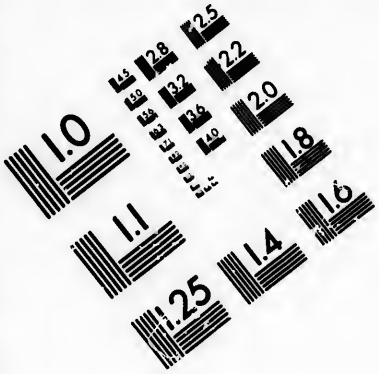

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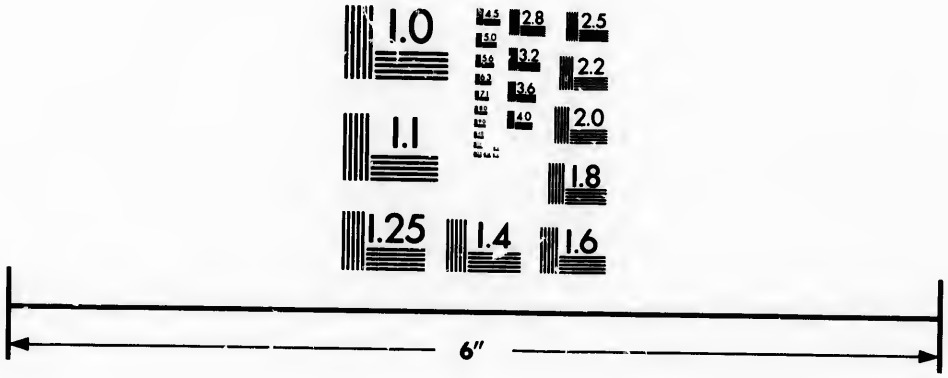

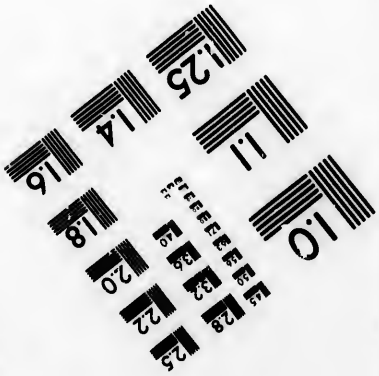

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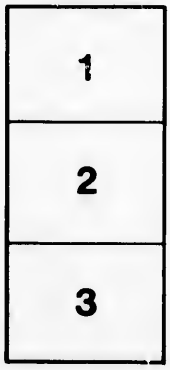

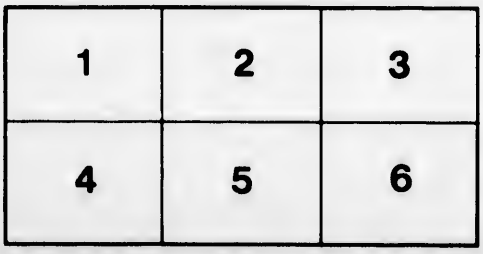

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THE

PACIFIC RAILWAY,

AND

THE CLAIMS OF SAINT JOHN, NEW BRUNSWICK,

TO BE THE

ATLANTIC TERMINUS.

READ BEFORE THE MECHANICS' INSTITUTE OF SAINT JOHN.

FEBRUARY 7, 1859.

BY T. T. VERNON SMITH, C. E.

Published at the request of the President and Directors.

SAINT JOHN, N. B:

PRINTED BY WILLIAM L. AVERY, 25 PRINCE WM. STREET.

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PACIFIC RAILWAY.

MR. PRESIDENT, LADIES AND GENTLEMEN,

Roads, Railways and Canals, the channels through which the principal movement of a country is conducted, have been classified by economists into three varieties, to indicate the objects sought, and the results to be expected from their construction. The Russian, English and American Railways afford illustrations of the military, commercial and territorial systems, and though each nation presents examples of roads not exclusively of one character, yet in the majority of lines in these countries the intention is sufficiently evident. In Russia, and to some extent in France also, the Railway system will be when complete a vast military engine, to maintain constant and rapid communication between head quarters and the distant out-posts, to enforce the will and energy of the one central mind on the threatened frontier, or it may be to concentrate the guards of each scattered station for the defence or controul of the imperial capital itself. In England, Railways are merely the media of commerce, the veins and arteries of a constantly expanding traffic, continually demanding additional facilities, closer connection and more frequent communication. Purely commercial, they are the offspring of a trading capital, ready to invest in any legitimate enterprise that promises a fair return on the outlay. In America, land speculations and territorial considerations have been at least an important, if not sometimes the principal advantage to be derived; and the development of the country, the enhancement of price of the contiguous property, and the opening up and settlement of the wilderness have contributed two-thirds of the mileage of the Railways on this continent.

The different purposes for which Railways are constructed, the military, commercial or territorial results they are intended to accomplish, ough tto impart a marked character upon the works themselves, both in general outline and in minor details; and failures and miscalculations have arisen generally, more from a want of appreciation of the object sought to be obtained than from anything else. As a general rule, military works, whether canals, railways, steam frigates, or stone fortifications, belong to that class of necessary, but

non-remunerative expenditure that dove-tails in very imperfectly with commercial pursuits, and the "military considerations" that established the route of the Ottawa and Rideau Canals in Canada, rendered them all but commercially useless. The character of a commercial Railway, on the other hand, the necessity of seeking the centres of industrial development, and following the beaten track of trade, the purposes of which it subserves by more permanent and elaborate mechanical appliances, varies widely from the rough and ready application of the same principles to a thoroughfare intended merely to open up a new area for settlement, and to afford a cheap and speedy outlet for the productions of the district. The same design might be useless extravagance for the one, and niggardly mistaken economy for the other; and the outlay that would raise the price of the land above its market value, might be totally insufficient to deviate the stream of traffic from its accustomed channel, or contribute one atom to the commercial resources of the country.

The first design of the Pacific Railway, extending from the Atlantic to the Pacific Ocean, across the Continent of America, had for its object the territorial advantage only of opening up a belt of land shut out from cultivation by its distance from navigable water, and from the markets of the Eastern States. Ever since the settlement of Oregon, and before the cession of California to the Federal Government, Mr. Whitney laboured at this gigantic immigration scheme with a zeal and perseverance worthy of a better reward. Unlike most modern Railway projectors, Mr. Whitney asked from the public no capital; a belt of land thirty miles wide was the only requirement, and the 20,000 acres per mile thrown into the market was expected to pay for the construction of the road. The subsequent acquisition of California became another and a powerful inducement to its construction; the political and commercial ascendancy of the Union was seen to be identified with the land project; and the line became a national link to connect the new with the older States—to give a Pacific frontage to the former possessions, and to open a new field to enterprize and ambition.

Ceded as late as 1848, California presented itself to the Federal Government as a desirable acquisition from its supposed command of the Pacific trade. "The number of our whale ships alone in that sea," said the Presidential message, "exceeds 700, with 20,000 seamen, and a capital of forty

million dollars invested in that branch of business alone. By the possession of California we are brought into immediate proximity with the west coast of America from Cape Horn to the Russian boundary, and by a voyage of thirty days, we shall be in direct communication with Canton and the ports of China." Simultaneously with the closing of the agreement for the cession of the district, gold in quantity was accidentally discovered, the newly acquired territory assumed an unexpected importance, and within four months from the ratification of the treaty between the United States and the Mexican Government, 6000 gold diggers were at work, and $600,000 worth of gold dust had been collected. The impetus given to immigration and travel by the continued success of these mines lead to the proposition, almost immediately, of no less than three lines of Railroad across the Continent to communicate with the new El Dorado. Only one of these has been as yet really commenced, and in ten years the Pacific Railroad, so called, has been opened about one hundred and fifty miles only, westward from St. Louis. Much discussion has taken place, and immense influence been brought to bear upon the Government, by the partizans of the rival routes, but that the St. Louis line will ultimately be the choice of Congress has been lately indicated by the establishment of a semi-weekly mail, and arrangements for the settlement of stations, at every ten or fifteen miles of the distance between St. Louis and San Francisco.

Since 1848, when the mineral wealth of the Pacific coast first attracted attention, a series of explorations and surveys have been undertaken by the United States Government to determine the best direction and most feasible course for this Railway, the construction of which has now become a national want that each succeeding year renders more important, for the political, commercial and social well-being of the whole community. These researches have so far had an opposite tendency to what was expected, and have developed physical difficulties to be overcome, and natural obstacles so insurmountable by any ordinary appliances, that the Pacific Railway, if ever completed on United States territory, must be the slow elaboration of years, and constructed at an expense not at all commensurate with any commercial advantage to be gained, or any value to be imparted by the belt of land to be intersected.

The continent of North America is traversed in a North and South direction by two extensive mountain ranges, which following the general direction of the Atlantic and Pacific

coasts diverge from each other as they proceed northward, leaving between them an immense and fertile valley, containing over three million square miles of territory, and including nine-tenths of all the really valuable land, either in the United States or British possessions. This valley comprises three basins or areas watered by the Mississippi and its tributaries on the South, the St. Lawrence in the middle, and the Saskatchawan to the North—the water-shed or swell of land dividing these basins scarcely averaging three hundred feet above the ordinary elevation of the Great Valley itself. Of these three large tracks of valuable land, the North-Western section watered by the Saskatchawan, Assiniboine, and the Red River of the North, all flowing into Lake Winnipeg,—an inland sea as large as Lake Erie, and equally capable of supporting a busy population—has been until lately comparatively unknown and undervalued, and recent investigations have shewn that through this district the only passable route for a Pacific Railway can be expected.

The Eastern range of mountains dividing the Great Valley from the Atlantic, the Apalachian or Alleghany system are unbroken in the whole length of their course, except in one place, where the Hudson River deeply cuts them to their base, and affords a natural outlet from the West, which our neighbours have admirably improved by the construction of the Erie and Champlain Canals, and the New York Central Railway. The Rocky Mountains on the West are unbroken through the whole length of the range from Mexico to the Arctic circle, and it is with this extensive mountain system that the great difficulties of the Pacific Railway must be encountered, and the physical features of which must determine the ultimate route to be adopted. These difficulties will be the best appreciated by a brief comparison of the works already executed on the Alleghanies, with those necessary to overcome the far more gigantic steeps of the Rocky mountain range. The swell of land or water-shed of the Alleghanies has an average elevation of 3000 feet, although many of the ridges and peaks based upon it are very much higher, rising in some places to 6000 feet. The most difficult and expensive works on the Railways of the United States have been encountered in crossing this chain of hills, an obstacle which any line from the Atlantic to the Mississippi Valley, south of Albany, must surmount. The New York and Erie Road rises from tide-water by gradients several miles in extent, of one in eighty-eight or sixty feet per mile

to an elevation of 1,760 feet above the sea, overcoming altogether four summits by a total rise and fall of 8,056 feet, equivalent in mechanical power to raising and lowering every train one and a half miles of vertical elevation, in the round trip between New York and Buffalo. The Pennsylvania Central passes its principal summit 2,121 feet in height, by a tunnel three-fourths of a mile long, approached from the East by gradients averaging for twelve miles, over ninety-four feet per mile. The summit of the Baltimore and Ohio Railroad is over half a mile vertically above the sea, in a tunnel nearly a mile long, with thirty miles of gradients, varying from one in forty-three to one in fifty-six. This line has fifteen tunnels, together about two and a half miles long, the execution of which entailed a frightful expense. Four other Railways pierce the Alleghanies, their summits varying from 2,200 to 2,800 feet, by tunnels of from one quarter to one and a quarter miles long, all of them approached by heavy, if not dangerous gradients, and constructed at an enormous outlay. Besides these executed works the State of Pennsylvania sunk £8,000,000 sterling, and suffered a still more serious loss in national credit, in the construction of an unfinished water-communication between the Atlantic and the Ohio; and it must be borne in mind that these works have all been undertaken in a densely populated country, with every modern appliance close at hand, roads and other facilities round them in every direction, and labour and machinery in any quantity constantly procurable. Yet the difficulties have been so great, and the expenditure so enormous, that all these Alleghany works have occupied years in their construction, and have been brought to their present imperfect state of efficiency only by taxing to the utmost both the skill and the finances of their respective corporations.

The Rocky Mountain range consists generally of a more complicated and difficult system than the Alleghanies, and includes numerous parallel ridges, and an upheaved table-land of very considerable extent, occupying altogether one-third of the entire breadth of country to be traversed between the Atlantic and the Pacific. "This Great Western mountain system of the North American continent, may be described," says Professor Henry in a Report presented to the United States government, "as a broad elevated swell or plateau of land, the prolongation of the Andes in South America, extending northwards in the general direction of the Pacific coast, with varying elevation and width, to the Arctic circle.

It occupies nearly the whole breadth of Mexico from the Rio del Norte to the Pacific, and as it extends northward becomes still broader, until in the latitude of New York it occupies one-third of the breadth of the Continent, the other two-thirds being about equally divided by the Mississippi river." Resting upon this great swell of land is a series of parallel ridges, the general direction of which is North, and between these ranges are extensive elevated vallies of extreme dryness, and in the Summer, of intense heat. Proceeding North from the high plains of Mexico, the base of the mountain system gradually declines to the parallel of Natchez in the State of Mississippi. The average elevation is here about 4,000 feet, and the lowest notch 5,700 feet above the sea, more than double the highest summit crossed by any Railway on the Atlantic side, and one third of a mile higher than the most elevated part of the Copiabo Railway in Chili, on the snow-bound passes of the Andes, where a gradient of three hundred feet per mile, as steep as the upper part of King Street, has been necessarily resorted to. Proceeding northward from this point, the system gradually rises until in latitude 35°, the average elevation is 5,500 feet, and the lowest pass of the principal range, over a mile and a half of vertical elevation. Still rising to the parallel of St. Louis, the whole system of mountains has an elevation of over 7,000 feet, and the lowest notch in the main ridge has the impracticable altitude of over 10,000 feet above the sea level. Northwards from this, the mountain range gradually declines both in average height, and in width of base, until about one hundred and forty miles South of the British boundary, the average elevation is reduced to about 2,500 feet. The lowest pass is still however, double the height of any railway summit of the Alleghanies, and therefore to be deemed impracticable, nor is there so far as is now known, any more feasible route, than the one last indicated—the route suggested by Mr. Whitney.

But the main difficulty to contend with in the United States portion of the range arises not only from the enormous elevation of the passes, the length of broken and intricate country to be crossed, and the unheard of engineering difficulties to be encountered, but the character of the soil, the geological formation, and the general physical features of the whole route, form a still more insuperable objection to the construction of a Railway through any portion of the United States between the Mississippi and the Pacific. Referring

again to Reports presented to Congress, and deriving all our information from unprejudiced American authorities, we are told by Professor Henry that the general character of the soil is a barren waste, over which the eye may roam to the extent of the visible horizon, without finding any object to break the monotony. Dr. Leatherman, surgeon to the United States army at Fort Defiance, describes the country along the parallel of 35° as a series of mountain ridges, broken in many places by deep cracks called *canons*, which afford the only means of traversing the country, except with great difficulty and labour. Dr. Anticete, geologist to the exploring expedition for the southern route, describes the country traversed as utterly destitute of the means of supporting a population. "The entire district," he says, "is bare of soil and vegetation, except a few varieties of the cactus. Over the greater portion of northern Sonora, and the southern part of New Mexico, sterility reigns supreme." The greater part of this extensive desert, occupying one third of the total area of the United States, has now been thoroughly explored for the purpose of finding a route for the Pacific Railway, and of the five lines examined and reported upon, it appears that the least distance of uncultivable land that must be passed, on any line between the Mississippi and the ocean, exceeds 1200 miles in length, whilst four out of the five require the crossing of a desert 1400 miles long, in one vast unbroken solitude. As the only means for the conveyance of materials and iron for the construction of the road and the supplies of the men, must be carried on any of these routes by the finished portion of the railway itself, only comparatively short sections could be undertaken in advance of the parts actually completed, and the experience of every work, so situated, teaches us that its progress must be extremely slow, and the expense enormously increased. With the best arrangements, and a lavish outlay of means, years must elapse on any of these routes, before the most difficult portions of the line could be even commenced, and by what means the number of men necessary to operate efficiently amongst the gorges of the Rocky Mountains, could be concentrated, fed and otherwise provided for, a thousand miles in the interior of such a desert, is a problem that has not yet been solved, or is likely for some time to be attempted.

The country North of the international boundary, between the United States and British America, in latitude 49°, was a short time since, as utterly unknown to the general world

as any place possibly could be. Granted by a very doubtful title to a rich and powerful monopoly, few had the curiosity or interest to disturb the solitude, purposely depreciated by the Hudson Bay Company. Even the best means of access to it was, for exclusive motives, and to shut out travellers and explorers at the very threshold, systematically disregarded; and a portage so accessible that without previous preparation, and for a moderate compensation, a regular mail from Toronto has for some time been carried over it, was purposely neglected by the Company, who preferred the additional expense and inconvenience of a voyage, some thousand miles long, round the inhospitable shores of Hudson's Bay, to the admission of strangers upon their premises, or the knowledge of the real value of the land locked up from cultivation becoming generally known. Indeed so perfect a system of secrecy seems to have prevailed through the whole establishment, in order that the monopoly might be undisturbed, that the existence of a valuable agricultural district, the size of Europe, and of the highest fertility, has been looked upon, until very lately, as an impossible absurdity, and fit only for the purposes of the trapper and the huntsman.

The expiry of the Company's charter last year, the strong feeling that exists in Canada against the monopoly, the opening of the Sault Ste Marie Canal, which brought Lake Superior into navigable communication with the Canadian Lakes, and the development of the valuable mines of copper and iron on the verge of the unknown territory, all attracted attention to a part of the continent, the value and accessibility of which was fast becoming evident. A surveying and exploring party, deputed by the Canadian government, under the guidance of Captain Kennedy, an old North West hunter and former friend of Sir John Franklin, visited the Saskatchawan Valley, and have only lately made their report. The beauty and fertility of this magnificent valley is now an established fact. It is described as a vast oasis of continental dimensions, and prairie character. The numerous herds of buffaloes supported by it, and browsing throughout the winter, is a sufficient warrant both of the extent of its resources, and the moderation of its climate; whilst the beds of coal known to exist on the Upper Saskatchawan, and well developed on the Red River, give to these woodless but fertile pasture fields a commercial and political importance that cannot be too highly appreciated. The river divides into two branches, both of them navigable for steamboats to the

foot of the Rocky Mountains, and within 300 miles of the Pacific, presenting a continuous water communication, interrupted by only one rapid from the foot of Lake Winnipeg, nearly 800 miles due West on the course of the projected Railway.

The exploring party had scarcely returned, before the discovery of gold fields of great extent and value are reported on Frazer's River, a stream flowing into the Pacific through British territory, and forming at its mouth one of the finest harbours in the world. The gold fields are situated within 200 miles of the head of navigation of the Saskatchawan, and when it was further determined that the gold bearing stream itself presents one of the lowest and most practicable passes through the Rocky Mountains that has yet been discovered, such that does not exist further South, lower in absolute elevation than the Alleghany summits of the Atlantic Railways, and accessible by navigable rivers on both sides to the base of the mountains, nothing further remains in an engineering point of view, and the Pacific Railway on this route presents no works of magnitude or difficulty to prevent its rapid and easy completion, whilst by far the greater proportion is a surface line of the most economical description.

Steamers of 400 tons can now pass from Quebec to the head of Lake Superior, a distance of over 1600 miles. Forward to Red River, crossing the water-shed that divides the rivers flowing into Lake Superior from those emptying into Lake Winnipeg, the distance as at present travelled by the mail is about 700 miles, of which less than thirty is obstructed navigation, and much of the remainder composed of rivers sufficiently large and sluggish to permit of the employment of steamboats. The North West Transportation Company however, propose to shorten this part of the route by the immediate construction of three or four portage roads, and when their arrangements are complete, the distance from Lake Superior to Red River will be reduced to 500 miles, one hundred and forty of which will be a wagon road, and the communication maintained by four steamboats running in connection with each other. One of these navigable reaches on Rainy River and Lake of the Woods is 160 miles long, and available for a passenger boat of respectable dimensions. From Red River, which is itself navigable to some distance in the State of Minnesota, Lake Winnipeg and the Saskatchawan, form with one single break of less than a mile, a continuous route westward of over 1,000 miles to the foot of

the Rocky range, much of it available for steamboats of the largest class. From this point to the Pacific, 400 miles by the Frazer's River, only 200 is necessarily land portage; so that in all probability in another year or two, of the 3,500 miles from Quebec to Vancouver's, following the course of the navigable streams, nearly 3,200 will be provided with steamboats, and travellers will be able without any additional Railway facilities than those now in existence, to reach Frazer's River from Montreal in ten days, without more fatigue than usually incurred in an ordinary journey of that duration.

We have seen that in any scheme for a Pacific Railway through American territory, the works can only be commenced from each end, each section as it is finished being necessary to forward the supplies for the next, so that operations can only be carried on from mile to mile as each is completed, but in the Canadian route a few unimportant links only are wanting to at once open a through communication, and the works may be commenced on any district, or if necessary, be carried on simultaneously over the whole length of the line, wherever the most difficulty presents itself. Another communication will probably be completed this next season, partly by portage road, and partly by steamer between St. Paul on the Mississippi River, and the Red River settlement,* which will form an important feeder to the Saskatchawan route, and open by far the shortest route from New York and the Mississippi Valley to California and the Pacific, and it is understood that arrangements are completed whereby the Hudson's Bay Company will import their supplies the next year by way of St. Paul.

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* At a meeting of the Chamber of Commerce, of St. Paul, Minnesota, held last week, a geographical report was made upon the Red River and Saskatchawan country, with a view to the development of navigation on the great rivers there abounding. The Red River is said to have a depth of six feet for a considerable distance above the mouth of the Cheyenne, and below that nine to twelve feet down to Red Lake River, and thence to Lake Winnipeg of sixteen feet The current is moderate, being only about two miles per hour. The Cheyenne is navigable one hundred miles, and the Assiniboine probably two hundred. The Red River is navigable five hundred and seventy-five miles, and its tributaries about three hundred and fifty, making over nine hundred miles of navigable water in this valley alone. Lake Winnipeg is two hundred and fifty miles in length, and the Saskatchawan is navigable upwards of seven hundred miles in a direct line, but by the course of the stream nearly twice that distance. It is mentioned as a singular fact that the sources of Frazer's River are separated from those of Peace River by only three hundred and seventeen yards, the first running into the Pacific, and the latter north eastwardly into Mackenzie's River. The area reached by the navigation of the Rivers above mentioned, is estimated at four hundred thousand square miles of fertile soil, favorable climate, useful minerals, and fur bearing and food yielding animals. The meeting concluded by offering a bonus

I have, I fear, tired your patience in the comparison of the United States and Canadian routes before the subject is exhausted. There are numerous well established facts and observations that I have been compelled to omit tending to confirm beyond the possibility of a question, the infinite superiority of the northern route, the one in which alone Saint John is interested, over any of the southern lines which would feed, without a British rival, New Orleans and New York. I omit too, a more particular description of the Great North West Prairies, and the territorial advantages to every section of British America in particular, to be derived from opening this magnificent expanse of land to settlement and civilization, and filling with a busy population this back country of our Province. A consideration of the route forward will be found to have equal advantages in its favor. Neither for freight nor passengers would there be any saving, either in time or expense, by leaving the British waters for a route through the United States, or, preferring Boston or New York as the point of embarkation for Europe, over Montreal or Saint John.

At the head of Lake Winnipeg, the point of debouche of the Red River of the North, and 1400 miles from the Pacific the traffic divides, partly turning South by way of the Red River, and the Mississippi to Saint Paul, where it meets the United States Railway system, stretching from that point over the whole Union, whilst the other stream of traffic from the Saskatchawan valley will continue on Canadian waters, or by a railway already proposed across the watershed of the Lake Superior Rivers, to Fort William or Thunder Bay, on the navigable waters of the Saint Lawrence. The distance to Saint Paul is about 700 miles from Lake

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of $1,000 to any one who would put a steamboat of a hundred tons on the Red River, and run her during the navigable season of the present year, commencing on or before the 1st of June.

Proposals were subsequently received from one party who now has a steamboat on the waters of the Crow Wing River, near the mouth of the Gull River, which point is only ninety miles from Breckenridge, the head of navigation on the Red River. This is the first steamboat that ever ascended the Mississippi as high as Crow Wing, and was taken over the Little Falls during the very high water of last spring The owner offers for a bonus of $2000 to transport on sleds immediately the machinery, and such portions of the boat as is practicable, and by the 15th of May next, to launch the boat at Breckenridge, or some other point thought best for the purpose. The requisite amount has been raised by private subscription, and the Board of Trade of St. Paul offer, in addition, a bonus of $500 each for three boats to be delivered in the Red River any time during the summer of 1859.

New York Tribune, February 4th, 1859.

Winnipeg, against 500 to Fort William, the proportion of navigable water about the same, and the cost of carriage in favor of the British line. Fairly afloat on Lake Superior, the chain of canals is completed to the Ocean, and heavy goods during the open season of the year will not probably leave the vessel in which they are deposited on Lake Superior until they reach the foot of Lake Erie, where the rivalry between the Canadian and American canals will again form a question, the solution of which is of the greatest importance to ourselves as well as to the whole of British America. Permit me to state the position as briefly as possible, and take the analogous case of a ton of flour brought from Chicago to be delivered at Liverpool.

From Lake Michigan or Lake Superior, British and American shipping sails side by side to the terminus of the Welland or Erie Canal at the foot of Lake Erie, arriving either by sail or steam, under precisely similar circumstances, the flats of Lake St. Clair limiting the size of the vessel more than the locks of the Saulte Ste Marie Canal, connecting Lake Superior to the others. If intended for Montreal, the vessel passes through the Welland, the locks of which admit steamers of 400 tons measurement, drawing nine or ten feet water, into Lake Ontario, and thence down the Saint Lawrence and its noble canals to Montreal, arriving at the head of ocean navigation with unbroken bulk in three days. If however, the cargo on Lake Erie is intended for New York, two courses are open, either to tranship at Buffalo into the boats of the Erie Canal, or passing through the Welland proceed in the same vessel to Oswego, on Lake Ontario, and there be transhipped into the barges of the Oswego branch of the New York State canals; in either case reaching Albany, on the Hudson River, by the Erie Canal, and being towed thence by steamer to New York. The enlarged locks of the Erie Canal are adapted only for boats of about seventy tons burden, intended to be drawn by horses; and to make the comparison of routes clearer, we will suppose all the enlargements to be complete, and the consequent reduction in freights to have taken place.

The Montreal route saves first, the cost of transhipment into these barges, either at Buffalo or Oswego, which is worth twenty cents per ton; secondly, the use of large vessels instead of small ones for one-third of the distance, which involves great economy; and thirdly, the use of steam the whole way instead of three or four hundred miles of

horse traction. Besides this, there is the towage of barges down the Hudson from Troy to New York; and last, but not least, the longer time taken on the route. It takes three days to transhipp the cargo at Buffalo, occupies eight to traverse the Erie Canal, and two in the towage down the Hudson, against three days, the total time to Montreal by the Canadian route.

The lowest cost that all this can be done for, according to Clark in the Appendix to the Board of Works Report to the Legislature of Canada, for 1856, from Chicago to New York for a ton of ten barrels of flour is $8.64 via. Buffalo, and $6.3 via. Oswego. Another authority, Mr. M'Alpine, formerly Engineer to the State of New York, estimates in his Report to the Harbour Commissioners of Montreal, that when the Erie and Welland Canals are both enlarged, and every facility afforded for the employment of the largest class of boats, the distance from Chicago to New York, per ton of 2000 lbs., may be worked for $6.36 by steamer, and $4.46 by sailing vessels. The same authority gives the corresponding cost to Montreal at $4.69 by steamer, and $2.78 by sailing craft, or a saving to Montreal of 8s. currency per ton by either class of vessel. This saving to Montreal is however lost on the ocean passage to Liverpool, in consequence of the high freights ruling from Montreal in comparison with New York. The average freights from the latter port to Liverpool, as taken from a pamphlet by the Honorable John Young, gives $5 per ton against $9 from Montreal, as the average of the nine years preceding 1855. During the last three years several circumstances have tended to bring down ocean freights to something more like an equality between the two ports, but physical and natural causes will always prevent Quebec or Montreal competing on equal terms with New York, Boston, or our own St. John. There is however one vital advantage, which New York at present enjoys, that the construction of a Railway from the St. Lawrence to St. John would enable us to share in, and by so doing assist to that extent Quebec, Montreal, and the Canadian route generally. Until lately both these cities and the St. Lawrence itself, for a portion of the year, was in the position of a culde-sac, and flour arriving too late in the fall remained on hand the winter. The construction of the Grand Trunk Railway partially removes this disadvantage, and flour can now be forwarded to Portland cheaper than it can be laid down in New York. But Portland cannot answer the purpose of a

depot as St. John can. The great market for western produce is not so much England as the Eastern States and these Lower Provinces. Out of equivalent to three million barrels of breadstuffs arriving at New York annually, only one million is exported, the rest is consumed on this side of the Atlantic, and principally eastward of New York. As a distributing port for the Atlantic seaboard, St. John has advantages that can be shared only by Boston, were that port available to compete for this western trade by equal Railway facilities from the St. Lawrence. Commanding by the Shediac Railway the supplies to the Gulf Shore Fisheries, and the whole of Nova Scotia, running through the lumbering districts of New Brunswick and Lower Canada, tapping the portage routes to the best timber of Maine, and commanding the coasting trade of the Bay of Fundy, St. John occupies a position as the flour-mart of the East, such that could not be conferred on any other port on the Atlantic sea board.

When a vessel has reached Montreal 1300 miles from Chicago, or 1400 from the head of Lake Superior, she has come through every canal, passed every light, and paid all the dues of an extended voyage to Riviere du Loup, or Trois Pistoles; at the same rate as the cost of Lake navigation per mile, she can land her cargo for sixty cents per ton additional over the cost to Montreal, which is $1.10 cents less than the utmost reduction that the improvements to the Erie Canal will enable the same to be delivered in New York. The transhipment to the Railway and carriage to Saint John will not increase the price over the present cost to New York, and even with all the Erie improvements will not exceed the freight to that port by more than $1.50 per ton, or fifteen cents per barrel. Our position here then with a direct Railway to the Riviere du Loup is equal to that of New York as an exporting point for the Atlantic trade, and equal, if not superior for a distributing one. In these calculations there is nothing assumed on the British side for the immense improvements yearly making in the Canadian canals, all intended to reduce the cost of transit, nor is the Ottawa route brought into the question at all, a project that if completed on the scale commenced, *must* command the whole of the through traffic from the Upper Lakes.

The only position that may not appear clearly established, is the comparison of our own projected Railway and the present line from Montreal to Portland; paradoxical as it may appear, a direct line from St. John can compete from Montreal

even to a western port, such as Boston or New York, with the Portland line, for the through St. Lawrence traffic. The additional cost of freight to the Riviere du Loup, over stopping at Montreal, is as before noticed, (at six mills per ton per mile,) sixty cents per ton, loading and transhipment twenty cents, freight two hundred and seventy miles at one and a half cents, $4.05; total, $4.85 cents per ton of 2,240 lbs., or forty-four cents per barrel. Last winter the Grand Trunk carried flour from Montreal to Portland for forty-five cents, making our position apparently equal to theirs, but in reality the rate per mile on that line cannot be as low under the same circumstances, as in New Brunswick to be equally remunerative. The Portland section of the Grand Trunk cannot compare in efficiency and economy with a first class line through this Province, or with the other portions of their own magnificent Railway. Contracted for by local corporations in the cheapest and most niggardly manner, the greater portion of the capital raised in town bonds and debentures of the most unmarketable character, the work like the pay was not very good, and the general arrangements were by no means equal to the average of second rate American roads, and not to be compared with the subsequent execution of the other portions of the Grand Trunk. The route is by no means easy, and the crossing of the White Mountains is more picturesque than practical, more attractive to lovers than locomotives, and though interesting to tourists, is lost in the romance of a flour barrel, or the æsthetics of a truck.

The nearest possible distance from Portland to Longueil is two hundred and three miles; the actual distance is two hundred and ninety two, or nearly fifty per cent more. The air line from Montreal to the crossing of the Province line is ninety-two miles—the Railway makes it one hundred and twenty-seven. The true direction from the St. Lawrence terminus to the boundary is fifty degrees East from the meredian—the road starts off for thirty miles at an angle of 78°. In the Canadian portion of the road, which is by far the best of the two, eighteen per cent, or nearly one fifth has grades exceeding forty-five feet to the mile. The curvature in the same length is equally objectionable, one quarter of the whole line is on a curve, and the total deflection gives a complete circle about every twelve miles, whilst a large proportion of these deviations from the straight or tangent line, are at an angle so acute as to seriously increase the cost of

maintenance and the expense of operating. Nor is the alignment the only detriment to the economy of working, the execution of many of the works was extremely deficient in the first instance, and must ever entail a frightful expense. The breadth, both of cuttings and embankments, was insufficient for the stability of the road, and a worse lot of wooden bridges were probably never erected. Since the present Company have had possession of the Railway, the repairs in many instances, have amounted almost to a reconstruction, and from Mr. Keefer's Report to the Directors, the outlay on new bridges alone for the next four or five years will probably absorb the nett earnings of the whole section south of the St. Lawrence*. It is with no unkind feelings, or with any disparagement to the works of the Grand Trunk Company that these defects of one portion of their line are pointed out. The greater part of that section forms no portion of a British Pacific Railway, and the exceptional gradients of the Portland Branch will not interfere with any traffic in which we are concerned. The routes from the Great West and the Pacific to Baltimore, Philadelphia, Boston and New York, are so nicely balanced, that a few cents turn an enormous traffic, and to compete at all, a new line must be as complete as possible in its details, and as perfect as can be constructed. Whatever natural advantages a fine harbour or a secure roadstead may present as an ocean terminus, bad gradients and objectionable curves will tell upon the carriage of heavy goods, and the poorest economy in the world is a shabby cheap Railway, unreliable and incomplete. Were Halifax as near to the Saint Lawrence as Saint John, and as available as a distributing depot for western produce, the execution of the Nova Scotian Railways, their bad curves, enormous gradients, and deficient arrangements, would go far to destroy any possible advantage that can be urged in favor of their capital. The construction of Lord Bury's line, if it were adopted, must commence at Halifax and not at Truro, before the Pacific carrying trade could be deviated from the United States Railways. As a passenger terminus and for the military purposes of Great Britain, no one can

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* See Report of S. Keefer, Esq., on the Saint Lawrence and Atlantic Railway, December 18th, 1852. In Appendix to Journals of Legislative Assembly, Canada, 1852-'3, Vol. II, No. 8, Appendix V. V. V. Also Report of Messrs. Keefer and Shanly on the state of the Railroad Bridges in Lower Canada, April 4th, 1857, laid before Legislative Assembly, April 23d, 1857. Also Report of Charles Hutton Gregory, Esq., September 10th, 1857, to Directors of Grand Trunk Railway on the Montreal and Portland Section.

fail to appreciate the advantageous position of Halifax, but as a freighting port for the American continent, or even British America, it possesses not one single advantage. The same reasons that militate against Montreal in comparison with New York as the importing and exporting depot of the West, tell with much greater effect against Halifax in comparison with Saint John. Without a large export trade it is impossible to secure an importing one, and the vessels that carried the rails for the Nova Scotian Railway from the same consignees in Great Britain to Halifax for 28s. per ton, and to Saint John for 12s., did not necessarily make a worse bargain in one case than in the other. Ocean freights at Halifax rule too high to permit her to enter the lists against Saint John, Boston and New York, and now that the chimera of ice in the winter season at Saint John has been cleared away from the imagination of Railway projectors over the water, the only place where it ever existed, it is to be hoped that the *bona fide* value of our noble harbour, and its position as the key to the winter trade of the Canadas, may receive their due meed of appreciation.

I have endeavoured to trace the course of the Pacific trade from Vancouver's to Saint John, following the lines of water communication principally, and attempted to establish this as the most available for freighting purposes for time, expense and outlay. A Railway to suit a more valuable traffic follows, especially in Canada, a somewhat different route, and Halifax as one of the Atlantic termini, and for military purposes, must not be neglected. Starting from a point, between Saint John and the Bend on the present line of railway, available for freight traffic seeking the shortest land route, and for passengers avoiding as much as possible the water, and embarking at the nearest port to Europe; through the heart of New Brunswick to the Saint Lawrence, along the Grand Trunk Railway to Montreal, up the Ottawa Valley to Lake Nippissing, thence round the heads of Lakes Superior and Winnipeg to the Great North West valley of the Saskatchawan, the Rocky Mountains and the Pacific, makes a total stretch from Saint John to the harbour of De Fuca of 3,200 miles. The local advantages previously referred to, as the nearest and cheapest outlet from Lake Superior to the Atlantic, and the immense territorial possessions in the North West Prairies, in the valley of the Ottawa, and in our own Province, thrown open to settlement and civilization, are a small part of the whole question. They serve merely

to indicate the importance of each separate link in the series, and to establish the local necessity for the construction of each section of the system. They convince us of the propriety of an expenditure, the interest of which is provided by an existing traffic, and the principal will be almost extinguished by the land sales of 60,000 square miles of fertile territory, devoid of an available outlet, and waiting only for the introduction of the locomotive and the steamboat to teem with life and energy; and to link under one sovereign the whole noble expanse of these British possessions, stretching from Ocean to Ocean, and spanning the North American continent, where that continent is the broadest, its lands the most valuable, its rivers the most magnificient, its future the most promising, and its destiny the most elevated. Let us for a moment glance at the description of commerce that will pour its wealth into the Lower Provinces when British America becomes the highway of the world, when the traffic of Europe and Asia is concentrated on its Pacific Railway, its inland seas, its mighty rivers, its magnificent canals.

The Pacific Railway is no local or secondary project. America great as she is, and greater as she will be, is only one of its tributaries. The roving Englishman and the wandering Chinaman, the East Indian merchant returning to the home of his childhood, and the European soldier going to his Oriental duties, the Australian and the Californian, the Birman and the Peruvian, the Mohawk and the Mogul, must all tread its busy avenues, and swell the motley multitude that throng its termini and crowd its carriages. That traffic which yearly sends its fleets from the Spice Islands to Europe; that still supports the caravans of Cairo and Damascus; that loads a weekly steamer on the Black Sea with the shawls of Cashmere, and the cotton, silk and drugs of Armenia; that overflowing trade which congregated in a few years a population of 600,000 souls in the city of Alexandria; and last, but by no means least, that trade which the wants of three hundred and fifty millions of Chinese, recently thrown open to the world, must require and will have eventually. These currents of trade, swelled from Australia, South America and California, must all be collected and pay tribute to a Pacific Railway before that line can properly subserve the wants of the world or fulfil the purpose for which it is created. A line from the Atlantic to the Pacific, complete, unbroken and integral, can and will revolutionize the Eastern world; and it is due to the subject to linger a few moments on the sources from

which the future traffic will be derived, and to which the manufactures of Europe will ultimately trend in return.

The productive industry of Asia generally is of a simple and unique description, and it is worthy of remark how the peculiar idiosyncracy of the Asiatic mind has impressed itself upon their manufactures. In all the useful arts which depend upon a development of principles and a progressive improvement in their application, the Oriental has long since been utterly distanced by European and American manufacturers, but in those rare productions where extreme patience, laborious and unremitting attention, and manual dexterity, are the main requirements, the Asiatic with instinctive fidelity reproduces the same pattern for ages, and supplies to his European customer the ornate and costly copy of the same article that adorned the monarch of a thousand years' oblivion, or decorated the temple whose last column is crumbling into forgetfulness. Time with us is too valuable, human hands too few, human hearts too susceptible, to waste the precious energies of life in the adornment of a shawl, or the embroidery of a skull-cap; but fashion dictates, luxury demands, taste sanctions, and wealth pays for the sacrifice; and in this store room of the world, human beings are numerous and unemployed, nature is bountiful in her supplies, life is rank, cheap and swarming, hands not minds work, fingers not feelings are employed; and man, debased, degraded man, steeped in superstition, lost to noble and regenerate feelings, performs the duties, plods through the drudgery of living, unfeelingly, unwittingly, almost unwillingly.

Not the least remarkable of the wonderful changes that have recently taken place in the Asiatic world is the breaking up of the seclusion of centuries in the Celestial Empire, and the wholesale emigration of the Chinese to Australia, California and the Spanish dependencies in the Gulf of Mexico. This exodus, so strangely unexpected and apparently accidental in its commencement, bids fair to form a new feature in the ethnological history of the present century, and the formation of any more direct route would have in this Coolie emigration, an immediate return and an immensely prospective revenue. The Chinese already form a considerable portion of the labour of Cuba, they contributed largely to build the Panama and Central American Railways, and British screw steamers are now engaged in the trade to that quarter, doubling Cape Horn with their living cargoes, and coasting round nine-tenths of the South American continent. In ten

months of 1855, one hundred and thirty square rigged vessels cleared from Hong Kong with nearly 15,000 passengers. During the same period 11,000 cleared for Cuba from other ports; the stream fed by the teeming millions of the Central Provinces has increased ever since, and though only vague calculations can be made as to the total number, if the present ratio of increase is continued, it is certain that from China alone, a stream equal to the emigration from Great Britain, nearly 1000 per day, will shortly seek a communication to or across this Continent. The frightful mortality on the passage has hitherto checked the number of the self-exiled Celestials, and the removal of that by the construction of the Railway would no doubt double and treble the stream of emigration. Of the total number in 1855 that sailed for Cuba, one in seven, or nearly fifteen per cent. succumbed to the horrors of the middle passage, and died before reaching their destination. As an item of traffic on the Pacific Railway, the present Coolie exodus would load heavily a train a day for five months in the year, at the very season too when freights ordinarily are most in request.

The tea trade of China, extensive and valuable as it now is, would receive an impetus from the Railway, the influence of which would certainly increase the consumption. Western Europe and the Eastern coast of America require annually about 50,000 tons, or nearly two pounds per head of the population. The freight, insurance and expenses, average from Hong Kong to England nearly five cents per pound, and in this trade alone, which would employ one freight train per day the year round, the saving to the European and American consumers in freight alone, would be over $1,000,000. The silks and cotton of China and Hindoostan await only this communication to supply Europe with a description of fabrics different, and it may be better than any at present imported. Up to the middle of the last century the old world was supplied from these countries almost exclusively with the better description of goods, and indications are not wanting that the future consumption of cotton will be drawn mainly from India, from the Great Plains of the Coromandel coast, and the valleys of the Godavery and the Kistna. The cotton plant is indigenous to India. Professor Schouw of Copenhagen calls it the characteristic plant of Hindoostan, where it forms the sole article of clothing of one hundred and fifty million inhabitants, and is cultivated over the length and breadth of the land to the extent of 400,000 tons per annum.

During the last fifteen years the relative consumption of American and Indian cotton in England has been six to one in favour of the former, but fifty millions sterling are being expended on Indian Railways, and who shall estimate the corresponding improvement in that country when its vast plains and rich vallies shall be fairly opened, to the agencies of civilization and improvement? As the cheapest route to Europe, the North American Railway and the British Provinces generally will share in every advancement in India, will profit by every outlay there, and will reap golden harvests from a country where they have not strawed.

But there is another element—time—affecting, even more than the cost of freight and the course of trade; and in no description of commerce is this so apparent, or of so much consequence, as in the Eastern trade with Europe. The Aberdeen clippers obtain from £8 to £12 sterling per ton from China on the finer description of teas, in consideration of a few days saving in time, and any route that can reduce the period of transit from China to England from eighty days, the present average clipper time, to fifty, at an expense not exceeding £5 or £6 per ton additional cost, may safely calculate upon 150,000 tons of European exports to the East, and at least the same weight of imports from Western Asia. When the simple value of these Oriental productions is considered, the element of time is seen at once to be of far more consequence than a few pounds in freight. The silk and silk goods of India and China average from £2,000 to £3,000 sterling per ton in value; the indigo of Hindoostan ranges from £500 to £1000 per ton, whilst tea, coffee, spices, shell lac, and over 70,000 tons per annum of Eastern exports range from £100 to £300 per ton. The bare interest alone, on a saving of thirty days time, equals the present freight of £8 to £12 per ton on the silk goods, whilst insurance and risk of damage or delay on such valuable and perishable commodities would insure their carriage by rail wherever the same were practicable.

Independently of the saving in time and cost of transport of these Eastern productions, Great Britain has another and a more important necessity for the construction of this railway than at first sight may appear. One other European power has an Empire in Asia, and a frontage on the Pacific. No other country is advancing so rapidly in all the arts of civilization and improvement, or promises so soon to attain to a commercial importance of the first rank as Russia.

Within the last two years she has taken a decided step towards the highest modern civilization, and apart from her military power must soon rank amongst the first class nations of the world. Within that period the tariff on foreign importations has been modified, and the steam communication between Great Britain and her quondam enemy is now extensive and mutually profitable. The cultivation of the arts of peace are raising Russia to a moral elevation that the warlike ambition of the late Czar could never have anticipated. Her rivers are now navigated by steam, her industrial resources are being developed to the utmost, internal improvements are projected in all directions, and her ports and harbours have become the centres of a busy and flourishing commerce. Forty steamers are owned by one Company on the Black Sea, before the end of this year seventy will be employed on the Sea of Azof, and Russian propellers ply regularly from Odessa to Marseilles, Trieste, Genoa and even London.

Between China and Russia an overland transit trade has long existed, which has lately assumed an importance that Great Britain must soon look upon as the omen of a serious rivalry for the carrying trade of the East. It may serve to some extent to remove the prejudices of some who fancy that a railway 3000 miles long, across this Continent, can never form part of a freight line between England and China, to learn that the manufactories of Warsaw and of Moscow have latterly driven the woollen cloths of Prussia and Germany out of the Chinese market, where they had previously sold to the extent of $8,000,000 per annum. These Russian woollens are transported 5,000 miles by land, over the steppes of Siberia to Kiatchka, the frontier market of exchange, situated 1300 miles from Pekin. From 1830 to 1840, this transit trade between Russia and China increased 1000 per cent., and so perfect is the communication that the news of the Chinese war, and the details of the late Treaty were well known in St. Petersburgh a fortnight before the official dispatches were received in London by steamboat, telegraph and rail. To shorten this overland communication both in time and distance, to improve the watercourses, and take advantage of her noble rivers, Russia at the present time is bending all her energies. Forty-five millions sterling of French capital are being expended in the construction of a railway 2,600 miles long, to which our projected Pacific scheme is a pigmy attempt. Ten millions more have been

authorised on other lines to complete the communication to the Black Sea and the Oural Mountains, and to connect the navigation of the Volga and the Don. Steamers have been placed on Lake Baikal, the Superior of Asiatic Russia, and the navigation of the Amoor, a large river 2000 miles long on the direct route to the Pacific, and whose tributaries drain Chinese Tartary, is soon to be opened.

All these undertakings tend to oppose our present almost monopoly of the Asiatic trade with Western Europe, and Great Britain must either prepare to lose to a great extent the cream of that commerce, or rival Russia in the extent of her expenditure on a new line of communication, where the speed of the locomotive will be substituted for the clipper ship, and the punctuality of the land route for the precarious uncertainty of the long sea voyage.

Such are some of the advantages and necessities of the Pacific Railway in its commercial importance to Great Britain. It remains to be briefly considered in its political and military character. The British Empire in India gradually aggregating to itself the smaller principalities has become either by conquest or treaty one of the most powerful colonial dependencies that the world has ever witnessed. Recent events have shewn us that whilst India requires management, strong and energetic, and that promptness is one of the most important elements in the solution of the question of supremacy, our present communication is not adequate to the military wants or exigencies of her government. The mails from Bombay, the nearest of the Presidencies to London, average thirty-five days, whilst sailing vessels round the Cape take one hundred and twenty. Even under the most urgent circumstances, steam vessels have seldom made the passage in less than ninety days, and did no other argument exist for the construction of a British Railway to the Pacific, the recent painful events in India would supply the deficiency.

On the 9th of April, 1857, the first telegram arrived in London, announcing the murderous resort of the Bengal Sepoys to fire and sword, and measures were immediately taken to reinforce our troops in that quarter. On the 26th of June telegrams again arrived announcing the revolt at Meerut, and the seizure of Delhi, the government were then perfectly sensible of the position of affairs in India, and the press and the public were unanimous in the demand for instantaneous action, in the despatch of the troops. The choice lay between the Egyptian and the Cape routes.

between sailing vessels and steamers, and in looking back upon the course pursued, it is scarcely fair to blame the government by the light of facts gleaned since. The tremendous risk we were running of losing our Indian Empire altogether, the terrific suffering of our countrymen overpowered by numbers, and the contagious example to other districts still faithful, of a successful rebellion, put all questions of economy or inconvenience on one side; it was a consideration merely of time and quantity. Steamers by hundreds were ready in England, but how on the Red Sea? Australian clippers were performing their journeys in equal time and with more certainty than Australian steamers. The passage of troops through a foreign and distant territory, the possible objections that might delay or stop them *en route*, the unhealthiness of the Red Sea and Desert in July and August, and a thousand other suggestions all forced themselves upon the attention of the Commissioners, and wrongly perhaps, they decided in that moment of anxiety and suspense in favour of sailing vessels and the Cape route. Of thirty-one vessels taken up by the 10th of July, nearly all were sailers, and in looking back at their performance, we may take these trips as representing the best that can be done between England and India. The average length of voyage of twenty-two sailing vessels between the 10th of June and the 27th of August, from England to Calcutta, was one hundred and sixteen days, the average of nine steamers subsequently between the 6th of August and 21st of October was eighty-six days, and the average loss of time of 16,000 men, embarked in fifty-five sailing vessels, was thirty seven days over what might have been done had steamers been available and at once taken up. Had a British Pacific Railway at that time been in existence, and a fleet on the Pacific in such condition as it would necessarily be when that communication is open, an army, however extensive, might have been transported across this continent to Calcutta, accumulating at every military post on its route, in at most fifty-five days from England, saving sixty days over the time actually occupied by the greater part of the army despatched to the scene of difficulty. It is a simple question when the elements are known, to calculate the saving in the transportation of an army occupying fifty-five days in place of one hundred and sixteen. It is an easy matter to estimate the value of the time of 16,000 men, two months longer than necessary upon their passage, but what human head can sum up the amount of misery endured, the

irretrievable mischief done, the desponding hearts broken, the suffering inflicted upon the gentle, the lovely and the innocent, through the lawless unrestrained passions of 100,000 ruffians preying for two months on the vitals of society, and exulting over their powerless victims with all the refinement of cruelty and the malice of fiendish revenge. That two months of misery endured, that two months of unnecessary wrong and violence inflicted, plead louder than the two or three millions of disbursements that would have been saved, and demands, necessitates, the creation of any route that can check or controul for the future a repetition of so terrible a chastening.

The Frazer's River gold discoveries have an importance in connexion with the extensive coal deposits of Vancouver's Island, too palpably requiring protection to be disregarded by the British government. Situated between California and the Russian forts of the Pacific, New Caledonia requires a strong police force to guard against the lawless fillibusters of the one, and a fleet to oppose to the powerful armament of the other in those northern waters. The necessity therefore of a strong naval and military establishment at this half-way station between Halifax and India, at once points out the economy of a railway communication which would dispense to a great extent with a standing army in time of peace on the Pacific coast, and facilitate its movements in time of war. Halifax, Saint John, and Quebec, would then effectually guard our new dependency, and England with a chain of fortresses across this continent, would grasp the Indian Empire with a resistless strength that distance would not impair, nor delay be mistaken for want of means or vacillation of purpose.

The military value of the Pacific Railway has however one drawback which must be stated. For five months in the year, were it made to-morrow, it would be without an Atlantic terminus that England could use in time of war. The first link is still to construct, and that step belongs to New Brunswick to initiate. Two hundred miles separate the Canadian territory from the military line to Halifax or St. John, and that two hundred miles is the key to a commerce which St. John only of all the Atlantic ports seems unwilling to understand or appreciate. Boston, in railways alone, to secure the Saint Lawrence trade, has expended £12,000,000 sterling, New York in canals and railways, has up to the present time, disbursed £25,000,000, and Philadelphia nearly

£8,000,000, all to secure a connection with the Great Lakes, which after all may not be the most economical. Portland, a small city, but made great by its enterprise, subscribed in cash, $50 per head of its inhabitants, and extended credits for $100 more, to secure its Montreal railway. A similar subscription on the part of the people of British America, would build the Pacific line from Halifax to Vancouver's three times over. Portland has not been irredeemably ruined by the speculation, the population has been doubled by its liberality. Boston and New York have grown rich by their expenditure, and the phenomenon of a country ruined by its railways is yet to be witnessed.

There are two points in connexion with Saint John, that viewed conjointly, give it as the terminus of a Railway three thousand miles long, advantages not possessed by any other port on the Atlantic seaboard; these are its facilities for the formation of docks, both wet and dry, and its immense water power. A tide rising twenty eight feet, and a railway running more than two miles over an alluvial formation, below the level of high tides, and waiting only an inexpensive canal and one pair of lock gates to give eight miles of quay-side frontage, and four hundred acres of wet dock, is a feature not found elsewhere. The City of Portland with great liberality and at considerable expense, built two wharves, perhaps forty or fifty feet wide, to serve as landing places from the stem and stern gang-ways of the Great Eastern, a mile from the centre of the city, and forming, after all, only an uncomfortable and amphibious sort of connection with the monster, if ever she makes her appearance in transatlantic waters. At a less expense than it cost to put her into the water in the first instance, our so-called mill pond in the heart of the city might be converted into a graving dock to repair the lowest plate in her hull or the bottom rivet of her keel; or floating within fifteen feet of the Railway track a whole train might discharge its varied contents over her side in one-tenth of the time that the present arrangements at Portland would possibly admit. When such vessels become more common on the Atlantic, it will be a question of grave importance whether the only open harbour in America that can float her at low water at all seasons, and dock her at high water, will not command the trade, as the most eligible terminus for their voyage.

Saint John has another advantage, shared in only by Quebec as the Atlantic terminus of a Railway, and at present

wholly unimproved in her immense water power. The application of the paradoxical principle in water and other fluids, whereby the weight on a certain area is made independent of the actual volume of water employed, and dependent only on the height of the head or point of supply, as a motive power for machinery, is as recent as 1846. In that year the corporation of Newcastle-on-Tyne put down the first hydrostatic crane for unloading vessels, the water being taken from the ordinary street mains. One of the most beautiful applications of this principle is for the purpose of supplying the power round Railway stations, for loading and unloading the cars, working the turn-tables, traversing machines and waggon-lifts, for raising and tipping coal waggons, opening and closing swing-bridges and a variety of other purposes. At the Central Station at Newcastle a three inch service pipe from the street main turns the locomotives, puts the coke in the tender, loads and unloads the merchandize, and after it has done its work, is forced into the tank for the supply of the engines, so that there is literally no cost for the enormous power used round this busy depot, excepting £5 per annum paid to the Water Company for the use of the water in its transit this way. During the late Crimean war ten of these water cranes were erected in the arsenal of Woolwich at a cost of £30,000. The ships that went out first were loaded in the river, and each vessel required three weeks to take in her cargo. The saving effected by their use in time and labour after their completion, in eight weeks repaid the whole cost. In Great Britain alone twelve hundred of these machines are now at work, nearly all of the public docks and most of the government establishments have them in use, and wherever practicable, the Railways have universally adopted them for lifting, hauling, hoisting, loading and discharging vessels, and every purpose for which a strong intermittent power is requisite or available. Distributed under almost every street in Saint John, water, the cheapest, safest and best motive power yet introduced, at an enormous pressure, but nevertheless noiselessly and unseen, awaits the touch of science and mechanism to be led forth from its underground channel, to pull, or grind, or crush, discharge our vessels, turn our machinery, work the ponderous forge-hammer, or do the humble drudgery of our houses.

In concluding this Lecture, which I fear has sadly taxed your patience, I must recall to mind the general argument

with which I commenced, and the details of which I have attempted to prove. As a commercial, territorial, and military Railway, the Pacific line through British North America is the only possible route and the political necessity of the age, and as its Atlantic terminus this City has advantages, shared in by no other. The construction of the road, heavy and expensive as it is, is by no means without a precedent. Excluding the portion now completed, Vancouver's Island may be connected with Halifax and Saint John at an expenditure not exceeding £25,000,000 sterling. Russia with one line of 2,600 miles asks for £45 millions. The Lombardo-Venetian Company will require on their railroad of 1900 miles in length, probably the same amount. Twenty-six miles only of this road cost over two and a quarter millions, and ninety-six consecutive miles averaged over £45,000 sterling per mile. Spain has 1500 miles of railway built or building at a cost equal to our utmost requirement, and in England where the system is supposed to be nearly complete, 1000 miles of road are under construction, and the estimated expenditure this year is over £20,000,000. In India four long lines are being prosecuted simultaneously, and on one of them, stretching 1235 miles from Bombay, a single section of thirty miles, requires more labour than the whole of the New Brunswick roads together. There is nothing therefore impossible or improbable in the whole being completed in a few years from this present time, when the proud position this City will have attained will constitute it the commercial, if not the political capital of a Colonial Empire on this Continent, the value and importance of which to Great Britain, it is impossible sufficiently to appreciate.