have presented themselves, which now urge its immediate consummation. It is my purpose to present these motives in a brief view, which will serve to show the importance and value of this line, both to the stockholders, and to the community—as an investment, and as a public convenience.

There is now a line of Rail-Roads extending from Boston, to Rochester, a distance of four hundred and sixty-one miles, and another from Lockport to Niagara, a distance of twenty-two miles, (but which will be shortened two miles, the direct distance being but *sixteen* miles,) leaving only the space of fifty-six miles, between Lockport and Rochester, to be filled up, to open the shortest line from the Eastern Cities, to one of the greatest natural wonders of the world; as well as the most direct route from Boston to Detroit, and other places in the great west.

It is now known to the public, that the capital stock of

\$6,000,000, has been secured, to open a line of Rail-Road through Upper Canada, to connect with the work in actual progress across the centre of the state of Michigan,—thus joining the fertile lands of Michigan and Canada West, New England and New York, by a common band, extending through a space of nine hundred miles.

The road which you propose to make, must form a part of this continuous line, and great thoroughfare of travel; since it cannot be avoided, but by deflecting widely from the direct course, and encountering the inconvenience of a difficult, and sometimes impassable *ferry*, at the outlet of Lake Erie.

The location of your road is a most happy one. It matters not to what point the Western traveler, arriving at Rochester may be directed—whether it be for the Falls of Niagara; for Buffalo, for Canada, or any part of the Upper Lakes,—the road from Rochester to Lockport, which it is now intended to construct, will offer the most favorable, and the most expeditious route.

The distance from Rochester to Niagara, by this line will be seventy-six miles. The distance from Rochester to the Falls, by the way of Batavia, Attica and Buffalo, is ninety-seven miles, and the distance by the Packet Boat to Lockport and thence by Rail-Road to the Falls, is eighty-two miles. By the Steamboats, from Rochester to the Falls, via. Lake Ontario and Lewiston, the distance is one hundred and six miles.

It will readily be seen, that the existing routes to the Falls, are much longer than the proposed road, require much more time, and great additional expense, and are not at all adequate to the traveling community.

In going to the Falls from Rochester, via. Lockport, there will be a saving of twenty-one miles, when compared with the Attica and Buffalo route, besides avoiding the high grades and summits, near Batavia and Attica.

If Detroit or Canada West be the destination of the traveler, and the contemplated bridge across the Niagara River, be established at the narrowest and most appropriate

point ; or the *steam ferry* be used at that place, the saving of distance from Hamilton to Rochester, will be *twenty-four* miles, by taking the Lockport route. If it should be desirable to have a direct line to Buffalo, a road could be constructed nearly straight from Lockport, with no grades over *ten* feet to the mile, that would not exceed the route, via. Attica, more than *two* miles in distance, which would be more than compensated for, by the great difference in the *grades* on the Attica route ; while the distance from the proposed Ferry at Fort Eric, is no greater via. Lockport, than it is by Attica to Rochester. So that view the subject in what light we may, *this* is the true line of Western trade and travel, and possesses natural and physical advantages which are enjoyed by none other. [See Map, annexed.]

These positions are *facts*, and cannot be controverted. We pass therefore to the important enquiry, **WILL THIS LINE PAY?**

The traffic upon which its advocates justly count, are:—

1. The pleasure travel to the Falls of Niagara, either in going, or in returning.
2. A fair diversion of the Buffalo travel.
3. The way-traffic of the line.
4. The Canada travel, and that passing through Canada to the Western States.
5. The transportation of produce, merchandise, coal and iron, to and from the Great West and Canada.
6. The carrying of the United States Mail.

To estimate the amount and value of the traffic from all these sources, with any great degree of accuracy, would be impossible, but we may fairly assume that the aggregate travel, exclusive of that which will be brought by the Canada road, (at the low fare charged,) will not be less than the number of the through passengers that in 1844 passed over the Auburn and Syracuse Rail Road, viz: 80,000. The way passengers on this line will be equal to 60,000—which is 10,000 less than the way-travel on the Rochester and Auburn Rail Road in 1844. This large amount of anticipated way-

travel is here justified by the fact, that there is no part of the present line from Boston to Buffalo, which passes through a more productive, or more highly cultivated country, than that bordering the celebrated Ridge Road, or on which are found an equal number of flourishing places, as the villages of Brockport, Clarkson, Albion, Gaines, Medina, Hartland, Lockport, Lewiston, Niagara Falls, and other villages which are strung along the route of your road, embracing within a territory of thirty miles by eighty, a population of over 130,000. [See appendix, *Note A.*] And in assuming 80,000 for the number of through passengers, independently of the accession which will be gained from the completion of the Canada Railway, I am fully justified by the fact, that 50,000 have visited the Falls the last year, while there are portions of the present line between Albany and Rochester, that carry more than this number. [See appendix, *Note B.*]

When to this is added the rapid increase of the yearly pleasure travel to Niagara, being more than ten per cent. a year, and which will be largely augmented by the attraction of the Suspension Bridge, and the large and elegant hotels that are to be erected the coming season, it cannot be doubted that this increase of summer travel would be more than doubled, and would counterbalance any loss your road might sustain, by competing with rival routes for the Buffalo travel.

To these quantities must still be added the travel which must pass to and from Canada—that to which existence will be given by the simultaneous opening of the Great Western Railway—an enterprize to which it is believed, all the companies from the Niagara to the Hudson will be indebted for an increase of not less than 50,000 persons annually. [See appendix, *Note C.*]

In this estimate of business, I count nothing on the great and rapid increase of travel which has been experienced on the present line of Railways, and which is to be looked for in an augmented ratio, under the advancing prosperity of the region bordering on the Western Lakes.

During the past season of navigation, there has passed through Rochester nearly *one thousand* travelers per day, of which number more than one-half were carried on Canal Boats, at a charge as high as it is proposed to tax on your road. Estimating this travel on the Canal at five hundred per day for six months only, and it makes ninety thousand, of which number it would be safe to estimate fifty thousand as emigrants, who would undoubtedly pass over your road at *one and a quarter cents* a mile, as it will be admitted that this route will afford the western emigrant a rapid and cheap transportation; not only saving the expenses often incurred in waiting for a steamer at Buffalo, but it will enable him to arrive at his destination in the West in time to prepare the ground for a summer crop, and thus take the advantage of the first season at his new home.

We may justly, therefore, and with all moderation, base our calculations for this line, on its completion, and the completion of its great extension in Canada, on an aggregate traffic, equivalent to one hundred and thirty thousand through passengers, of the first class, and fifty thousand of the second class, and sixty thousand way passengers, at the *low rates* named in the estimate. If only *two-thirds* the number estimated should be transported over the road on its completion, a charge of three cents a mile for through passengers, (which is nearly twenty-five per cent. less than is now charged,) would make the sum I have estimated. But I have put the fare *low*, to avoid competition, and induce a large amount of business.

As this road is to be built with a heavy iron track, on very light grades, gradually descending to the east, and is allowed by its charter to carry freight, at *all* seasons of the year, without paying tribute or tolls to the State, and will, when completed, form an important link in the chain of uninterrupted Railways of nine hundred miles in length—it cannot be doubted for a moment, that it must always command a large and profitable freighting business. The completion of this

Rail-Road would insure the construction of an iron track from Rochester to Schenectada, which would enable the Central line of Railways to compete successfully with the present Erie Canal, for the Western transportation. [See appendix, *Note D.*]

The completion of the Railways already chartered, and in progress, to connect the Railways of Central and Western New York with those of Pennsylvania, will, it is thought, add largely to the amount of freight on your road. Add to this the large amount of Western produce, that would seek this route to an Eastern market, and the merchandize for the far West and Canada, that would be transported over it, even during the suspension of Canal and Lake navigation, and it would seem to be within safe bounds, to estimate the through freight, at not less than an average of one hundred and twenty tons a day each way, (about the load of *four* Canal Boats,) or in round numbers, at one hundred thousand tons a year, and the way freight at twenty-five tons annually. [See appendix, *Note E.*]

FINANCES.

The present capital of the company, which represents the amount that has been expended, on the part that is now in operation between Lockport and Niagara Falls, is	\$175,000
To which add the sum necessary to supply this line with an <i>edge</i> rail, re-grade parts of it, and finish it in the best style, say	175,000
Add to this again, the estimated cost of the road from Rochester to Lockport, [See estimate, <i>Note F.</i>]	1,025,000
And we obtain for the total investment for the completion of the whole line, from Niagara to Rochester, and supplied with Depots and furniture,	\$1,375,000
We may say in round numbers, <i>fourteen hundred thousand dollars.</i>	

PROBABLE INCOME.

In estimating the *revenue*, I shall assume a much lower rate of charge for transportation of passengers and freight, on the substantial road which it will be for your interest to build, than that which is now adopted on the existing lines. In this country, the results of experience abundantly show, that wherever it is an object to construct a Railway, it is to the last degree desirable to obtain a heavy rail. On numerous roads where the strap or light bar was originally laid, it has been replaced by one better adapted safely to permit rapid traveling, to sustain the severe shocks incident to a heavy trade, and to admit of constant and economical use; of such, the Columbia, Newcastle and Frenchtown, Baltimore and Ohio, and others might be referred to as instances. "It is believed that with a flat bar, your road would be wholly inadequate to the travel and transport which it ought, and if properly constructed, assuredly would command—that it would be unsafe for passengers, (at high rates of speed,) would be subject to enormous expense for repairs, and could not be economically used for the conveyance of tonnage—whereas, with a heavy iron rail, it would be competent to all its objects, could be worked with economy, would require but a moderate expense for repairs, and would be so much more productive and valuable, as to justify the additional expense necessary to purchase an *edge* rail of not less than *eighty* tons per mile. [See appendix, *Note G.*]

Two cents a mile for through passengers, or a charge of *one dollar and fifty cents* from Rochester to the Falls, (the present rate by Rail Roads, via Buffalo, is now \$3 25,) and *two and a half cents* a mile for way passengers, is believed to be ample for the liberal support of the company, if we have not over estimated the number.

ESTIMATE.

130,000 passengers, (first class cars,) \$1 50,	\$195,000
50,000 do. (second " ") \$1 00,	50,000
60,000 way passengers, (half way,) \$1 00,	60,000
100,000 tons through freight, \$1 00,	100,000
25,000 " way do. 60 cts.,	15,000
76 miles U. S. mail contract, \$150,	11,400

Total receipts,	\$431,400
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Deduct for actual expenses, (exclusive of <i>interest</i> on capital,) <i>one-third</i> the whole receipts, the av- erage of the Eastern Roads,	\$143,800
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Nett receipts,	\$287,600
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OR OVER TWENTY PER CENT on the whole capital of FOURTEEN HUNDRED THOUSAND DOLLARS!

That the estimate of one-third will be ample for the expenses of your road, it is only necessary to show, that the Utica and Schenectada Rail Road, seventy-eight miles in length, transported in 1844, nearly the amount of freight and passengers estimated on your road, (which were about the average for the last eight years,) at an expense of \$132,838, which is less than the amount estimated.

It will be seen that these roads being nearly equal in length, and the business equal, the expenses ought to be likewise equal, with this difference only, that the Utica and Schenectada Rail Road is laid with a slight strap, or flat bar, and yours is to be a substantial and durable iron track, which will make a difference of at least *fifty* per cent. in the cost of transportation.

But as it is my intention to avoid every chance of over estimating, the probable results, I shall take the estimate of *one-third* the receipts for the expenses of your road, and in my estimate of the number of passengers I have assumed for your road, on the completion of its connection, with those through Pennsylvania, Canada West and Michigan, no more than is *now* carried on some of the roads west of Albany, and at *half* the price charged on them.

As there may be doubts in the minds of some (although I have none,) as to the location of the Canada Rail Road at Niagara Falls, I will, to satisfy the most skeptical, deduct the 100,000 tons of freight and 100,000 through passengers, that it was estimated the Canada Road would create, and see what would be the probable value of the stock, should it only connect with the Buffalo Rail Road at Niagara Falls, and the branch Road to Lewiston, and we have for receipts, as follows:

80,000 through passengers, \$1 50,	\$140,000
60,000 way do \$1 00,	60,000
25,000 tons way freight, 60 cts.,	15,000
76 miles U. S. Mail, \$1 50,	11,400

Total receipts,	\$226,400
Deduct one-third for expenses,	75,466

Income,	\$150,934
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or ELEVEN per cent. on the capital, at the low price of *two* cents a mile for through passengers, and *two and a half* cents for way travel. Call this two and a half cents and three cents, and on the amount of business estimated, it would net *fifteen* per cent. stock, and this too without any travel from the Canada Road, and without building the Road from Lockport to Fort Erie, which Road would undoubtedly be made, if the Western Rail Road should by any possibility be located there. This route, as has been shown, would be only 77 miles from *Fort Erie* to Rochester, and on the natural *inclined* plane, to the Hudson, which would always give this line great advantage in competing for Western trade and travel with the Road via Attica.

In view of all these facts, I think no *impartial* or *discriminating* reader, will doubt, that this road will be (without the Canada connexion,) a secure and permanent *ten per cent stock*, and with that connexion a *fifteen* or *twenty per cent stock*.

The result in either of these cases, may appear extravagant to those who without informing themselves of the reasons why some roads pay dividends and others do not, reason and decide only from what they happen to know of some unfortu-

nate work, constructed at an expense largely disproportioned to its objects, located where, in the nature of things, it could command but a meagre amount of business, defective in strength, or other qualities requisite to economy and success in using it. But in such a case as is presented by this Road, there is no mode of estimate or calculation on such a route, located on the great thoroughfare from East to West, and bordered by a fertile country, and dense population, that will not justify all that need be claimed or presumed for it." [See appendix, *Note I.*]

The connection with the Canada Railway, at Niagara, will undoubtedly be made. Its practicability is demonstrable, and when completed, it will offer the means of obtaining the most feasible line for the travel of the Northwestern States, to and from the seaboard, and to the seat of our National Government. [See appendix, *Note J.*]

The only difficulty that could possibly be urged, that arising from the width and depth of the Niagara, cannot now be entertained. The Bridge is practicable; and we have now before us, the estimate and report of an experienced Engineer, and one entirely familiar with the subject, and an offer to build the work for the sum named in his estimate, (\$220,000) and submit it, on its completion, to a severe and satisfactory test of its strength. (See report, *Note K.*)

The "*right of way,*" usually a large item in the cost of Rail Roads, when made through a fertile and populous country, will on this road, be unusually small, probably not exceeding \$500 per mile. Considerable portions of the several lines surveyed, have already been released without charge, and from the interest manifested by the land-holders, further gratuitous cessions are anticipated.

I leave for a future examination and report, the question of the Batavia terminus, and also the comparative merits of the different lines surveyed for your road, between Lockport and Rochester.

Respectfully submitting these views,

I have the honor to be your obedient servant,

CHARLES B. STUART, *Chief Engineer.*

APPENDIX.

(NOTE A.)

The Rail Road from the Niagara Falls passes east to Rochester city, in the vicinity of the far famed Ridge Road and the Erie Canal, near the centre of the eastern portion of Niagara County, and through the centre of Orleans and Monroe Counties; varying from eight to twelve miles from Lake Ontario, and about the same distance from the southern lines of the three counties named, drawing to its lines the population of these counties, and if we include Rochester, it embraces a population of not less than *one hundred and thirty thousand*. The Canal and Ridge Road from Rochester to Lockport, are literally studded with villages, and the whole country is densely populated.

(NOTE B.)

The following table shewing the amount of travel on the line of Rail Roads between Albany and Buffalo, for the year 1844, is extracted from the official returns made by the several companies to the Legislature of the State of New York:

NAMES OF RAIL ROAD.	THROUGH PASSENGERS.	WAY.
Mohawk & Hudson, - - - -	132,685 - - -	<i>none.</i>
Utica & Schenectada, - - - -	101,215 - - -	60,634
Syracuse & Utica, - - - -	82,038 - - -	39,708
Auburn & Syracuse, - - - -	80,538 - - -	6,716
Auburn & Rochester, - - - -	50,512 - - -	70,857
Tonawanda Rail Road, - - - -	52,662 - - -	26,570
Attica & Buffalo, - - - -	64,646 - - -	9,303

Lockport and Niagara Falls, Lewiston to Buffalo, no returns, but amount to many thousands annually.

(NOTE C.)

The Great Western Rail Road through Canada West, if it terminate at *Niagara Falls*, will be a most important element in the passenger business of the Niagara Falls and Lockport Road, (extended to Rochester) as well as to all the roads east of that city. In speaking of this Canada Rail Road, it should be understood that it is to be built in the most substantial and durable manner with heavy *iron rails*, and no grades over twenty feet to the mile, and almost in a tangent line; so that its running time will not fall short of *thirty* miles an hour; making the time required to go from Detroit to the Falls not exceeding *eight* hours.

At Detroit, this Road meets the Michigan Central Rail Road, which terminates at St. Joseph's on Lake Michigan, sixty miles from Chicago. The distance by land, from St. Joseph's to Chicago, is about eighty miles and a charter has been obtained to construct a Rail Road over it—also to make a Rail Road to Galena, and another to St. Louis, on the Mississippi River.

But we will take the traveling inducements as they will be without those

Rail Roads. The population of Illinois is now about 700,000, Wisconsin 350,000. Iowa 300,000, Upper Missouri 300,000, Michigan 300,000, that portion of Indiana which comes to Michigan with produce, and in their transit to the Atlantic, say 250,000; making in all 2,200,000 of inhabitants, whose business habits and pursuits naturally lead them to the Atlantic. At least one-half of this population are emigrants from New York and New England where they have left their relatives behind them, and whom they would often visit if they could avoid the long and dangerous passage of the upper Lakes.

The Rail Road through Canada West, will pass through the most settled part of that Province, and draw to its lines a population of 250,000.

We will now see what portion of this population whose business tends to the northern Atlantic cities, would be likely to travel on the Canada Road. The direction of Illinois, Missouri, Iowa and most of Wisconsin, is to Chicago. From that point to St. Joseph's it is four or five hours steam boat travel. This would be their natural summer route. In winter they would travel round the head of the Lake, and be brought on the Central Rail Road, a little east of St. Joseph's, so that at all seasons of the year this would be the route, and it would bring them directly to the Canada Rail Road.

If a portion of the travelers east from Chicago would take the circuitous route of the Lakes 750 miles, instead of the direct route of 260 miles, they would nevertheless be brought to the same point, Detroit, ready to take the Canada Road. At Detroit then nearly the whole of the travel eastwardly is gathered. Two routes are offered during the season of navigation. One through Lake Erie, where a first class steamer (with no gale or other impediment,) will arrive at Buffalo in *thirty-six* hours; but in a gale or heavy head wind, besides the danger and sickness, detain them *forty-eight* hours more.

The other is to take the cars and reach Niagara for a certainty in *eight* hours, and at this point they will be as near Boston or New York as at Buffalo, or, in other words, reach either of those cities by the time the Lake passenger, if he has good luck, will be in Buffalo.

Who then can doubt, that when this road is completed, nearly all the travel from Detroit east will pass over it? As to the number that will pass through Detroit, we are, so far as relates to the future, left somewhat to conjecture. But the present has been ascertained. A committee appointed in Detroit, after careful investigation, last summer, reported that the number of travelers was about *twenty thousand* a month. Allow only six months for the traveling season, and the number would be *one hundred and twenty thousand*, two-thirds of which, it is thought, would go over the Canada Road. This number only includes the arrivals by Steamboats, and does not take into the account those who travel by Propellers and Sailing vessels, and who are known to be numerous.

These statements give some idea of what may be expected on the road from the Falls to Rochester, and the roads east, by reason of the construction of the Canada Road. When there shall be an Iron track from Boston to St. Joseph's, and the traveller can pass over it, at the rate of *thirty* miles an hour, and at *two* cents a mile, the travel will be more than doubled. It is not merely the people of the west that will pass on these roads, but New England and New York are constantly penetrating the west on business or pleasure. The traveler from New York to New Orleans, will find this route, as multitudes already do, with its present imperfections, far preferable to a coast passage or a stage passage through Georgia and Alabama. The average time in this direction will not, when completed, exceed *ten* days. The coast passage is on an average *twenty-five* days—the former pleasant, certain, and without danger, the latter uncertain, dangerous, and always unpleasant.

For at least half of the year navigation may be said to be closed on the western Lakes, and for that period the proposed Rail Road would be without a competitor, by forming a continuous line between Boston and St. Joseph's,

at all times of the year, and for this reason would no doubt completely change the season of traveling to one *uninterrupted* stream from one year's end to the other.

(NOTE D.)

EXPERIENCE, both in this country and in Europe, has demonstrated beyond all doubt, the *great superiority of Rail-Roads*, when compared with *Canals*, for the transportation of *freight and passengers*.

However hold this assertion may at the first glance appear to the many, who have not fully examined the subject, or may shock the prejudices of others, who are unwilling to admit the *fact*, I trust that little need be said at this day, of the capabilities and general utility of well constructed Rail-Roads over Canals, to convince any unprejudiced mind, that Rail-Roads must of necessity supersede them on all great thoroughfares, where cheap transportation, celerity of motion, and certainty of arrival, are always important; and in event of competition with *rival improvements*, absolutely necessary to command success.

"Instances are too frequent," says a late writer upon this subject, "within the last few years, of the complete triumph of Rail-Roads, where Canals have been as complete failures, to require much comment."

I am well aware that the success of the Erie Canal has induced numberless efforts of the kind, and awakened an almost enthusiastic zeal in favor of them throughout the country. The public were captivated by the brilliant results of this gigantic enterprise, not only in the amount of tolls, but also in the universal improvement in the value of landed property, which followed its completion. But in how few, very few, other cases, has *success* attended the opening of *Canals*? Even in this State, many of the Canals which have been made since the completion of the first great work, have been *failures*, and are now supported from the profits of the one first completed.

The great Canal from the Delaware River to Chesapeake Bay, has proved *unproductive* stock, and the Canal through the Dismal Swamp, is found to produce a very small dividend in tolls. Of the Canals made by the State of Pennsylvania, and the chartered Companies within its limits, scarcely one in ten are profitable stock, and its citizens are turning their attention to Rail-Roads, as a *substitute* for them.

The Farmington Canal has been destroyed by the Hartford and New Haven Rail-Road, and doomed to disappointment the buoyant hopes of its projectors, notwithstanding Clinton had said that it would be to New Haven what the Erie Canal has been to Albany, it is now abandoned, and the project is recommended for that Company to *draw off its useless waters*, and lay a Rail-Road upon its bottom, in order to turn it from a direct tax or loss to a certain profit.

The Camden & Amboy Rail-Road might also be noticed as an instance, where a road only sixty miles in length, with grades of *forty-five* feet per mile, and costing over *two millions* of dollars, has paid for itself in *seven years*, notwithstanding one of the finest Canals in the Union runs parallel to it, in dimensions the same as the "*Erie Enlargement*," admitting the passage of Steam Boats and vessels, which Canal has languished for want of patronage, having paid to the stockholders only *one per cent* per annum; while the Rail-Road has paid for *itself*, notwithstanding it is obliged to pay the State of New Jersey \$30,000 yearly, for the privilege of competing, as relates to *produce and merchandise*, with this Canal of DEEP CUT.

The Rail-Road from Philadelphia to New York carries *flour at twenty cents* per barrel, and the Western Rail-Road charges only *twenty-five cents* per barrel, from Albany to Boston—201 miles. The Superintendent of transportation on the Baltimore & Ohio Rail-Road, in his report, as far back as 1834, in speaking of the Western trade, says:—"This Company have now the benefit

of an experience derived from active and *uninterrupted* operations for a period of nearly three years, on a line of *sixty* miles in extent. The transportation that they have effected during the time has been of the most varied and general character, embracing commodities of the most cumbrous and ponderous description known in commerce; among them may be daily remarked, *blocks of granite weighing several tons each, logs of timber from fifty to seventy feet in length, machinery of the most unwieldy forms, considerable numbers of live stock,—as well as every imaginable variety of produce and merchandize;—* these may frequently all be seen on the Rail-Road, collected into a *single train*, and all moving with equal facility and dispatch. The question of the adaptation, therefore, of the Rail-Road system to the purpose of a general commerce, may certainly by the proof thus afforded, be considered as *settled*."

The views entertained in the report made in 1834, has been fully realized as it appears from the nineteenth annual report of the Directors of the Baltimore and Ohio Railroad, that during the *past* year the gross receipts for *freight and passengers*, on the main track of the road, were \$794,064,57 from which is to be deducted for all disbursements \$424,778,27, and there remained \$359,201,42 as the *net* receipts for the year.

The cost of transporting freight upon the railroad, does not exceed 12½ cts. per ton per mile, at a velocity of ten or twelve miles an hour, being a speed four to five times greater than is attainable upon a *canal* where boats are moved by animal power. The *tolls* for merchandize upon the Erie Canal amounts to more than the total cost of transportation upon this road.

Virginia caught the canal mania from the success of New York with the Erie Canal, and has expended nearly \$7,000,000 on the James River Canal, and \$12,000,000 on the Chesapeake and Ohio Canal and neither of these works have yielded any return for so large an outlay. It is now conceded, that a Central Railroad, through Virginia, will, with the aid of the Baltimore & Ohio Railroad, *supercede* both these Canals.

In fact, Railroads, not only answer all the purpose of Canals and Lakes, but they have the decided advantage of *speed, economy, and regularity*, and of being in operation during *all* seasons of the year.

In proof of these remarks, I give the following extract from the report and experience of J. Edgar Thompson, Chief Engineer of the Georgia Railroad.

"I can now state with confidence that wherever the transportation is of a mixed character, such as agricultural products, general merchandize, and passengers;—sufficiently large to justify the construction of a good road;—Railways will be found to be not only the most expeditious, but the *cheapest artificial medium of conveyance at present known*."

The earnings of this road for 1845, exceed those for 1844, \$40,026,75, being an increase of 12½ per cent. The number of bales of Cotton transported last year was 114,641 bales.

The people of New England, with their usual sagacity have arrived at this conclusion, and have constructed a Rail-Road from Boston to Albany, at an expense of not less than *eight millions* of dollars, to intercept the Great Western trade, and direct it from its natural channel, the Hudson River. To use the language of Gen. Dearborn, "Massachusetts has turned her eagle gaze westward. This link, (speaking of the Western Rail-Road) in the lengthened chain of intercommunication, unites the pier-heads of Boston harbor, and the port of St. Louis—the ocean with the Mississippi."

"Canals are not adapted to latitudes where they can be used from *six to seven* months in the year, and from the past experience of Massachusetts, she is not satisfied with the Canal system, especially since the late improvements in the Locomotive Engine, and the introduction of the *edge* rails, in the place of the *flat* bar, permits the transit of all kinds of freight at cheap rates, with speed and certainty at all seasons of the year.

In an able report of E. J. Johnson Esq., Civil Engineer, on the useful and

profitable adaptation of well constructed railways, to the conveyances of various descriptions of *freight*, submitted to the Legislature of this State in 1838, he says, "the superiority which Rail-Roads possess as a medium for the transit of passengers, gives them great advantage in the transportation of *freight*. Upon a road doing a large passenger business sufficient to maintain itself, and pay the interest on its cost, freight may be carried, if necessary, in the event of competition, at an expense, without loss, not exceeding the actual cost of transportation, independent of profit, or toll: or, if the conclusions above stated are correct, at a total cost, to the merchant or farmer, not exceeding *one and one third cent* per ton per mile. This is an important view of the subject, and will have a great bearing upon the future success of the Rail-Road."

The additional expense of accommodating an increased amount of business upon a Rail-Road, is confined principally to the transportation department, and not to the maintenance of way, the durability of which is effected, mainly by exposure to frost, floods, and natural decay, rather than by the severity of the service to which it may be subjected.

The present rates of transportation between Buffalo and Albany, (including tolls) is not less than *nine dollars* per ton, or *sixty cents* for a barrel of flour, and last fall the forwarders have received as high as one hundred and eighteen cents per barrel for flour to Albany from Buffalo, while the highest price charged on the Western Rail-Road from Albany to Boston, has been *thirty-three cents per barrel*. This shows the great want of an *Iron Rail-Road*, on the *direct* route from the Niagara to the Hudson to act as a *regulator*. The farmers of western New-York would have saved *one hundred dollars*, the last season, if such a road had been in operation, and allowed to carry *freight*. The time occupied by a canal boat, from Buffalo to Albany, is not less than *six days* of twenty-four hours each, without including the time consumed in loading and unloading the freight, and will carry on an average not more than *sixty tons*.— Now a Locomotive of fifteen tons, with *six drivers*, could transport with ease, on an edge rail of suitable dimensions, on the descending grades of the *direct* route, along the Erie Canal, *two hundred tons of freight*, at the rate of *ten miles* an hour, or thirty hours for the whole distance of three hundred miles from the Niagara to the Hudson River, including the necessary delays for fuel and water. The actual cost of making this trip would *not exceed one dollar per mile*, or three hundred dollars for the whole distance, including fuel, oil, wages of men, wear and tear of Locomotives and cars; being only *1 dollar and a half per ton* for the whole distance, add to this one hundred per cent for interest on cost of road, and then again another hundred per cent. for profits, and the aggregate will only be *four dollars and fifty cents per ton* for the whole distance, or *forty five cents a barrel for flour*. This estimate is not high, for it will be as easy for a Locomotive of fifteen tons to draw two hundred tons to the Hudson, having no grades over twenty feet in a mile, as it is now to draw a train of *eighty tons* (which they do daily) over the short curves and *eighty-four feet* grades of the Western Rail-Road.

"There was received in this city from Albany," says the Boston Daily Advertiser of 25th Nov. 1845, "by the Western Rail-Road, in the week ending, the 15th inst. 13,174 barrels of flour. In the week ending on Saturday last, the quantity received was 15,426 barrels, and the *three* first days of the present week, 10,845 barrels, making in *two and a half weeks*, 37,455. In the last, three days, the freight trains have contained an average of more than *one thousand barrels*, in addition to large quantities of other freight. About 3000 barrels of flour in addition to the above, were received at the depot in this city yesterday."

But if *one hundred and fifty tons* only is carried, still the cost of transportation will be only *two cents a ton per mile*, which is about equal to the *up tolls* alone on the Erie Canal. The Pottsville Rail Road is now carrying coal at less than *one cent a ton per mile*, and has conveyed the last year over *one million of tons* to Philadelphia. Experience in this country has shown that it

costs from sixty to eighty cents a mile on edge rails, to run *full trains*, and I have estimated *one dollar* per mile. But I will not stop to compare further the cost of Rail Road and Canal transportation. The contrast in favor of Rail Roads is very great, as will be obvious from what has been already shown, and cannot admit of a doubt when once fully examined, and candidly considered.

It is well known that our success with the Erie Canal served to stimulate Eastern enterprise. They were determined to share with New York, the great Western trade. In view of this object, they proposed a Canal to connect Boston with Lakes Champlain and Ontario, but were sagacious enough to abandon it. The triumphant success of the Liverpool & Manchester Rail-Way, in transporting large burthens of merchandise, produce, live stock, &c. &c.—turned their attention to this “better improvement of the day,”—and for the last ten years, as has been seen, the Capitol of New England has been directed, with *profit*, to Railways diverging from Boston.

Since the introduction of the “Rail-Road system,” a new era has dawned on that City, and her far-seeing citizens became convinced, that although she had no *rivers* like the Hudson, the Delaware, or the Susquehanna, to bring to her wharves the products of the boundless and fertile West, yet that an “*Iron pathway*” might be laid along her mountain gorges, over which a Steam Engine, with a train of cars, could move at the rate of ten, twenty, or thirty miles an hour, taking the produce of the Lakes at the outlet of the Erie Canal, and landing it at Boston in less time than it can be delivered in New York by the Hudson River.

To illustrate more fully the high estimation in which the “*Rail-Road system*” is held by the great mass of the people throughout the United States, and more particularly in the New England States, we need only to show the immense number of Rail-Roads that have been *constructed* within the last *fifteen years*, and which have paid, on the average, more than *seven per cent.* upon their cost, after deducting all expenses of repairs, renewals, management, &c. &c.

In the New England States alone, there are *now* in operation *twenty-six* Rail-Roads, with an aggregate length of *eight hundred and seventy-five* miles, costing *thirty-one millions, three hundred and seventy-seven thousand* dollars; of which sum *twenty-five millions, one hundred and thirty-seven thousand* dollars has been expended in Massachusetts alone.

There are in the State of New York, *twenty-one* Rail-Roads constructed, measuring in all *seven hundred* miles, at a cost of *nineteen millions, one hundred and sixty thousand* dollars; while there are in the remaining States of the Union, *forty-four* Rail-Roads in use, making in all *two thousand, five hundred and fifty-nine* miles, and costing the sum of *sixty-three millions, four hundred thousand* dollars; making in the total aggregate *ninety-one* Rail-Roads, *three thousand, one hundred and thirty-four* miles in length, and costing the enormous sum of *one hundred and thirteen millions, nine hundred and thirty-seven thousand* dollars. These Rail-Roads, as before stated, *net* not less than *seven per cent* on the *average*, which would give an annual income of nearly *EIGHT MILLIONS OF DOLLARS*.

The total length of all the lines *now chartered*, in part constructed, and soon to be completed, will not be less than *two thousand miles* in addition to the above, to which we may add the roads chartered but not yet commenced, but which undoubtedly will be within the next five years, amounting to not less than *one thousand miles* in length, and we have an aggregate in the year 1850 of over *six thousand* miles of Rail-Roads in the United States, at a cost of not less than *two hundred millions* of dollars.

Let this be compared with the amount expended in the construction of Canals, during the last fifteen years, (and which with the exception of the Erie Canal, have not paid an average of *one per cent.* on their cost) and the result will clearly show, that the “*Canal System*” is behind the spirit of the age.

In England they are turning their Canals into Railways; and the London Times for November, 1845, contains a complete list of all the Railways constructed, chartered, and projected, in Great Britain, up to the date of publication: from which it appears that the number completed and in use is forty-seven, costing £70,680,877, or about *three hundred and fifty-three millions of dollars*,—the number in the course of construction is *one hundred and eighteen*, or about *two thousand and nine hundred miles*, which are estimated to cost £67,359,325, or nearly *one hundred and ninety-two millions of dollars*. The number projected in addition to the foregoing, is 1,263!—of which 218 have paid a deposit of over 5 percent, amounting to £11,171,717; and to comply with the resolutions of the House of Lords, must pay a further amount of £9,594,464; and on 402 lines a deposit of 10 per cent is required and much of it is paid, and which if all paid, will amount to £38,366,109—making upon these 620 lines, an actual *deposit*, before they can be acted upon in Parliament, of £59,136,300, or about *two hundred and ninety-five millions of dollars!*

The *remaining* projects, 643 in number, have not registered their prospectuses, and have not therefore paid up the 10 per cent, on their estimated capital. The total number *made, chartered and projected*, is *one thousand, one hundred and twenty-eight*; and if, of the average length of those made and making, equal those already made, viz: *twenty-eight miles each*, will give *thirty-nine thousand, nine hundred and eighty-four miles of Rail-Roads in Great Britain*. “But of this amount,” says the Editor of the American Rail-Road Journal; “probably not more than *one-half* will be constructed within the next fifteen years, or about 1200 miles, at a cost of about £18,000,000 a year, and who will say that this cannot be done, if done in a regular business way, without interfering *at all* with the other business operations of that country?”

“The importance of the Railway system,” has brought numerous competitors into the field, and there are at this time many able minds engaged upon it; and from the advances already made, and the energy with which the investigations are prosecuted, we are led to believe that at no distant day, it will assume a very different position in the estimation even of those able and independent minds which make it a rule to admit nothing in the way of improvement until it is fully established by *experience*.

I am well aware that the views here taken will startle many, and that the facts I have set forth, can scarcely be believed by others, who have not given the subject the examination its importance would seem to demand. I know that “until within a very few years, Rail Roads have been considered as only supplementary to Canals, to be employed in short distances, or where the nature of the ground precluded the application of inland navigation. Accordingly while the attention of some of the most enterprising and highly gifted minds were turned to the consideration of inland water communications, the better adaptation of Rail Roads was overlooked and neglected. This country is now traversed by Canals intersecting each other; which affords inland navigation between many parts of this State and Union, for only *half or two-thirds* of the year. There can be no doubt *now*, that many of these Canals have been constructed where Rail Roads would have answered a better purpose, and could have been completed at less than *half* their cost. However well they may have answered the purpose for which they were originally designed, the “spirit of the age” indicates that the “*Canal system*” has been already extended as far as the wants of the community require. It is not probable that another Canal of any magnitude will ever be undertaken unless it is the enlargement of the Erie Canal, (which is on the great thoroughfare from West to East, and may sustain itself when *steam tugs* are used, in place of animal power,) and the Ship Canal around Niagara Falls.

I will close this note with the following description of the advantages of a Rail Road, when compared even with a navigable River, for transportation and travel, taken from the report of a “Joint Committee of the Legislature of Massachusetts,” made in 1840:

"Railways universally have created the means of their own sustenance, and have drawn to their trucks employment for their motive. If the beneficence of Providence had hollowed a channel from our coast to the Western Lakes, and poured the floods of those inland seas eastward to the ocean, the blessings would have been too great for sufficient gratitude, as they would have been beyond all computation. The river swelled by tributary streams from every valley would have scattered wealth along its course. For all *practical* purposes, the invention of art bestows *better advantages*, and furnishes communication more *easy and certain* than the bounty of nature could give. During the stern winter of our climate, the rivers are closed for a *third* of the year with ice; in summer they are exhausted for a nearly equal period, and their navigation is bounded by the hills that supply their fountains. The Railway is neither locked by cold, nor dried up by heat, nor confined by ridges. Stretching out its arms to every town and village, it may be extended beyond the highland barriers of water passage, and beyond the lakes, until its *iron bands* clasp together in a net work of improvement, overspreading the whole Union."

(NOTE E.)

It is a well known fact among all conversant with the subject, that Western produce, whenever practicable, seeks Northern or Eastern climates for a market. Flour is worth more on an average by *one dollar* a barrel in New York than in New Orleans. The difference in the value of corn is nearly double; pork, ham, butter and cheese vary in the two markets nearly as much as flour, and often much more. On the other hand, merchandise, with the exception of a few articles, comes from Northern climates in a much better condition than Southern. The channel for returning merchandise, it being less in bulk, will almost invariably be the same as that in which the products of the West are carried to the East or North.

Let us see what facilities will be afforded the Northwestern States to bring their products in this direction and over the Rail Roads from Detroit to Rochester.

The Central Rail Road of Michigan, runs through the center of that State to Lake Michigan, and is already the transit for the majority of their products and merchandise. Wisconsin lies on the west of Michigan Lake, and must take either the interior communication by Rail Road, or pass Detroit through that River.

A Canal is nearly completed, and will be navigable in one year, connecting Illinois River with Lake Michigan at Chicago. From the intersection of this Canal the Illinois is navigable for large steamboats to the Mississippi River and the Canal and River will take in their sweep, almost the entire business of Illinois, and connect with the Mississippi at a point most convenient for the trade of Iowa. It is nearly certain to command the principal business of St. Louis and the entire Upper Mississippi.

But this is only a limited view. There is scarce a doubt that a Railway already chartered, from St. Joseph, (the terminus of the Central Railway,) to the Mississippi at St. Louis, will in the course of a few years be completed, and another from Chicago to Galena. The Rail Road across Michigan is now of wood and strap iron structure. Thus it is with the Rail Roads in New York from Schenectada west to Lake Erie. Already the companies east of Syracuse are making an effectual movement to replace their frail structures, with a heavy edge rail. The Rail Road from Rochester to the Falls is also to be laid with a heavy iron rail, and the Road from Rochester to Syracuse must be built in the same manner, if the central line of Rail Roads expect to compete successfully either with the Erie Canal or the New York & Erie Road for western travel or transportation. An application is noticed for a charter to construct a Rail Road *direct* from Rochester to Syra-

case, via the Canal route, by which some *thirty* miles would be saved in distance, and high grades and elevations avoided, as no descending grades would be encountered, of over twenty feet to the mile, on this level route. The distance by this route, from the Niagara to the Hudson, just three hundred miles, and to New York four hundred and fifty miles, being *twenty miles less* than from Dunkirk to New York, by the N. Y. & E. Rail Road. The eastern capitalists, I am informed, have offered to purchase the Central Rail Road in Michigan, and lay down an edge rail, and the State must sell if it obeys the public voice. This would secure an *iron road* from Lake Michigan to Boston.

The directors of the Great Western Rail Road, in their report of August 6, 1845, say that, "the great and increasing trade of the Western country, with the seaboard, renders it a matter of the highest importance, nay, even of necessity, to establish a rapid, short, and uninterrupted communication between the two by Rail Road; and by an examination of the map, it will be seen, the route of the Great Western Rail Road (in Canada West) possesses advantages superior to that of any other for this purpose, from the fact that no other road to the northward of it can be made, unless it shall meet the interruption of water communication, which is closed for so large a portion of the year; neither can any road be made to the southward of it, without winding round the south shore of Lake Erie, and increasing the distance by at least *one hundred and twenty-five miles*. The business from the West is now carried on through Lake Erie, and gives employment to a vast quantity of shipping; but the navigation of the Lake is circuitous and dangerous, and for six months in the year rendered unavailable, from the harbors being frozen up, and the generally tempestuous and inclement state of the weather during the winter season."

From the report of the board of internal improvements to the Legislature of the State of Michigan, in December, 1844, it appears "that the number of passengers on the Central Rail Road of Michigan increased from 25,000 in 1841 to 62,000 in 1844, and that the yearly receipts for freight from 1841 to 1844, on the same road, increased from \$48,000 to \$138,000! The freight on the agriculture proper to the State of Michigan, increased during the same period, from \$33,000 to \$95,000 per annum; and as these are the products of a State yet in its infancy, it would not be unreasonable to anticipate a very large yearly augmentation, as the State becomes more thickly settled, and her resources more fully developed."

This Rail Road when in operation only to Marshall did this amount of business, and yielded *eight* per cent. on the investment. The length was one hundred and ten miles. It is now completed as far west as Kalamazoo, one hundred and forty-six miles from Detroit, leaving only fifty-four miles to extend it to St. Joseph. The extraordinary mineral wealth of the northern part of Michigan, and territories adjacent, which has been but recently discovered, is producing a great influx of population in that part of the State, the natural effect of which must be to increase the business on this great thoroughfare."

The late Report of a Committee in Elmira, N. Y., on the subject of the connection of the Rail Roads of Pennsylvania with those of Central and Western New York, states, that "the project of connecting the public works of New York with those of Pennsylvania, by means of a Rail Road from Elmira to Williamsport, has long occupied the attention of business men in both states. The formation of the country, presenting a valley of but very little acclivity from the heart of Western New York, to the centre of the coal and iron regions of Pennsylvania, is a circumstance so rare, occurring as it does in an otherwise rough and mountaneous country, as to force upon the traveler its peculiar appropriateness for the formation of a connecting link between the commerce and trade of these great and growing States. Charters have been obtained from Williamsport in Penn. to the Seneca Lake of

New York, the routes surveyed and the first *twenty-five* miles have been constructed and are in use, extending from Williamsport to Ballston on the Lycoming Creek. Sixty miles remains to be done to Seneca Lake, and thus connect with the canals and Rail Roads of Western and Central New York. The best quality of anthracite coal is now selling at Williamsport for *two* dollars per ton. The cost of transportation by Rail Roads and Lake, to Rochester, will not exceed *two* dollars a ton, and one dollar additional to Niagara River, making the total cost *five* dollars only per ton at Niagara. It is known that there is no anthracite coal in either of the Canadas; and when it is considered that this article, and also iron, are allowed to enter the British Provinces duty free, it must be apparent to all that a market will be opened there for these articles when they can be furnished at such low rates, where nearly as much of them can be disposed of as in Western New York. 'There is no superior *iron ore* to that of Ballston, in Pennsylvania.'

(NOTE F.)

1st. Estimate from Niagara to Lockport, 20 miles of superstructure and Edge Rail,	\$150,000
20 " " re-grading in places, say	25,000
	<hr/>
Total,	\$175,000.
2d. From Lockport to Rochester.	
56 miles grading and bridging, (per estimates.)	\$280,000
56 " Superstructure with <i>Edge</i> Rail,	420,000
Add for Branches and Switches,	10,000
" " Land Damages and Fencing,	75,000
" " Damage to Buildings, &c ,	25,000
" " Engineering and Contingencies,	50,000
	<hr/>
Total,	\$860,000
For 8 Locomotives, (8 wheel,)	\$60,000
" 20 First Class Cars, "	30,000
" 30 second Class Cars, "	20,000
" 8 Baggage Waggon, "	6,000
" 50 Freight do. "	24,000
" For Depots and Water Stations,	25,000
	<hr/>
	\$165,000
	<hr/>
Total amount,	\$1,025,000

(NOTE G.)

It is not perhaps generally understood that *economy in the construction and management* of Railways is a subject of as much interest to the community as to the proprietors. It enables the latter, without diminishing their *profits*, to *cheapen* both the cost of transporting freight and passengers. The profit of a Rail Road—and it is peculiar in this respect—depends much more upon the *quantity* of freight and travel on it, than upon a *high charge for transportation*. It has been ascertained by *experience*, that to a certain extent, a reduction of the cost of freight and travel, does stimulate to increase of receipts and of income. It is now known that a Locomotive, with power to convey *four hundred* passengers, (on grades not exceeding twenty feet to the mile,) can travel over a Rail Road at the cost of *one dollar* per mile, *all* expenses included, or a *quarter of a cent* to each passenger, provided the whole number could always be obtained. A Rail Road in a very populous country, may prove a profitable investment at the low rate of *one cent* a mile, and as there is scarcely any limit to the capacity of a Rail Road for transporting passengers, it fol-

lows of course, that a population sufficient in numbers and wealth to supply travelers, is all that is required to insure the success of a Rail Road, at a very low rate of fare.

To prove this, I give an extract from the official report on English Railways, made to the French Government by an agent, charged with the special duty of making a study of those Railways :

"The Darlington Railway has produced by its *low rates of passage and freight*, a complete revolution in the region of country which it traverses. It has increased the land from one hundred to two hundred per cent. By these low rates the freight has been increased from eighty thousand tons per annum to six hundred and forty thousand tons. The passengers estimated at four thousand, have been increased to two hundred thousand!"

From the report of the Irish Railway Commissioners, it appears that "Previous to the opening of the Railway between Liverpool and Manchester, there were about four hundred passengers per day, or one hundred and forty-six thousand per year, traveling between those places by coaches, whereas the present number by Railway alone, exceeds six hundred thousand a year!"

The passengers on the Dundee and Newtyle line exceeds, at this time, one hundred thousand annually, the number of persons who performed the same journey previous to the opening of the Railway having been four thousand only.

Between Schenectada and Utica, before the completion of that Railway, the number of travelers by stages and coaches, did not exceed fifty a day, or less than twenty thousand a year. The Packets and Line Boats carry as many now as then. The number of passengers transported over that Railway in 1845 was not less than one hundred and sixty-two thousand, at four cents a mile. The receipts of the Long Island Railway, (one of the principal routes between New York and Boston,) parallel to the Long Island Sound, from 1st of August, 1843, to 1st of June, 1844, were \$57,000; and from August, 1844, to June, 1845, they were \$228,000!! at about one cent per mile. The receipts show that it is very productive, notwithstanding it has to contend with the most vigorous competition of Rail Roads and Steamboats, carried on throughout the year.

The Pottsville Rail Road, in Pennsylvania, tried the experiment of *low freight*, and it has increased the tonnage from one hundred thousand, to nearly one million tons annually of coal and iron, and superseded the Canal along side of it. The Eastern Railway, in Massachusetts, boldly tried the experiment of *low fares*, and that too with complete success, and the ratio of increase has been vastly greater than on any other Rail Road leading into Boston.

Numerous other instances might be cited to prove the wonderful increase of travel upon all Railways that charge low rates of fare and freight, not only in England, but in this country. "Some of our best managed and most profitable Railways are those, which by a vigorous opposition, either by Stages, Steamboats, or Packet Boats, or by all, have been compelled to reduce their fare; and where the experiment entered into from compulsion, has proved finally to be the best and most judicious permanent policy."

I would not advocate the adoption of *low fares* upon all the Railways in this country, for in many portions the population would not sustain them; but I would contend that from two to three cents per mile should be the highest charge for passengers, and from one and a half to two and a half cents a ton per mile for freight, upon any of the Railways on the great thoroughfares of the Union.

For the satisfaction of those who are not aware of the great difference that exists between light and heavy rails, it may be useful and instructive to refer to the experience of others on this subject.

The heaviest wrought iron rails in use in England, prior to the construction of the Liverpool and Manchester Railway, weighed but twenty-eight pounds

to the yard, and proved to be much too light for general traffic, and unsafe for rapid travel. Rails weighing *thirty-five* pounds to the yard were then adopted, but these also proving insufficient, were removed, and others of *sixty-four* pounds were substituted, which still remain in use. Experience thus induced improvements in the construction, and in the increase in the weight of rails, until the vast strength of the forms now most approved, was attained.

The rails on the Midland Counties road	weighed	78	pounds	per	yard.
“ “ “ Eastern “ “	“	76	“	“	“
“ “ “ London Rail Road	“	75	“	“	“
“ “ “ North Eastern Counties road	“	69	“	“	“
“ “ “ “ Midland & the Manchester,	“	65	“	“	“
“ “ “ Great North of England road,	“	62	“	“	“
“ “ “ Great Western	“	56	“	“	“

Of these, one only is as light as that estimated for this road, and in that instance, as in ours, the rail has a continuous bearing on heavy longitudinal sills, (kyunised) connected by cross ties, framed into the upper surface, instead of being supported only on cross ties, laid at intervals of three to five feet, as is the case on most roads now in use. These sills, by giving to the iron a continuous bearing, contribute greatly to the strength and safety of the track. In many instances in Europe and this country, the rails that have been first laid down, proved too light, for the engines that were put upon them, in order to convey the immense loads that were offered, and which were much *greater* than were ever anticipated would be conveyed when these roads were constructed, and the consequence naturally was, they were not sufficient for the weight which they had to support, and as a necessary consequence, they *broke*. It is well known that engines of much greater weight are used on *all* the Railways now than were used a few years ago—they have increased from 8 tons to 16 and 24 ton engines—and this is required to accommodate the large increase of *freight and passengers*, and this is the cause of the rails having been, in most cases, *renewed* by adopting heavier ones. Instances have occurred in this country, where a *plate* rail was used for more than six years, with Engines in use upon it, of *eight* tons, and was at the end of that period in tolerable condition; yet, when heavier Engines and trains of another road were brought upon it temporarily, the rails of the road alluded to, were nearly *destroyed in nine months*. That such an effect might be anticipated, is obvious—and yet this rail *did not wear out* by fair usage, but was taxed beyond its capacity, and this is the case of many roads in this country. “The Railways of the present day, with the Engines now in use,” says a late writer, “are a very different thing from the Railways and Engines of 1825 and 1830; for example, in the conditions, stipulated by the directors of the Liverpool and Manchester Company, in 1829, when they offered a premium of £500 “for an Engine weighing *six tons*, capable of drawing on a level plane a train of carriages of a gross weight of 30 *tons*, including tender and water tank, 10 miles an hour.”

It was for such Engines and for such loads and velocity that the Rail Roads with the plate or flat bar (so numerous in this State) were intended, as well as all roads built in England previous to 1835. Would it be reasonable to decry railways as a means of transportation, because such a rail would not support an Engine of 20 tons with its load of 600 *tons* traveling *twenty* miles per hour? “With about as much propriety one might assert that the Erie Canal had not answered the purpose for which it was constructed, because it is to be thrown aside for another of greater capacity, for one capable of admitting the passage of larger boats.”

To show that actual *wear* of the heavy iron rail is trifling, I quote the following from Wood, as the wear of rails on the Stockton & Darlington Railway: “Malleable Iron Rails, 15 feet long, over which locomotives

passed, weighing from 8 to 11 tons, waggons and their loads 4 tons each.—
86,000 tons passed over it in a year, exclusive of Engines and waggons.

Weight of Rail, 1 cwt. 24½ lbs.

Loss of weight in twelve months, *eight oz.*

At page 288 of Pambour it will be found, that 600,000 tons, passed over the Liverpool and Manchester Railway in the space of 21 months, and had reduced the weight of the *rail* only 1-168 of its primitive weight; so that it would require more than a *hundred years* to reduce it to *half* its present strength."

The edge rail is now manufactured at Dansville, Pennsylvania, of as good quality as those imported from England, and sold at a less price than they can be imported. They have recently made edge rails of T form, weighing 51 pounds to the yard, for the Harrisburgh and Lancaster Rail Road for about \$75 per ton, which is less than is estimated for this road. This company are prepared to make contracts for large quantities, as will be seen by their advertisement, which states, that "*The Montour Iron Company, Danville, Penn., is prepared to execute orders for the heavy rail bars of any pattern now in use in this country or in Europe, and equal in every respect in point of quality.*"

(NOTE H.)

It is well known that the competition for the trade and travel between the northwestern States and the Atlantic coast, is now, and always will be, vigorous and active between the different channels. To the eastward of the Niagara River are the Erie Canal, 360 miles long, from Buffalo to Albany, (open for about *seven* months in the year,) and the line of flat bar roads, 325 miles in length, between the same cities. There is the Welland Canal, extending from Lake Erie to Ontario, (in Canada West,) which passes Steam Propellers and sailing vessels from the Upper Lakes to the Canal that unites Ontario with the Erie Canal at Syracuse, 35 miles long.

In addition to these channels, which are finished and in operation, there are others in different stages of progress, all having for their object the Western travel, and amongst which we may mention the New York & Erie Rail Road, leading from the city of New York to Dunkirk, on Lake Erie, distance 466 miles. A Rail Road from New York to Albany is chartered, 145 miles long, and another from Albany to the finished portion of the N. Y. & Erie Rail Road, at Goshen, in Orange county, 90 miles distant. A Rail Road is also chartered from Oswego to Syracuse, (parallel to the Canal,) which is thirty-six miles long. A Rail Road is now in operation from Niagara Falls to Lockport, and the continuation of the chartered one from the latter place to Rochester of 56 miles, will give a *direct* line from the Niagara frontier to the latter city. There is now a Rail Road from Buffalo city to Niagara Falls, and there is to be one constructed immediately, from the Niagara River to Detroit, and there to connect with the road now in use through the centre of Michigan. There will no doubt, in time, be a Rail Road connecting Buffalo with Dunkirk, Erie, Cleaveland, Sandusky, and Chicago.

There is now a Rail Road from Albany to Boston, and another about being built from Ogdensburgh to Boston, to take the trade of Lake Ontario and Lower Canada to that city. These rival routes show the importance of the great western trade and travel, and in this trial, at least, the *battle* will be to the *strong* and the *race* to the *swift*.

Now let us see which of *all* these routes will be the most *direct* and the most *expeditious* and *economical* for the western and eastern trade and travel. In the first place, we have shown in Note D that the Erie Canal cannot compete with a heavy *iron* road for freight or passengers; and in the next we state the distance from Detroit to New York city, via Dunkirk, taking Lake Erie and the New York and Erie Rail Road is one hundred miles farther

than the direct Rail Road route from Detroit to New York, via Niagara and Albany; while on the New York & Erie Rail Road there are continuous grades of *sixty feet* per mile, both going *east* and *west*; but on the direct route from Detroit to New York, there are no grades required (taking the straight route from Rochester to Syracuse) of over *twenty feet* per mile going *east*, and *thirty feet* going *west*. On the present lines of flat bar roads between Buffalo and Syracuse, via Attica, Rochester and Auburn, there are grades of *forty-five feet* per mile, going both east and west, and several very high elevations to overcome, while on the route from Rochester to the Falls, via Lockport, there is only sixty feet elevation, and this would be all were a Rail Road built from Lockport direct to Buffalo, while the present elevation on the existing Rail Road, from Rochester to Buffalo, is *three hundred and eighty-four feet* near Attica.

This then, must be the great main track from Buffalo or Niagara to the Hudson, passing through Lockport, avoiding the high grades and summits of the present lines, for it is unwise to locate the lines of great Rail Roads, having for their object the accommodation of millions, and the competition of rivals, over *high grades* and elevations, when comparatively level ones can be obtained, and consequently the most *level* and cheap route should be adopted, regardless of petty localities. It is well known that the present line of Rail Roads from Albany to Buffalo, were not made with the sole view of competing for the Western travel, much less the Western trade and freight. They were made for the accommodation of local towns, at a time when it was thought that Railways could never carry freight; consequently the grades and distances were not so important as when competing with the Erie Canal and rival roads for the Western produce.

They were made in detached sections, here and there a piece, running from one village to another, to suit the interest of the inhabitants, and they have answered the purpose for which they were constructed; but no one will say that they are built on the most *direct and feasible route* from Albany to Buffalo, or such a route as would *now* be selected by competent Engineers or sagacious capitalists, for the most *direct* and *cheap* Rail Road through Central New York.

Where there are competing lines of Railways, the question of *grades and elevations*, becomes of great importance, as it has been shown from satisfactory experiments, on various Roads, both in this country and Europe, that an inclination of *twenty feet* to the mile only, on a Road in good adjustment, requires for its ascent a power nearly *double*, and one *forty feet* per mile, a power *treble*, and one *sixty feet* per mile, a power *quadruple* that which is required to draw the same weight on a *level*, at the same velocity and on the same kind of road.

The following table will give a sufficiently correct view in round numbers, of the business load which a Locomotive, weighing *ten tons*, and working within her power, can carry at the average speed of *ten miles* per hour, on a permanent track with an *edge rail*. Heavier Engines would of course do more, and at *cheaper* rates.

Level,	80	Cars,	three tons each,	net is	240 tons.
10 ft.	60	do	" "	" "	180 "
20 "	50	do	" "	" "	150 "
30 "	40	do	" "	" "	120 "
40 "	30	do	" "	" "	90 "
50 "	25	do	" "	" "	75 "
60 "	20	do	" "	" "	60 "

Thus it will be seen that a Road with a maximum grade of *twenty feet* will allow 150 tons of freight to be carried over it at the *same price* that a road with *forty feet* grades will *ninety tons*, or one with *sixty feet* grades, *sixty tons*, with the slight additional expense of the wear and oil, for an additional number of *freight cars* only, as the cost of transportation, interest on capital, &c.

&c. is the same. It is therefore plain, that if the New York and Erie Rail Road can carry freight at *two cents a mile per ton*, the Rochester and Niagara Rail Road would make money at *one cent a ton per mile*, for one would carry *one hundred and fifty tons* to a train, with the same power that the other transported only *sixty tons*, allowing the *tracks* to be equal, and full loads offered.

Who can doubt then that the *direct* route from the Niagara to the Hudson, (when completed, as it soon will be,) will be the *great thoroughfare for Western trade and travel?*

(NOTE K.)

NIAGARA SUSPENSION BRIDGE.

PHILADELPHIA, NOV. 27, 1845.

To Geo. S. Tiffany, Esq., Chairman of the Great Western Rail Road Company, and Washington Hunt, Esq., President of the Niagara Falls and Lockport Railroad Company.

GENTLEMEN:—

The questions which have been put to me by the Chairman of the Great Western Rail Road Company, and by the President of the Niagara Falls and Lockport Railroad Company, in reference to the practicability, cost and security of a Railroad Bridge across the Niagara river below the Falls, to unite their works and remove the only interruption to a great line of intercourse, coinciding in all essential particulars, I have thought it well to reply to both parties in the same paper, so that one communication may cover all the important ground.

For this purpose I will repeat the questions of Mr. Tiffany, and in compliance with the concluding sentence of his letter, offer such other information in my reply, as may seem to be explanatory of the subject.

The following are the questions as submitted:

1. "Have you examined the Niagara river below the Falls, with a view to the construction of a Suspension Bridge?"
2. "If so, do you think it practicable?"
3. "How far would the proposed site be from the Falls?"
4. "Of what material would you advise the Bridge to be built?"
5. "What would it cost, and what time would it take to build it?"
5. "Can it be so constructed so as to be perfectly safe for Locomotives trailing 200 tons to pass over it with velocity, without putting the Bridge to the extent of its power?"

In reply to those questions, I have to say that I have examined several sites for a Bridge across Niagara river, commencing with a point above the Falls, on Goat Island, and passing thence to other places below the Falls, and in the neighborhood of Lewiston.

So far as regards the simple question of practicability, either of these might be selected, and a Bridge competent to all the duties of Railroad traffic, constructed with perfect security and success. But the position which appears to be most suitable, on account of the near approach of opposite cliffs, and of the favorable form of the ground for the fastening of the cables, and the entrance of the Railroads on either side, is about one and a half miles below the Falls; and I believe the lowest point on the east bank of the river from which the Cataract is visible.

This point is a short distance above the Whirlpool. The river is here 700 feet wide, measuring from rock to rock; but as the upper ledge of the lime stone rather overhangs the base, it is necessary to fall back, for the sake of security, and make the span of the Bridge about 750 feet.

The surface of the rock on the New York shore, is 210 feet above the Niagara. The material is of firm structure, and offers an unexceptionable foundation. The space to be spanned is entirely within safe limits.

The question of practicability admits of no discussion. The only points which it seems necessary to consider, are the probable cost of the work, and the value of the motives for its construction. Bridges of greater span have been erected and tested by ten years' use; and if the present objects require a work capable of sustaining heavier weights, or which must be subjected to rougher usage than those which have been made, it must be rendered proportionally stronger and securer. But while such considerations influence the cost, they cannot raise up a question of practicability.

The material which I would propose to employ is iron wire formed into cables of adequate strength, in the mode usually adopted for Suspension Bridges.

This is, in fact, the only material suitable for the purpose; and is recommended by its extreme tenacity, great security, and the additional motive of economy.

A wire cable 12 miles long might be made and suspended safely between the summits of mountains of which the height is five miles above the lowest point of the curve; and such a cable stretched between supports of 750 feet apart, and drawn to the tension usual in Suspension Bridges, will sustain first its own weight and then some twenty-five times its own weight in addition.

If a bridge of a given span be secure when used for the transportation of given weights over it, by doubling the number of cables and the strength of the flooring, it would sustain loads twice as heavy—and by trebling the quantity and strength of the material, we may treble or increase in the same proportion, the magnitude of its load.

The Bridge, which is the subject of this paper, is intended to have a single railway track in the centre, and two lateral ways for common travel, and two foot ways.

It will span the gorge of the river at a single sweep of 750 feet, and will be sustained on each side by columns of massive masonry, finely wrought, and built as firmly as the rock on which they rest.

The bridge will be supported by 20 cables of iron wire—10 on each side—each of which will be nearly 5 inches in diameter, 100 feet long, and weigh about 29 tons.

The weight of the pendant portion of the Bridge, when not loaded, will be from 600 to 700 tons. The strength of the material is calculated with a view to the possibility of loads of 400 tons being placed on the flooring. The greatest tension which the cables will ever have to resist, will be 2,300 tons. The absolute strength of the largest cables will be 500 tons, and the aggregate strength of the 20 main cables will be 9000 tons.

These supporting cables will be attached, at their extremities, to the solid rock by a process similar to that which I have adopted with satisfaction for the eastern fastening of the cables of the Fairmount Bridge. They will be sustained at the summits of the columns on moveable saddles, by means of which compensation may be obtained for the expansion and contraction of the material without producing any injurious action on the masonry.

I estimate the cost of this work—assuming that it is to be built for Railway purposes, and in the substantial style proposed—at \$220,000.

The time required to complete it will depend much on the season of the year when it is commenced. If the preliminary arrangements can be effected this winter, so that the work may be begun in early spring, it may be completed in the course of the year.

The next point for consideration is, will the objects to be subserved by the Bridge justify the necessary outlay?

The objects are the obtaining of the most direct route for the great line of Rail Road reaching from Lake Michigan to Boston—the saving of distance computed at 11 miles—the avoiding of transshipment and ferriage from Fort Erie to Buffalo—the saving of time at all seasons, and the prevention of a

total interruption of traffic consequent on the accumulation of ice at the head of the Niagara river in the winter.

To judge of the propriety of constructing a bridge, we must first form some estimate of the value of these considerations. For this purpose I will assume, that the length of the Great Western Rail Road, if it terminate on the Niagara River below the Falls, will be, as estimated, 11 miles shorter than if it is carried by Fort Erie and Buffalo.

We shall then have

1. The saving of the construction of 11 miles of road, the first cost of which, in the absence of actual surveys and authentic facts, may be estimated at \$20,000 a mile, and for 11 miles \$220,000.

2. The cost of maintaining and repairing 11 miles of road with single track—worth, on the average, \$600 a mile, or \$6,600 per annum, which is equivalent to a capital of \$110,000.

3. The cost of working 11 miles of road depends on the amount of trade and travel to be accommodated. The Western Road in Massachusetts, in 1844, carried an amount of tonnage equivalent to 71,000 tons transported over the whole length of the line. The Boston and Worcester Road the same year conveyed in all 126,000 tons. The Boston and Lowell Road 150,000, and the Baltimore and Ohio 103,000. The Southern Roads generally carry much less than these quantities; but viewing the location of the Great Western Road in Canada, and the fertile country which it is said to pass through, I think it not unreasonable to assume that its trade will be at least 50,000 tons per annum.

The cost of transporting freight on the best managed roads of this country—as well as on those of Great Britain and Europe—is about two cents per ton per mile.

50,000 tons carried 11 miles at two cents, is \$11,000 per annum, which is equivalent to a capital of \$183,333.

4. The cost of conveying passengers will depend also on the number to be conveyed. But I think we may safely assume that there will be two daily trains each way, at a cost per mile run of 50 cents, over and above the road repairs.

Four daily trains running 11 miles at 50 cents each per mile, will give \$22 per diem, and for 300 days, \$6,600, which is equivalent to a capital of \$110,000.

5. The cost of running a ferry boat on a ferry two and a half miles in length, with the necessary shore fixtures, cannot be set down at less than \$30 a day, or \$9,000 per annum—which is equivalent to a capital of \$150,000

6. The expense of transshipping goods, in addition to the maintenance of a ferry boat, will be equal to 20 cents a ton on all goods conveyed. On 50,000 tons it will be \$10,000 per annum, which is equivalent to a further capital of \$166,666.

7. The loss arising from the total interruption of the trade and travel in the winter, when this ferry will be impassible, will be a very heavy item, though one which I am not prepared to estimate. I have no correct data for determining the probable amount of interruption which will arise from this cause; but it is fair to assume that the Great Western Road will earn six per cent. on a capital of \$5,000,000, clear of all the expenses of the line.

Leaving out of view entirely the loss which will be increased by the roads on the east side of the Niagara, any interruption to the Canadian improvement alone will be equal to a sacrifice of \$300,000 per annum, or to a loss of \$1000 for each working day. Each day of total interruption, at a season of the year when there is no competition, will involve a loss of \$1000; and as the abstraction of this day's earnings is a thing of annual occurrence, it may be represented by an equivalent capital of \$16,666.

If it should appear on a close inquiry that a dependence on a ferry at the head of the Niagara will result in a total stoppage of the trade of the Great

Western Road for 30 days in the year, then it would seem to be good policy to expend, for the purpose of removing the evil:

For each day, \$16,666; for 30 days, \$500,000.

These are the leading items—and the only ones I believe which we are able to estimate with any reasonable degree of approximation—of the objections to the adoption of a ferry and the construction of the longer line of road.

It is not pretended that any of these quantities can lay much claim to accuracy; yet I am inclined to believe that if you will examine the several items separately and closely, they are more likely to appear under, than over valued.

Taking them, however, as they result, we have,

1. The cost of 11 miles of road,	\$220,000
2. Repairs and maintenance of 11 miles of road,	110,000
3. Cost of carrying 50,000 tons over 11 miles of road annually, equivalent to a capital of	189,333
4. Carrying passengers 11 miles,	110,000
5. Maintaining and running a ferry boat,	150,000
6. Transhipment of tonnage, and depot expenses,	166,666

* Equivalent total capital, \$940,000

If the data which I have assumed, be correct—if there be as estimated, a difference of 11 miles of distance in favor of the route by the Falls, which obviates the necessity of a ferry and of all delay and of transhipment—that route will be worth to the Great Western Company some \$940,000 more than the other without including at all the loss consequent on the total suspension of traffic which may be occasioned by the ice which accumulates at the outlet of Lake Erie.

If this intermission amount to 10 days in a year, it is equivalent to an additional capital of \$166,000: and if it amount to 30 days, it would justify an outlay of \$500,000 to remove it.

I will leave this item for others, more conversant with the navigation of the Lake, to estimate. It is enough at present to know that there is such an interruption, and that it will not only amount to many days in the year, but that even when it does not amount to a total stoppage of the traffic, it is still sufficient to produce great delay and serious embarrassment.

This obstruction is in fact so great that even for the convenience of parties seeking to reach Buffalo, it would be better to cross on a bridge at the Falls, and avoid the ferry, than to submit to its exposure and delay.

The profits of the Rail Road from the Falls to Buffalo, will therefore be greatly promoted by the construction of the Bridge.

The cost of a Bridge such as I have described, and which will remove these impediments to trade and travel, both on the Canadian and American lines of improvement, will be, as stated, \$220,000.

The structure itself will be a beautiful and durable object, and the investment a great deal better and more profitable than that of any Rail Road line now in use on this continent.

I will make no specific estimate of the probable value of the stock. To yourselves, as the head of the two lines of Railway most immediately inter-

* The Engineer has here been misinformed as to the difference in the distance from Hamilton to the Falls and to Fort Erie opposite Buffalo. From Hamilton to the Falls, by way of the Rail Road will be 40 miles, and from the same place to Fort Erie, 56 miles; difference 16 miles. Adopting then the Engineer's rates for 16 instead of 11 miles, it would be as follows:

1. Cost of 16 miles of Road,	\$320,000
2. Repairs and maintenance of 16 miles road equivalent to a capital of	160,000
3. Cost to carry 50,000 tons of freight over 16 miles road equivalent to a capital of	266,663
4. Carrying passengers 16 miles equivalent to a capital of	160,000
5. Maintaining and running ferry boat,	150,000
6. Transhipment of tonnage and Depot expenses,	166,666

Equivalent total capital,

\$1,223,332

ested in the consummation of the work, these are considerations more important than the dividends that may be anticipated.

I have endeavored to submit these considerations for your reflection, in the belief that you will have confidence enough in the enterprise to carry it through, and gain to your respective companies and the public the benefits of the advantages which it holds out.

For further explanations and calculations respecting the construction and equilibrium of such bridges, I must refer you to the printed documents accompanying this paper, in which I have entered into all necessary detail.

Finally, in reply to the inquiry as to the ability of the bridge to sustain the weight of a locomotive engine drawing a train of 200 tons, at high velocity, I have to say that I am prepared to construct the work for the sum at which I estimate its cost—to complete it within the year 1846—and to test its strength by running a locomotive engine drawing 200 tons as often over it as may be desired, and at the highest speed that the engine can attain.

Submitting these remarks for your consideration,

I am, Gentlemen,

Respectfully your obedient servant,

CHARLES ELLET, JR., Civil Engineer.

P. S. Since closing this communication I have received a letter from a gentleman who takes much interest in the enterprise, desiring to know for how much less the bridge might be built if it were made with a view to pass Rail Road cars drawn over by horses, or carried over by the velocity which the Engine had previously communicated to the train, without subjecting it to the concentrated weight of the Locomotive.

This modification of the plan might be adopted, if it were thought advisable, with a saving in the first cost of about \$30,000—reducing the whole expense to \$190,000.

This change would not interfere with the further additions by which the bridge would be fitted for the use of Locomotives, if it should ever be found desirable to bring the Engine of the Provincial Road upon this side.

CHARLES ELLET, JR.

At the proposed site of the Suspension Bridge over the Niagara River, about one mile below the Falls, a new and wide carriage road, with easy grades, and protection walls, has been made the last year, on the *American shore*, from the high banks (near Bellevue Mineral Spring) to the river, by the "*Niagara Falls Ferry Association*," at an expense of several thousand dollars, and there is now a large and splendid *Steam Ferry Boat*, being built by this company, with deck room for *twelve carriages and two hundred passengers* at a time, and a double set of *Steam Engines* of great power, so as to render the boat perfectly *safe* from accident.

This company are about constructing a carriage road of equal extent on the opposite shore, immediately opposite, and intend to have the steamer ply directly *across* the Niagara river—which is, at the foot of these roads, only *one thousand feet* in width, and as low down as this, is *never* obstructed by ice, so as to prevent navigation—although at the *foot* of the cataract, the ice frequently piles up in large masses, and remains lodged for some time, interfering at times with the row boat ferry at that point. But at this point the river is quite narrow, and the *under* current is rapid, and takes off the ice, (which becomes heavy and sinks after laying some time at the foot of the falls, in the large basin there,) while the *surface* of the water above the rapids will be *entirely* free from ice of any thickness or size. The river at that point has been closed against *row boats* only *twice* in 17 years, as I am informed by those residing there. This ferry, so much and so long needed at Niagara Falls, will doubtless add much to the attraction of the place, as it will enable visitors to

visit both sides of the river in carriages, instead of the fatigue of ascending and descending the steps on the banks. Even if the bridge should be delayed a year or two, (on account of the *war panic*) the passengers, baggage and freight from the Western Rail Road could be transmitted from one side to the other with much more expedition and safety than at the *two mile ferry* at Buffalo, and also save the fierce *competition* with *Steamboats* at that city for *Detroit passengers*.

"GREAT WESTERN RAIL ROAD.—The Survey of this Road was commenced last week by two parties under the direction of H. Strange and Wm. Hale, Esqrs., civil engineers. Mr. Strange commenced on the shore of the Bay at the foot of John street, and is to gain the summit level of the mountain in an easterly direction, and thence proceed to Fort Erie, opposite Buffalo, and also to the Falls, or the proposed site of the suspension bridge. We understand another line is also to run in an easterly direction, and to make the ascent at or near St. Catharines. Mr. Hale commences his survey at Land's wharf, and is to gain the summit of the mountain in a Westerly direction with a view of continuing to Windsor on the Detroit River.

We understand that other surveying parties will be put upon other portions of the line shortly. The Directors are adopting the most energetic measures to have the work completed in the shortest period."—*Hamilton Gazette*.

