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NOTES

ON

THE CANADIAN

PACIFIC RAILWAY;

BY

GENERAL M. BUTT HEWSON,

(Formerly, Originator and Promoter of the Memphis and Louisville Railroad; Chief Engineer [under Commission from the State of Mississippi] on the Memphis and Charleston Railroad; Chief Engineer of the Mississippi Central Railroad; Chief Engineer of the Arkansas Midland Railroad; Consulting Engineer of the Mississippi, Ouachita and Red River Railroad, etc., etc., etc.)

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PREFACE.

The following notes on the Canadian Pacific Railway were made originally for publication in England. One of their objects being the enlistment of English capital in the construction of the line, they attempt to place it to the fullest extent on the basis of Imperial interests. They seek to combine in the highest degree, the industrial uses of the enterprise with its uses as a line of defence; and to make it in that and other ways, an essential agency of the Imperial policy which stands committed to the experiment of developing these Provinces of North America into a political power based on conditions of permanence.

Because of the local character of the Government-expenditures in that Province, Manitoba is being spoken of in the East as "a favored Province." The outlays about to be commenced in the name of the same enterprise in British Columbia, will not serve to correct the disposition of the old Provinces to regard that system of special action with jealous question. The monies granted the Canada Central and those committed to the Georgian Bay branch, supply other instances marked by localism. Even an *ultimate* unification of these special applications of the general credit in a continuous line of railway beginning on Lake Nipissing, has very little in its pretence to Nationalism—a pretence nothing in its design justifies—to reconcile to the burdens of all those expenditures, the tax-payers of Ontario, of Quebec, of New Brunswick, of Nova Scotia. When that burden shall have commenced to press heavily on the people of these Provinces, all those grounds of dissatisfaction will come to the front in a danger to the completion of the Railway, a danger from which there is no such escape as would be found certainly in the execution of the enterprise on a broad design, one anchoring it firmly in not only local interests, but in also National aspirations.

What interest has *New Brunswick* in a railway discharging Canadian freights for Europe at Portland? Quebec made the terminus of the Pacific Railway on the St. Lawrence, less than 290 miles of railway (7 miles shorter than the line connecting Montreal with Portland), would give the shipping interests of that Province, the opportunity of competing for the winter freights of half a Continent, at St. John.

What interest has *Nova Scotia* in a railway discharging Canadian freights for Europe at Portland? Quebec made the terminus of the

Pacific Railway on summer-tide-water, a chord-line across the bow-line of the Intercolonial will spring into existence, reducing the distance to Halifax to 510 miles ; and thus will the establishment of the terminus at Quebec give the shipping interests of Nova Scotia, subject to the drawback of transportation over 220 miles of railway, the great advantage of their geographical position in competition with St. John for the winter-freights of the British North American Empire of the future, at Halifax.

Five or six hundred miles of railway running up the St. Maurice and down the Moose, would tap Hudson Bay. That line once ready to discharge upon the St. Lawrence at Quebec the treasures awaiting to be claimed by enterprise in and around that great sea, it would quicken the latent energies of the French Canadian population by directing a powerful stream of industrial blood into its heart. The timber, the soil, the minerals, the fisheries—with their whales and their seals and their salmon and their caplin and their cod—thrown open by that line even to Hudson Bay, would fix the Canadian Pacific firmly in the local interests of Quebec and the Maritime Provinces, by placing new opens for industry and wealth at the service of their lumbermen, their farmers, their miners, their sailors, their ship-carpenters, their merchants, their capitalists.

On neither the route adopted, nor on the route proposed in the following pages, does the Pacific Railway obtain a broad basis in the special interests of Ontario. While meeting that expediency, a further developement of the Imperial and of the National character of the enterprise may be obtained in the case of the line proposed in this pamphlet by constructing from its crossing of the Moose, a branch-line of 350 miles up the Abittibee and down the Montreal River to a junction with two lines converging on a point east of Lake Nipissing—one of these lines progressing now by way of Ottawa from Montreal, the other progressing now from Toronto. The point of junction of the Pacific Railway branch with these two lines from the south being retired some eighty miles inland from the Georgian Bay, and in a country highly defensible, this expedient would supply an interior line of communication in direct connection with a base upon Hudson Bay ; and while giving about 700 miles of Railway to local development in Ontario, would give that Province at its great railway-centre, a terminus of the Canadia Pacific. Montreal would continue to enjoy the *present*—its canals, its lakes, its Grand Trunks—and being provided, like Toronto, with one terminus of the Pacific Railway, would be asked by the proposed change of route but to divide the *future*, in a highly expedient distribution of the industrial and commercial vitality of the country, with that centre of French Canadian life, " the Ancient Capital."

Yellow Head Pass should, it seems to me, never have been thought of as a point on the Pacific Railway while a pass half the height offers at the discharge through the Rocky Mountains, of Peace River. In this and other points glanced at in the following pages I cannot avoid setting down the present location of the National Railway as an error. The plea set up in apology for that mistake, that the Canadian North-West will be crossed hereafter by several lines to the Pacific, supplies, assuredly, no reason why the *first* should be fixed on the route which is the most objectionable. Nor is the investment of twenty millions in the blunder which evidently has been made, a good reason why a hundred millions more should be invested in continuation of that blunder. Indeed that commitment ought not to count for anything against the overruling expediency of placing the Railway on an Imperial and National plane—certainly ought not to count so when it is considered that those twenty millions supply a distinct want of the day, in giving access for even six months of the year to the lines of emigrant-distribution centering at Winnipeg in the navigation of Red River, of the Assinaboine River, of Lake Manitoba, of Lake Winnipegosis, of Lake Winnipeg, of the River Saskatchawan.

A mistake has been made in the mode of exploration. An investment of fifty or a hundred millions ought not to be predicated on anything short of full knowledge. The present system of investigation may stumble on a good line ; but it fails to supply evidence that there may not be found even ten miles on either side of that line, one better by many millions of dollars. The exploration ought to proceed on a plan of breadth, one serving to show not only a good line, but *the best* line. Besides this reason for stopping at once the present mode of proceedings, there exists the further reason that, while that mode *wastes*—and has carried the waste already to millions—all outlays save those on the line ultimately adopted, the method proposed in the following pages applies almost all its outlays to a work of permanence which is a very necessity of settlement. With such a map as Colonel Dennis' map of Manitoba, I can affirm on the authority of many years of personal experience in the determination of railway-routes through regions new and thinly settled, that the question of the route across the Continent may, in the first place, be simplified in the office by the projection of several lines on the map on a basis of specific knowledge. A personal examination of half a dozen points—known to Engineers in the United States as " ruling points"—on the lines laid down thus, will be sufficient for the rejection of the more unpromising of those projected routes. The few whose relative merits cannot be determined by this reconnoisance may then be subjected to instrumentation. That experimental survey may be made in the case of the Canada Pacific at a special cost which ought not to exceed $150,000—a cost sufficient in

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ON

THE CANADIAN PACIFIC RAILWAY.

A railway on British soil from the Atlantic to the Pacific is a conception which might have been expected to hold the thoughts of Canadian politicians at the level of statesmanship. But the peddling spirit in which that great undertaking has been treated from its inception until this present moment, is, perhaps, not so much a fault of the public men of Canada as of the Parliamentary system in a new country. Be that, however, as it may, the course of the Government at Ottawa on the Pacific Railway has been characterised by a remarkable want of comprehensiveness. One Ministry felt free to yield to local pressure in restricting the route of the road through the Province of Ontario to the south of Lake Nipissing. Another undertook to carry out the line in isolated links of a chain completed by "water-stretches"—water-stretches for six months of the year and for the other six months, ice-stretches! Again, the road, designed though it is to connect the two oceans and to discharge "Asiatic commerce" on the St. Lawrence, has been made to "begin in the woods!" Its ultimate connection with tide-water was, it is true, provided for at the same time by an "Order in Council,"* one declaring that connection to lie over two sides of a triangle whose base is perfectly available for making the connection in about half the mileage of the sides! The general purpose of the railway was compromised for some local consideration in order to build a branch whose only supposable uses had been already discharged elsewhere; and was again compromised when the influence of local interests was allowed to determine the site of a river-crossing!

Some struggling settlements exist on the northern border of Georgian Bay. Others battle on to crops on the northern shore of Lake Superior. These insignificant facts have been, seemingly,

* An "Order in Council" declaring that the waters of the Ottawa shall flow to the north, would be hardly less ridiculous than one declaring that freights shall pursue a route—distance being cost—unnecessarily long. Beyond general instructions within strict limits of *statesmanship*, any meddling of the political authority in the determination of the route of the Canadian Pacific Railway can work but evil. Orders in Council ought to decline to speak in the case, save only when necessary to give effect to the recommendations of a directing body combining engineering skill with generalised knowledge of the economics of transportation.

thus a line of navigation which will, most probably, prove to be a new route of commerce.

The Arctic Sea practicable for ships from Europe to Behring's Strait, what of that sea onward to the mouth of the Mackenzie?

West of Behring's Strait, the ice-pack of the Northern Ocean is shown on the Admiralty charts thus:

August, 1827—over a degree off shore.
July, 1850—over a degree off shore.

East of Behring's Strait the ice-pack is shown on the Admiralty charts thus:

August, 1826—half a degree off shore.
August, 1827—quarter of a degree off shore.
July, 1849—half a degree off shore.

The pair of facts cited here for the Siberian coast holds on the route just proved by Professor Nordenskjold to be practicable for ships. A comparison of these with the corresponding facts given above on the continuation of that route to the Mackenzie, is full of encouragement to the expectation that the navigation of the Arctic Ocean on that continuation, is also practicable for ships. If the warm —the Japan—current which rushes through Behring's Strait from the Pacific be the true explanation of the open water on the Siberian Coast, the settled fact that it forks at the discharge from the Strait, one prong following the coast to the east as the other does the coast to the west, is good for the presumption that the water on the American coast is also open. Captain McClure has proved that it is practicable for ships, for, at all events, a part of the year. Sir John Franklin's "Second Expedition to the Polar Sea" corroborates that conclusion when it says (page 34):

"The Rocky Mountains were seen from the S.W to W.½N., and from the latter point around to the north, the sea" (off the mouth of the Mackenzie on the 16th August, 1825) "appeared in all its majesty, entirely free from ice, and without any visible obstacle to navigation. Many seals and whites whales were sporting on its waves."

In an address delivered about twenty-five years ago to the Royal Geographical Society, Admiral Beechy said:

"I need hardly remind you of the report from the Secretary of the United States Navy to the Senate, to the effect that * * * a trade had sprung up in America by the capture of whales to the north of that" (Behring's) "Strait, of more value to the States than all their commerce with what is called the east, and that in two years there had been added to the national wealth of America from this source alone, more than eight millions of dollars."

Under the light of the above facts there can be little doubt that, whether open for twelve months of the year as some insist, or not, the Northern Ocean on the line of Captain McClure's "North-west Passage" is free to commerce, through the fishing grounds of the American whalers off the mouth of the Mackenzie River, for, at all events, a part of the year. And this being so, if commerce follow

Professor Nordenskjold as it has done over part of his recent journey, over the remainder of it, there is little or no doubt that commerce can go on through the whaling grounds off the American coast to deliver and to receive cargoes within the waters of the Mackenzie!

In answer 2595 to the Hudson Bay Committee of the Imperial Parliament in 1857, Mr. Isbister states that the mouth of the Mackenzie is free from ice from the beginning of June to some time in October—say for four months. At Fort Simpson, 7 degrees of latitude up-stream, the ice, he says, breaks up in the beginning of May. Going farther up the river, into its great affluent, the Peace, the length of the open season is found to increase. Speaking of that stream at a point east of its passage through the Rocky Mountains, Sir Alexander Mackenzie says in his Voyages (page 131), that the ice began to run in the river on the 26th of November, which he calls the closing of navigation; and he gives us to understand that, having resumed his journey up the river on the 10th of the following May (page 153), the navigation must have been open then, if not before.* Free to admit ships from the sea for four months of the year, the Mackenzie River offers a water-way open for distributing their cargoes inwards and supplying them with cargoes outwards, during a period extending from four to seven months of the twelve.

In his book on the North-West of America, Archbishop Taché of Manitoba says (Cameron's Translation, page 31) of the Mackenzie:

"The river is navigable, if not from its source, at least from Jasper House (15 degrees to the south of its outlet into the Arctic Ocean) to its mouth, a distance of about 2,000 miles. In this long line, navigation in boats of the country is interrupted at only two places, by the group of rapids in the Riviere a la Biche and one in Slave River. The latter rapids, at about 1,200 miles from the Arctic Ocean, present the first obstacle to vessels going up the stream. Vessels of less draught could easily navigate from above these rapids to the foot of La Biche Rapids; but not at all seasons of the year, as when the water is low there are numerous sand banks in the way. From the latter rapids to the Jasper House the current is exceedingly strong and the water generally shallow, so that here navigation is very difficult, and possibly only in boats of the country when powerfully propelled."

In his evidence (answers 2592-7) before the Parliamentary Committee of 1857, Mr. Isbister says of the navigation of the Mackenzie:

"There is one immaterial obstruction near Fort Good Hope. I know of no other until you come to the Great Slave Lake. Vessels of considerable size could pass at Fort Good Hope and into Slave Lake without any interruption whatever. * * * The Slave Lake itself is navigable * * * but the Slave River is interrupted by frequent portages. * * * On the Mackenzie, navigation by steamboat could be carried on undoubtedly."

* Professor Maconn states that on an average of ten years the Peace is open at St. John's on the 20th of April. This gives navigation for seven months out of the twelve.

Mr. Isbister says that "the Mackenzie is a fine large river," and that "it is a beautiful river." Archbishop Taché writes (page 31 of his North Western America) "In some places it" (the Mackenzie) "is two miles broad, and, in short, as regards its length and its volume of water, is one of the finest rivers in the world."

Archbishop Taché and Mr. Isbister concur in the statement that vessels can navigate the Mackenzie into Great Slave Lake. The former places obstacles to navigation by the same class of ships far up the stream on the Athabasca; but the latter says they present themselves in Slave River. The line of water-way which the Archbishop describes is that of the Athabasca, from the eastern slopes of the Rocky Mountains. The Peace, another great tributary of the Mackenzie, rises on the opposite side—the western side—of that great range; and from the point at which it completes its debouch from the Rockies—Hudson's Hope—is navigable by large steamboats for the whole length—several hundred miles—above Vermillion Rapid. Assuming the stretch of Peace River below Vermillion Rapid and also the whole length of the Slave River, to remain questionable in reference to their navigation by steamboats, there is still no room for doubt that, with the exception of the interval represented by these two—say 350 miles—the Mackenzie offers in conjunction with its affluent, the Peace, a line of water-way available for large steamboats for a period of from four to seven months of the year, and for a length of probably 2,000 miles.

The climate of the upper part of the basin tributary to the Mackenzie is like that of Manitoba.

The following testimony bears on that subject:

Dr. King was the naturalist of the expedition in search of Sir John Ross. In answer 5654 to the Select Committee of the House of Commons (1857) he said:—"Speaking of the very vast area of which the Athabasca is the southern boundary, I believe the average temperature to be about the same as at Montreal in Canada."

In answer 5653, Dr. King explained that when he said that the country "is well adapted for colonization" he included the character of the climate.

On page 131 of his "Voyages," Sir Alexander Mackenzie says he employed men to dig a ditch and set pallisades on the banks of Peace River, in November. On the 6th of that month he states that:

"The river began to run with ice * * On the 16th ice stopped in the other forks * * The water in this branch continued to flow until the 22nd, when it was also arrested by the frost so that we had a passage across the river which would last to the latter end of the succeeding April."

On page 135 he says that between November 16th and December 2nd, the range of the thermometer at half-past eight in the morning was from 27° above zero to 16° below. At noon the range during that period was between 29° above zero and 4 below. At six in the

evening the variation in that interval was from 28° above to 7° below. His thermometer broken, Sir Alexander describes (page 176) the remainder of the winter on the Upper Peace thus :

" On the 5th of January, in the morning, the weather was calm, clear and cold ; the wind blew from the south-west ; and in the afternoon it was thawing. I had already observed at the Athabasca that this wind never failed to bring us clear, mild weather, whereas when it blew from the opposite quarter it produced snow. * * * To this cause may be attributed *the scarcity of snow* in this part of the world. At the end of January very little snow was on the ground ; but about this time the cold became very severe ; and remained so to the 16th of March, when the weather became mild, and by the 5th of April all the snow was gone."

So much for the winter. Now as to the milder season—its character and duration—in the upper parts of the Mackenzie basin :

In his " Wild North Land," Captain Butler writing for the 2nd of April on Peace River, says, page 195 :

" April had come; already the sun shone warmly in the mid-day hours ; already the streams were beginning to furrow the grey overhanging hills, from whose southern sides the snow had vanished, save where in a ravine or hollow it lay deep-drifted by the winter wind "

On page 215 of his book, Butler says of the banks of the Peace :

" It was only the second week in April, and already the earth began to soften ; the forest smelt of last year's leaves and of this year's *buds.* * * * During the whole of the second week in April the days were soft and warm, rain fell in occasional showers ; at daybreak my thermometer showed only 3° or 4° of frost, and in the afternoon stood at 50° or 60° in the shade. * * * With bud and sun and shower came (page 246) the first mosquito on this same 20th of April. * * Have looked (page 356) from the ramparts of Quebec on the second last day of April and seen the wide landscape still white with the winter snow."

In his report of 1874 to the Government of Canada, Professor Macoun (a botanist) writes of the Peace River Valley :

" While we were passing through it, the constant record was ' warm sunshine, west winds, balmy atmosphere and skies of the brightest blue.' Even as late as the 15th of October, the thermometer was 48° at daylight and 61° in the shade at noon. Within the foot hills of the Rocky Mountains I picked up three species of plants in flower as late as the 26th of the same month. These facts, and many others that could be cited, show conclusively that there is an open fall, and the united testimony of the residents make it clear that the spring commences before the 1st of May. There must likewise be a warm summer, as the service berries (*Amalanchier Canadensis*) were gathered fully ripe as early as the 15th of July last year by the miner we engaged at Edmonton ; same berries ripening at Belleville (Ontario) about the 10th of the same month."

Macoun goes on to say :

" Captain Butler, in his ' Wild North Land,' speaks of the whole hillside of St. John's (on the Peace) being blue with anemones (*Anemone Patens*) as early as April 22nd (1873), and Sir Alexander Mackenzie

records in his journal that anemones were in flower on the 20th of April (1793). From the Hudson Bay Company's journal, I found that the average opening of the river in 10 years at St. Johns, was on the 20th of April. The year Captain Butler was there, it opened on the 23rd, and the year Sir Alexander Mackenzie was on it, on the 25th. These dates show that the spring is just as regular as the fall, and that the beginning of winter and the opening of spring are unvarying. * * * The setting in of winter and the end of the ploughing season is, at least, eight days *later* than at Winnipeg."

The climate of the Peace River region having been glanced at, a brief review may be submitted of the quality of the soil.

Sir Alexander Mackenzie says of the Peace River country, on page 129 of his "Voyages":

"There is not the least doubt but that the soil would be very productive, if proper attention was given to its preparation. * * The soil is black and light."

In answer to questions 5645 and 5647 of the Parliamentary Committee of 1857, Dr. King states that:

"Sir John Franklin, Ross Cox, and many others, speak of the richness of that part of country. * * That tract is a rich soil. * * It was a black mould which ran through the country, evidently alluvial soil."

In his "Wild North Land," Captain Butler says of the Peace River region (pages 194 and 256):

"The soil is a dark sandy loam * * the fertile nature of the country between Lesser Slave Lake and the Rocky Mountains, etc."

Professor Macoun says in his reports of 1874 and 1877 to the Government of Canada, on the soil of the upper parts of the Basin of Mackenzie River:

"The whole country seen or heard of throughout the region in question is covered with a deep, rich soil, of wonderful fertility, free from boulders, and having very few swamps or marshes." * *

"The soil examined was of the very best description, being evidently alluvium." * *

"Regarding the quality of the soil throughout the entire region, my note-book is unvarying in its testimony. I took every opportunity to examine the soil, and always found it deep and fertile. It was principally clay-loam; but had much the appearance of the *intervale* lands along streams in Ontario. Its average depth where sections were exposed was five feet; but, owing to the clay-subsoil, it was practically inexhaustible. Days would elapse without seeing a stone, except in the beds of the streams, and swamps were unknown in the level country along Peace River."

The climate and the soil in the region under consideration may be shown practically by a review of its growth. In answers 5633 to 5660 Dr. King said of that conntry to the Parliamentary Committee of 1857:

"The birch, the beech, the maple, are in abundance, and there is every sort of fruit, there is likewise barley."

"That tract is a rich soil interspersed with well-wooded country, with a growth of every kind, and the whole vegetable kingdom alive."

"The trees were very vast and splendid in their growth. * * They are like the magnificent trees around Kensington Park, and would bear comparsion with anything of the kind."

The explorers of the upper region of the Mackenzie-basin appear excited by its richness and beauty. None of them speak of it without enthusiasm. Sir Alexander Mackenzie is no exception. On pages 86 and 87, 129, 163 and 169 of his "Voyages," he says:

"From thence the eye looks on the course of the Little River * * beautifully meandering for upwards of 30 miles. The valley which is at once refreshed and adorned by it is about three miles in breadth, and is confined by two lofty ridges of equal height, displaying a most delightful intermixture of wood and lawn, and stretching on till the blue mist obscures the prospect. Some parts of the inclining heights are covered with stately forests relieved by promontaries of the finest verdure where the elk and buffalo find pastures." * * *

"Opposite the present elevation" (on the Peace) "are beautiful meadows with various wild animals grazing upon them, and groves of poplars irregularly scattered over them. * * Groves of poplar vary the scene and their intervals are enlivened with herds of elks and buffalos. * * The whole country displayed an exuberant verdure, the trees that bear a blossom were advancing fast to that delightful appearance. * * The east side of the river consists of a range of high land covered with white spruce and the soft birch, while the banks abound with alder and willows." * *

"The country is so crowded with animals" (a testimony of its richness) "as to have the appearance, in some places, of a stall yard, from the state of the ground and the quantity of dung that is scattered over it." * *

"After we had travelled for some hours through the forest, which consisted of spruce, birch and the *largest poplars I had ever seen*, etc."

Simpson's Voyage, edited by Mr. McLeod, supplies the following text from Note xxxiv.:

"We reached Methy Lake, near the middle of which, on a long projecting point, we encamped among *firs of great size.* * * From the hills on the north side, a thousand feet in height, we obtained that noble view of the Clearwater River which was drawn with so much truth and beauty by Sir George Back. * * One of the pines under which we took our night's lodging, measured three yards in girth five feet from the ground."

In his "Wild North Land," Captain Butler says (pages 122 and 123) that when he had passed from the south-east—from the Saskatchewan—into the valley of the Athabasca:

"The aspect of the country had undergone a complete change, the dwarf and rugged forest had given place to lofty trees, and the white spruce from a trunk of eight feet in circumference lifted its head full one hundred and fifty feet above the ground."

"A river" (the lower part of the Athabasca) "high-shored and many-islanded, with long reaches leagues in length, and lower banks wooded with large forest trees."

On page 187, Captain Butler speaks of

"The beautiful region of varied prairie and forest land which lies at the base of the mountains between the Peace and the Athabasca River."

On page 235, Butler says of another part of the territory under review :

"A terraced land of rich-rolling prairies * * a park-like land of wood and glade and meadow, where the jumping deer glanced through the dry grass and trees."

The region under review here is what it is said to be by Captain Butler—a "lone land." Except at a few posts of the Hudson Bay Company and a few missionary stations, it is a solitude. Though many instances of actual production of the farm or garden cannot be cited in evidence of its adaptation to cultivation, the following may serve that purpose :

Fort Norman, lat. 64° 31′. In answer 247 to the Parliamentary Committee of 1857, Col. Lefroy says that barley may be grown at Fort Norman. In answer 2562-5, Mr. Isbister says that when stationed at Fort Norman he grew barley, oats and potatoes.

Fort Simpson, lat. 61° 5′. Sir John Richardson says, in answer 3124, to the Parliamentary Committee of 1857, that at Fort Simpson they rear cattle and cultivate barley. Col. Lefroy states, in answer 246, that at Fort Simpson there are regular crops of barley, regular cattle and a good garden. Barley, he adds, grows very well indeed. Dr. Rae says in answer 391, that barley is grown at this Fort ; and Professor Macoun in his report of 1877, cites Mr. Chief Factor Hardisty as his authority for saying that at Fort Simpson barley always ripens, and wheat four times out of five.

Liard River, lat. 61°. In answer 2572 to the Parliamentary Committee of 1857, Mr. Isbister says that wheat can be grown at Fort Liard, but cannot be depended on. In answer 2649, he adds : "On the Liard you can raise large crops." In answer 391 Dr. Rae states barley is grown at Fort Liard. Professor Macoun says in his report of 1877, that Chief Trader Macdougall asserts that all sorts of grain and "garden stuff" always come to maturity on the Liard.

Fort Chippewayan, lat. 58° 42′. In his report for 1877 Professor Macoun says that scarcely anything is done with the soil at Fort Chippewayan until after the 10th of May, and often barley is sown after the 1st of June and comes to maturity. He states that he obtained fine samples of wheat and barley grown at this Fort—the wheat weighing 68lbs. to the bushel ; the oats 58lbs.

Little Red River, on the Peace, lat. 58° 30′. Professor Macoun states that on the 15th of August (report for 1877) cucumbers started in the open air at this place were fully ripe, and that Windsor and pole beans were likewise ripe.

At Vermillion River, on the Peace, lat. 58° 24′. Professor Macoun's report for 1877 cites Mr. Shaw, a Hudson Bay Company's officer, as authority for the statement that every kind of "garden stuff" can be grown here. Barley sown on the 8th of May was cut on the 6th of August ; and was, says the Professor, "the finest I ever saw. Many ears were as long as my hand ; and the whole crop was thick and stout."

Battle River, on the Peace, lat. 58°. Professor Macoun says that at this point (300 miles lower down the Peace than at St. John's, and therefore about lat. 58°) Indian corn has ripened three years in succession.

St. John's, on the Peace, lat. 56° 15′. Professor Macoun states in his report for 1877, that "Dan Williams had oats, barley and potatoes growing at St. John's when I was there. The latter he dug on the 2nd August, and they were large and dry; the two former were fit to be cut about the 12th of the same month."

Fort Athabasca, on the Athabasca, lat. 56° 40′. On page 129 of his "Voyages," Sir Alexander Mackenzie writes: "When first I arrived at Athabasca, Mr. Pond was settled on the banks of the Elk River" (Athabasca River) "where he remained for three years, and had formed as fine a kitchen garden as I ever saw in Canada." In answer 181 to the Parliamentary Committee, Col. Lefroy says: "most vegetables or anything requiring a short summer will grow at Athabasca very well." In his report for 1877 Professor Macoun states that he obtained at Athabasca "specimens of wheat and barley which have astonished all parties to whom I have exhibited them. Many of the ears contained one hundred grains and the weight of both wheat and barley was nearly ten lbs. over the ordinary weight per bushel. These grains had been raised on soil comparatively poor—very poor for the district—and lying only a few feet above the level of Lake Athabasca."

Isle La Crosse, lat. 55° 30′. In note xxxvi. of Mr. McLeod's "Peace River," Simpson says of this place: "The little farm is productive, and the few domestic cattle maintained were in excellent condition." Mr. McLean says: "This post is surrounded by cultivated fields." Colonel Lefroy states of this place, in answer 246 to the Parliamentary Committee of 1857, that 10 acres were cultivated, yielding barley. In his report for 1877 Macoun says of this Fort, that all kinds of grain are reported as ripening successfully. Sir Alexander Mackenzie (page 81) writes: "Except a small garden at Isle La Cross, which well repaid the labour bestowed upon it."

Little Slave Lake, lat. 55° 15′. In his report for 1877 Macoun says he found barley in stack at this place on the 12th of August.

Lac La Biche. lat. 54° 45′. Captain Butler speaks of this place in his "Wild North Land" (page 358), as "a French mission, where all crops have been most successfully cultivated for many years." Professor Macoun says of this station in his report for 1877: "The Indians and Half breeds raise an abundance of wheat and other cereals, together with enormous crops of potatoes and garden vegetables. The missionaries raise excellent crops of wheat and other cereals."

The specifications of production at the twelve places named in the foregoing summary apply at great distances apart. They include an area embracing ten degrees of latitude, and thirteen degress of longitude. The region to which these and the other facts of production and climate apply is described by Simpson (note xxviii. of McLeod's "Peace River"). as:

"Extending from Clearwater or Methy Lake to the Leather Pass (*Passa de la Cache de la Tete Jaune*), and the Rocky Mountain Portage, or Columbia Pass, or Boat encampment. * * In extent it is about five hundred miles from east to west, and two hundred from north to south, say eighty thousand square miles; and is the *very Eden of our North.*"

In answer 541 to the Parliamentary Committee of 1857 Dr. King describes thus the limits of the region covered by his answers as to its soil and production:

"It is bounded on the south by Cumberland House on the Saskatchewan; it is an enormous tract of country. * * Then it is bounded by the Athabasca Lake on the north. This large portion which I describe as within this area, I looked upon as the most fertile portion which I saw."

Mr. Horetzsky, who is employed as an exploring engineer by the Canadian Government, says in his book, "Canada on the Pacific." (pages 229 and 232):

"On proceeding a little to the north and on gaining the water-shed of the Peace River, a decided change is at once perceptible, not only in the appearance of the country, but also in the climate. * * * Within an area bounded by the Smoky River, the Rocky Mountains, and the parallel of $56\frac{1}{4}^{\circ}$ north latitude there lies *the future garden of the West*, now lying fallow, but yet gorgeous with many of the choicest prairie flowers, and replete with the finest wild fruits peculiar to both wood and plain. Beneath its serene sky the lovely hills and dales, with many crystal mountain-fed rivulets between, afford *the choicest soil on the continent*, from which the husbandman will, eventually, extract with ease abundant harvests."

The limits set upon the rich lands described by travellers in the Canadian North West, are seen from these extracts to be loose and different. A map recently published by the Surveyor-General has attempted to give them fixity, but has done so, it may be supposed, without claims to accuracy. Descriptions already cited of the valley of the Clearwater show that that map is wrong in excluding almost all that luxuriant tract from its "fertile belt." Mr. McLeod says with some truth, in his "Simpson's Voyage to Peace River," that the alleged limit of the "fertile belt" does not go far enough north and west. It ceatainly does not go far enough east. Captain Back says (page 64 of his narrative):

"In the River Saskatchewan I was not more pleased than surprised to behold on the right bank a large farm house, with barns, and fence-enclosure, amid which were grazing eight or ten fine cows, and three or four horses. It belonged to a freeman of the name of Turner."

This proof of good soil applies to a part of the Saskatchewan forty or fifty miles to the east of the Surveyor-General's limit of the "Fertile Belt." Cumberland House is about the same distance east and north of that limit. It has been placed outside it in the face of the following evidence of the quality of the soil around the house:—

In his narrative of a journey to the shores of the Arctic Sea Dr. King says on pages 24 and 56:

"The ground about the House (Cumberland) is not only excellent, but fit for immediate cultivation and exhibited a few years ago a very productive farm * * Of fruits, strawberries, raspberries, cranberries, and a variety of gooseberries and currants are found in vast quantities."

McLean's "Hudson Bay" (page 224, vol. 1) says:

"Here" (Cumberland House) "I was cheered by the sigh t of exten sive cornfields, horned cattle, pigs and poultry, which gave the place more the appearance of a farm in a civilised country than of a trading post in the far North-West."

On page 392 of the Report of the Parliamentary Committee of 1857 Mr. Gladman states that the Indians at Cumberland House raise wheat, barley and all kinds of vegetables. In answers 5706 and 5747 Dr. King told the Parliamentary Committee of 1857 that he saw at Cumberland House, farms growing corn, wheat and barley successfully. The wheat was luxuriant. And he bears direct evidence that the fertile belt to whose existenee he testified, extends to Cumberland House, when he said (answer 5669) "my enquries at *Cumberland House*, at Norway House, and at Athabasca, were: To what extent does *this*" (the fertile soil) "go?"

The boundary of the Surveyor General's "fertile belt" may be set down on the faith of the three cases pointed out, to be too far to the west. *How* far no evidence at hand serves to show, save only so far as the following may be held to point—and it points directly—to the conclusion that the rich soil of the region under consideration extends to Norway House.

Dr. King said in 1857 to the Committee of Parliament: "My enquiries at Cumberland House, *at Norway House*, and at Athabasca, were: To what extent does *this*" (the fertile soil) "go?" Col. Crofton stated in answer 3316 to the Parliament Committee, that you might grow corn at Norway House. In answer 182 he said he had seen rhubarb, peas, cabbages, and many other vegetables growing with success at that House. Ballantyne says (page 88), "Behind the Fort" (Norway House) "stretches the thick forest, its outline broken here and there by cuttings of firewood or small clearings for *farms*." On page 126 he speaks of happy hours spent "rambling in the groves and woods of Norway House." Of the Indians at a village two miles from that House, he says (page 116): "They spent their time in farming during the summer; and were successful in raising potatoes and a few other vegetables for their own use." He speaks of the "deepening shadows of the lofty pines at Norway House." And Gladman says on page 392 of the report of the Parliamentary Committe of 1857, that wheat may be raised at Norway House and that the soil at the House is good.

Extending probably from Norway House to the Rocky Mountains, there is, it may be concluded with confidence, a vast region containing a high proportion of land of extraordinary richness. The evidence goes to show that, narrow, perhaps, at its eastern end, that region opens out about the 110th degree of longitude, and presents a depth, including all westward to the Rocky Mountains, if not of ten degrees as alleged by some, of, at all events, four degrees. The most fertile land available in perhaps all the world for settlement, a land more ready in its natural state than any other on earth for immediate cultivation, this future granary of Europe, enjoying an admirable system

of inland water-way and cheap access for some months of the year to ocean commerce, constitutes in reference to the very necessity of providing freights for so great an undertaking, a fact which goes far to determine one part of the true route of the Canadian Pacific Railway.*

The "passes" through the Rocky Mountains within British territory vary from a height of about 7,000 feet above the sea to 1,800 feet. The Yellow Head Pass, which has been made the common point of most of the test-lines applied to the location of the Pacific Railway through British Colnmbia, is about 3,800 feet above the sea. North of it about two and a-half degrees is a pass not half that height, the pass which discharges through the Rocky Mountains the water of Peace River. On page 356 of the "Wild North Land," Captain Butler writes:

"The Peace River affords a passage to the Western Ocean vastly superior to any of the known passes lying south of it. * * It is level throughout its entire course; it has a wide, deep and navigable river flowing through it; its highest elevation in the main range of the Rocky Mountains is about 1,800 feet. The average depth of its winter fall of snow is but three feet. * * From the western end of the pass to the coast-range of mountains, a distance of 300 miles across British Columbia, there does not exist one single formidable impediment to a railroad."

A *prima facie* case presenting itself thus in support of this conclusion, the Peace River Pass taken in conjunction with the extraordinary richness and adaptation to settlement of the Peace River country, seems to determine one point on the true route for the Canadian Pacific Railway.

Portland cannot be accepted forever as the winter outlet of Canada. If dependence on a foreign power in that case is to be stopped at all, the stoppage must govern the location in reference to the Atlantic Ocean of the great arterial line of this nursling Empire. Halifax, or St. John, or both, offering an escape from holding the trans-continental commerce of Canada subject to the good pleasure of the United States, the summer port of the Canadian Pacific, should be selected in reference to these harbours as its winter ports. At or near Quebec is the lowest point at which the St. Lawrence can be regarded bridgeable. About 40 miles farther than Montreal, on a straight line, from Peace River Pass, it is now nearer by railway than Montreal to Halifax by from 150 to 170 miles.† Saving ultimately a railway transportation of over 90 miles to St. John, and over 330 miles to Halifax, the true point for discharge of the Pacific Railway upon summer-tide-water would seem, on these grounds, to be Quebec.

If Quebec be accepted as a fixed point in the East, and the Peace River Pass as a fixed point in the West, a question arises as to the

* The subject of industrial resource is touched on in this paper in reference to but the immediate uses of settlement. The vast wealth of this north-western region in minerals being remote in its application to the question in hand, is disregarded.

† This rests on a comparison of direct-lines—lines certain in the future if the Pacific Railway be made to discharge upon Quebec.

intermediate route. To follow the line now contemplated by way of Montreal, Nipissing, Selkirk, etc., would involve an unnecessary length of track, which would aggregate a total excess between tide-water and tide-water of probably not less than 240 miles. With even six trains each way per day, the working-expenses over that distance would cost a million of dollars per annum. It is needless to add to that reason, if Quebec be accepted as the summer-port, other proof of the conclusion that the route which has been surveyed should not have been considered until a thorough investigation had been made of the direct route.

The straight line between Quebec and Hudson's Hope cannot be followed otherwise than generally. Special considerations demand modifications in that basis of experimental examinations. What these are can be determined but by those who are in possession of access to official reports and maps of the country to be traversed. A few may be suggested here, at a venture by way of illustration. The broken country back of Quebec demands, probably, that the route be thrown as soon as may be into the valley of the St. Maurice. Passing out of that into the rainshed of Hudson Bay—at a maximum elevation of, perhaps, 1,400 feet—it should be directed upon the Abbittibi and the Moose with a view to connection without any considerable increase in length of track, with navigation by ships or steamers from Hudson Bay. Proceeding, tapping on its way the Albany River, the Weemisk River, the Wastickwa River, etc., it would tap the navigation of Lake Winnipeg from the south and of, Nelson River from the north, at Jack River, crossing the latter at say where it is said to be but 200 yards wide, Norway House.

Continuing westwardly from Norway House, the deviations from the straight line suggested by great special considerations would take the railway to, say, Big Bend, so as to tap the navigation of the Saskatchewan above the Grand Rapid. Proceeding into the valley of the River *Lac la Rouge*, it would go on to tap the Beaver River and the Athabasca; and tapping the Peace River near the mouth of the Smokey, might continue thence to Hudson's Hope as it entered Peace River Pass.

The line sketched out here is sketched as but a basis of experimental work subject to modification, or, as facts may demand, rejection. It may prove an investigation to be unsuited totally. It involves some assumptions which do not rest on a sufficient breadth of information, and other assumptions that are little better as a ground for grave decision, than conjecture. But Peace River Pass being once accepted as a point on the route of the Canadian Pacific, and Quebec as its point of discharge upon summer-tide-water, the circuit by way of Lake Nipissing, Lake Superior, and Manitoba, involves so great an excess of length that it ought to be held inadmissible until all the facts, physical and agricultural, shall have been first brought out in reference to the line from Quebec by way of Norway House.

From Peace River Pass to Norway House the route suggested in the first of these articles has already been glanced at—its soil, its

climate, its topography. That section of the line proposed runs probably for its whole length---between 800 and 900 miles—through the "fertile belt." The other section—that extending from Norway House to Quebec—will be brought now under the light of the very few facts which have been collected as a ground for meeting the prejudices which are ready to reject without enquiry the suggestion of a railway through the immediate basin of Hudson Bay.

Unknown tracts of land in Canada have always been regarded icy "barrens." The progress of settlement has, however, corrected that indolent opinion so often that people in the Dominion are now disposed to think that there may be a fair land and a tolerable climate within the basin of Hudson Bay. An official map published by the Chief Engineer of the Canadian Pacific Railway asserts that one great tract immediately south of Hudson Bay is "a flat country; soil, loam and clay, good quality;" and that another great tract immediately south of that Bay is "reported to be a level country, alluvial soil." Applying as these descriptions do to about eight hundred miles of the line between Quebec and Norway House, they certainly do not discourage investigation of that line when they are contrasted with general facts of the corresponding eight hundred miles of the route by Nipissing and Superior to the border of Manitoba—a route of formidable difficulties, heavy expenditures and limited breadths of cultivable soils.

The climate along the route proposed north of the ridge dividing the great lakes from Hudson Bay seems to be fully as favorable to agriculture as that of the line south of that ridge. Retired sufficiently from the Bay to be beyond the chilling influence of its floating ice, the average elevation of the northern line would probably not exceed 400 or 500 feet; while the average elevation of the southern line is probably not less than 1,000 feet. According to Humboldt's rule the difference in elevation would compensate for two degreess of the difference in latitude. The meteorological averages offer the following basis of comparison between corresponding points on or near either route:—

Latitude.	Station.	Averages of Fahrenheit.				
		Spring.	Summer.	Autumn.	Ripening Months (July and August.)	
° ′		° ′	° ′	° ′	° ′	
46.48	Quebec	47.70	61.40	26.40	66.10	
45.25	Ottawa	51.60	64.00	26.20	68.50	
51.16	*Moose Fort	34.58	62.20	.....	64.78	Hudson Bay.
48.24	Fort William.....	39.67	59.94	37.80	60.52	Lake Superior.
54.00	Norway House ...	26.23	59.87	29.93	62.35	
53.37	Cumberl'd House	33.04	62.62	32.70	64.25	
49.53	Winnipeg.....	46.50	60.30	17.10	64.60	Wheat clim'te.

* These averages for Moose Fort have been supplied by the kindness of Professor Kingston, of Toronto University.

Moose Fort is situated on Hudson Bay. Influenced by floating ice during part of the summer, its climate is, it may be inferred, not so favorable to agriculture as that of the route proposed here for the Pacific Railway. Its heat-averages compare well with those of Fort William on Lake Superior, showing, it is true, a later spring, but a summer somewhat warmer and a ripening season warmer considerably. In comparison with the fine wheat-growing climate of Winnipeg, the climate of Moose Fort shows a shorter spring; but enjoys, probably, a longer autumn; and receiving the same amount of heat during the period of ripening, receives during summer a heat somewhat greater. This digest of the foregoing table may serve, in general, to open the mind of prejudice to the inquiry whether, after all the obstinacy of foregone impressions, the climate on the southern shore of James Bay may not be as well suited as that of Winnipeg or Fort William to the uses of agriculture.

Theoretical considerations having cleared the way, now for some facts as to farming at Moose Fort. Here we come on conflicting testimony, the witnesses interested in the Hudson Bay Company carrying out the policy in which they all, not excepting Sir George Simpson, attempted to mislead the Parliamentary Committee of 1857. Sir George said before the Committee (answer 748) that at Moose Fort, "barley seldom ripens; potatoes small; the crops being unproductive." Dr. Rae, another Hudson Bay Company's officer stated (answer 376) barley would not ripen; you could not depend upon it at Moose Fort. Potatoes there are, he said, variable; sometime five or six fold; sometimes scarcely the seed. On the other hand Mr. Gladman who had lived at Moose Fort for several years, says (page 392 of Report of Parliamentary Committee of 1857):

"Climate and soil good; raised potatoes and other vegetables there in great abundance; barley ripened well; small fruits, as currants, gooseberries, strawberries and raspberries, plentiful; grow wild; never knew wheat tried, the season being too short; horned cattle, horses, sheep and pigs kept there, all housed in winter."

This testimony of Mr. Gladman had been given in substance long previously by others. Robson said a century before, in his "Six Year's Besidence in Hudson's Bay," that fall wheat sown at Moose Factory stood the winter frosts and grew very well in the following summer. To the Parliamentary Committtee one hundred and eight years previously to Sir George Simpson's evidence, Dr. Thompson stated that he had seen better barley and oats grown at Moose River than he had ever seen in the Orkneys, though the seed required to be renewed. Hobbs, in his book on Hudson Bay (London, 1744), states that Mr. Frost who had resided for many years at Moose Fort, affirmed that he had grown there with success, barley, peas and beans.

In his report of 1875-76 to the Geological Office of the Canadian Government, Mr. Bell says (page 339):

"At Moose Factory, although the soil is a cold, wet, clay, with a level undrained surface, farm and garden produce in considerable variety

are raised every year. Among the crops harvested in 1874, were 1,700 bushels of good potatoes. Oats, barley, beans, peas, turnips, beets, carrots, cabbages, onions, tomatoes, etc., are grown without any more care than is required in other parts of Canada; and I was informed that some wheat which had got accidentally sown one year, was found to ripen. * * Upwards of 80 head of cattle are kept at Moose Fort, besides horses, sheep and pigs."

Moose Fort is clearly within the limits of agriculture. Situated on a shallow estuary in which the ice lingers longer than in the more open parts of Hudson Bay, its position is to that extent unfavorable. A dozen witnesses concur in stating that even twenty-five or thirty miles inland from any part of the southern shore of Hudson Bay the climate is much warmer. On the faith of this general testimony it may be concluded with safety that Moose Fort enjoying a climate in which gardening and farming are practicable, the interior of the Hudson Bay country south of Moose Fort enjoys a climate much more favorable for gardening and farming. But the special facts corroborating this conclusion are few and far between. In order to present them with direct pertinence to the question under consideration, they will be now stated as far as they have been collected in relation to the proposed route of the Pacific Railway between Quebec and Norway House. Dividing the route out of Quebec into sections of one hundred miles, the facts about to be cited may be grouped as follows:

Section 1.—The practicability of agriculture on the proposed route may be illustrated by a case a hundred miles north-east of the end of this section—that of Lake St. John. The Toronto *Mail* (newspaper) said a few months ago of that region:

"The agricultural progress of the Lake St. John district of Quebec is reported to be exceedingly rapid. Statistics are printed by Quebec journals showing that during the past ten years the population of the locality has increased 67 per cent., the acres of cultivated lands 116 per cent., bushels of wheat raised 1,147 per cent., butter 140 per cent., and live stock 139 per cent."

Section 2.—This part of the proposed route lies through the valley of the St. Maurice. In the Geological report made for 1870-71 to the Canadian Government, Mr. Richardson says (p. 300): "Following the St. Maurice upward * * the river for considerable distances winds through extensive flats of sandy loam * * Some of these produce an abundance of wild grass which would support many hundred head of cattle."

Section 3.—This includes the "height of land" which divides the rain basin of the St. Lawrence from that of Hudson Bay. Mr. Richardson says, in continuation of the last recited words of his report (page 302): "Lake Chibogomon * * towards the north-east end and along nearly the whole at the south-east side sandy loam prevails, and where the openings in the woods are met with a good wild grass is found. * * Lake Wakanitchie * * the remainder is dotted with green woods; the trees are of good size and of the usual kind,

spruce, white birch, tamarack and some Balsam-fir. What influence the climate may have on vegetation I am unable to determine ; and the only fact I can offer bearing on this, is that Mr. Burgess of the Hudson Bay Company's post on the lake furnished me on the 7th of August with fair-sized new potatoes, the only crop at present cultivated there."

Section 4.—This section lies within the basin of Hudson Bay, down the valley of the Harricanaw. On or near the summit between Hudson Bay and the St. Lawrence, Mr. McOuat of the Geological Service reports (page 119 of report for 1872-73) to the Canadian Government that he found several pine trees which measured in circumference eight or nine feet. He adds that several acres of land are cultivated at the Hudson Bay Company's post on Lake Abbittibe—about 150 miles from this section of the proposed route—and the lake being surrounded by clay flats, a French Canadian who has resided at the post for many years, asserts that although the only crop grown there now is potatoes, all the cereals can be cultivated on Lake Abbittibbe just as well as on the St. Lawrence.

Section 5.—No fact has been come on which bears on this section otherwise than remotely.

Section 6.—The review of things at Moose Fort applies to this section. Mattagami Lake and Missinibi Lake lie south of this part of the route about 150 miles, on the slopes of the basin of Hudson Bay. Mr. Bell says of these in the Geological Report for 1875-76 (page 341) : " Farming and gardening have been successfully carried on by officers of the Hudson Bay Company at their posts on Lake Mattagami and Missinibi ; at the latter, Mr. John McIntyre, now of Fort William, has informed me that he found spring wheat to ripen well." Of New Brunswick House, a Hudson Bay Company's post 100 miles south of this section, Mr. Gladman, in his statement on page 390 of the Report of the Parliamentary Committee of 1857, says : " The soil very good ; raised excellent potatoes and every description of vegetables ; oats ripened very well ; had barley also. Has since heard wheat has been tried with success. Horned cattle kept there, housed during winter. Know nothing to prevent a good settlement there."

Section 7.—Henly House is an old Hudson Bay Company's post which was situated not far from the route of this section. To the Parliamentary Committee of 1749 Mr. Hayter said : " The climate is much warmer at Henly House than at Albany" (on the shore of Hudson Bay). "* * The country about Henly House is very high, but much warmer than the coast. * * He has seen large tracts of land that would, in his opinion, bear corn if cultivated, the climate being much warmer within land."

Section 8.—Long Lake is about 100 miles south of the proposed route, but within the slopes of the basin of Hudson Bay—over 1,000 feet above sea-level. Mr. Bell says on page 351 of the Geological

Report for 1870-71 : "Oats and barley have been successfully cultivated at Long Lake House, while hay, potatoes and all the ordinary vegetables thrive remarkably well." Martin's Falls, on the River Albany, is on this section. Of the Hudson Bay Company's post situated at that place Mr. Bell says, in the Geological Report (Canadian Sessional Papers of 1872): "Hay, turnips and potatoes have been successively cultivated for a long time at this post, and the cattle kept there thrive well."

Sections 9, 10, 11.—No testimony as to the adaptability of the country along these sections for cultivation has been obtained.

Section 12.—Oxford House is a post of the Hudson Bay Company, situated on Hill River about a hundred miles north of this section. Lieut. Chappell says in his "Voyage to Hudson Bay," that at Oxford House excellent vegetables are produced, owing to the richness of the soil and the geniality of the climate. Mr. Gladman states (page 392 of Report of the Parliamentary Committee of 1857), that he experienced no difficulty in raising at Oxford House vegetables and potatoes to spare for York Factory and the Indians. Hill River flows to the north of this Section 12. Of that stream Simpson's diary, McLeod's addendum, ("Peace River") says : "Arrived at the Rock at half-past three in the afternoon. Had a peep at the Rock, an old establishment, and its *gardens*." Ballantyne says of Hill River, on page 190 of his book : "The banks of the river were covered from top to bottom with the most luxuriant foliage, while dark clumps of spruce and fir varied and improved the landscape * * numbers of little islets covered to the very edge of the rippling waters with luxuriant vegetation * * beautiful banks covered with foliage of every shade, from the dark and sombre pine to the light drooping willow."

Section 13.—This includes Jack's Lake and Norway House. The water-way from Lake Winnipeg to York Factory through Nelson River and Hayes River crosses this section. Robson says in his "Six Years' Residence in Hudson Bay," (page 43) : "Upon Hayes River, 15 miles from the Fort (York) * * after paling in some ground" (four degrees of latitude north of this section) "for a coney-warren and for oxen, sheep and goats, etc., I should expect by no more labor than would be proper for my health, to procure a desirable livelihood, not at all doubting of my being able to raise peas and beans, barley, and probably other kinds of grain." Of Fort York itself—on Hudson Bay, 300 miles east of north from Norway House —he says (page 43) : "The soil about York Fort, which is in 57° 10′, is much better than at Churchill River. Most kinds of garden-stuff grow here to perfection, particularly peas and beans. * * Gooseberries and red and black currants are found in the woods, growing upon such bushes as in England."

The route suggested here has been presented, so far, in facts of specification. The limits proper to this article make that mode of

treatment in every instance, impossible. Passing, therefore, into general assertion based on study of the subject, it may be stated that for a thousand miles east of Norway House, the line under consideration traverses a country covered from end to end with a forest-growth containing boundless supplies of timber. Though chequered with areas of naked rock and with numerous tracts of swamp, most of them of the class which disappears in the ordinary progress of settlement, it offers to agriculture in a climate admitting the growth of wheat and favorable to the growth of almost all other products of the field and garden, vast extents of good soil.

Topographically the route suggested here compared with that which has been surveyed, is decidedly preferable. While the thousand miles immediately east of Lake Manitoba on the latter involve heavy works and unfavorable lines, the corresponding thousand—from Norway House eastward—involve, in all likelihood, good lines and light works.

The proposed route from Quebec to Peace River Pass crosses many great water-courses. All of these are navigable, whether by the canoe, the keel-boat, or the steamboat; and supply thus a system of branch-lines discharging with their facilities of transportation along what are the usual, if not the very best, "fronts" of settlement.* Mr. Bell, in his Geological Report of 1872, says of the River Albany which flows into James Bay: "I ascertained that the river between this point" (Martin's Falls) "and James Bay is open, on an average, six months of the year." This is good for the conclusion that the Rupert, the Notaway, the Harricanaw the Abbitibbee, the two branches of the Moose, the Albany itself, and the smaller rivers flowing into James Bay, are open to navigation for a period but twenty-six days less than the period of navigation of Lake Superior as limited by the canal at Sault St. Marie. Taking the Nelson River as the guage of the period of navigation in the case of the water-ways west of James Bay, they—the Weemisk, the Deer, the Severn, the Hays, etc.—may be set down as closed by ice for fully seven months of the year at *their mouths;* but, on their upper sections, free from ice, like Nelson River itself, for six months.

The route proposed here would connect by ship, or steamboat, navigation on, say Moose River, with that unknown sea, Hudson Bay. Robson pointed out a hundred years ago the importance of directing the efforts of British statesmanship to the utilization of that North American "White Sea." On pages 81-82 of his "Six Years' Residence," he says:

"The countries surrounding Hudson Bay and Straits, have a sea-coast

* That certainly very great advantage is not without a serious drawback in the case of the rivers west of Norway House. Those flow at great depths below the general level of the country—Peace River at Dunvegan, being, for instance, 900 feet below the plains it traverses—and, therefore, constitute at their crossings by the railway, serious drawbacks in length of track, if not in also bad lines and heavy works.

of 2,000 miles extent * * great part of which is in the same latitude as Great Britain. Upon the sea-coast are many broad and deep rivers the sources of which are several hundred miles distance, south, south-east and south-west of the Bay. * * the soil is fertile, and the climate temperate for the produce of all kinds of grain, and for raising stocks of tame cattle; and the coasts abound with black and white whales, seals, sea-horses, and various kinds of small fish."

In the dedication of his book to Lord Halifax, he adds:

"The opening a new channel for trade to a vast country abounding with inhabitants" (Indians) "and with many beneficial articles of commerce, is a work that highly merits the attention of our wisest and greatest statesmen. * * * Whales and various other fish are so plentiful in the Bay and in the inlets leading from thence to the Western Ocean, that the natives, etc. * * The land abounds with mines and minerals, and is also capable of great improvement by cultivation, and the climate within the country is very habitable."

Hudson Bay Company's schooners carry on intercourse between the several posts on the shore of the Bay. That great inland sea is navigable by ships, it may be stated with safety, five months of the year. Two or three of the Company's vessels have maintained communication between Scotland and Moose Fort and York Factory for two centuries; but, whether or not because of the jealous exclusiveness of that monopoly, this fact does not apply in any year beyond limits of six weeks. Robson attemps to show that the Bay may be entered from the Atlantic earlier than the usual date of entrance by the Company's ships. But a more zealous, laborious, and able man followed in the footsteps of Robson when the Statistical Society's Journal received its admirable paper of March, 1868, on "The Commercial Progress and Resources of British America," from the pen of Professor Hind. In that article its author says:

"The passage from Norway House at the northern extremity of Lake Winnipeg to Hudson Bay is made in nine days, with loaded boats. It is not unreasonable to suppose that by the introduction of tramways over the portages the journey may be made in four days, thus bringing Lake Winnipeg within four days of the sea. * * It is not at all improbable that more easy means of communication with the sea board exists than those which are now pursued. * * It is more than probable that whenever the necessity arises, the communication between Lake Winnipeg and Hudson Bay, and thence to the Atlantic by aid of steamers, will be made easy and speedy for at least three months of the year. * * The outlet by which the waters of the Saskatchewan and Lake Winnipeg reach the sea is Nelson River. * * The head of tide-water in Nelson River* may yet become the seat of the Archangel of Central British America, and the great and ancient Russian Northern port—at one time the sole outlet of that vast empire —find its parallell in Hudson Bay."

* The French Admiral Perouse entered the Nelson with three vessels of war, one of them a line-of-battle ship. Ellis in his story of a voyage to Hudson Bay says the estuary of the Nelson is six miles across and has a channel of a mile wide which varies in depth from five to twenty fathoms (see Professor Hind's evidence).

Professor Hind has supplied a mass of highly valuable facts and suggestions as to Hudson Bay in his replies to a Committee of the Canadian Parliament. In volume xii. of the Journals of 1878 his answers on that subject are full, laborious, and highly interesting. Going to establish the conclusion that navigation may be maintained through Hudson's Straits for *four* months of the year, he dwells on the practicability of erecting at York Factory, or as it is called Port Nelson, a British American city of Archangel. He says :

" With the exception of that portion which finds its way into Hayes' River, the Nelson throws into the sea the combined drainage of the North and South Saskatchewan, and of the vast extent of country draining into Lake Winnipeg. In fact the Nelson River receives the waters of an area as large as France and England combined ; it is the outlet of the basin of Lake Winnipeg, and must be regarded as a river of the first-class— * * . Then, again, the distance of Port Nelson" (York Factory) " from Liverpool is nearly one hundred miles less than Liverpool is from New York, the relative distances measured on the globe being 2,960 miles and 2,020 miles. If two of the Dundee sealing steamers, similarly found, were to start at the same hour in the month of September, one from Port Nelson, the other from New York, the probability is they would arrive on the same day in Liverpool."

Large as would be the yield of wheat in the country around the River Peace, it would not leave a very high reward to the producer after the cost of shipment to Quebec. Economy might, perhaps, find an outlet for the breadstuffs of the lower reaches of the Peace by way of the Mackenzie River and the Northern Ocean. On the upper reaches, it would, with Quebec as the alternative, take, as the wheat of California does on the way to England, the railway to the Pacific Ocean. The line of division between the grain going west and the grain coming east would, however, run west of the Rocky Mountains if the former were offered the economy of Liverpool ships at Port Nelson.*

The freight-rates (Answer 5001 to the Parliamentary Committee of 1857) between Port Nelson and London were set by the Hudson Bay authorities in England at £2 sterling per ton. That was thirty years ago ; and is doubtless considerably in excess of the rate at which the carrying-trade from Hudson Bay could be maintained to-day ; certainly so when freights had offered in the vast volume and under the sharp competition of Professor Hind's British American city of Archangel. Six dollars per ton being as much as would be likely under the circumstances, productions could be delivered from the Far-West as cheaply, or nearly so, by way of Port Nelson (Hudson Bay), in London, as by way of Fort William (Lake Superior), *in Montreal or Quebec.* The intermediate route comparing as 1,030 miles of railway to Norway House *plus* 420 miles of river from Norway House to Port Nelson, with 1,590 miles of railway to Fort

* This goes to an increase of the receipts of the railway by giving it hold of its way-business for longer distances.

William *plus* several days' transportation by the lakes to tide-water, the shipment of grain to Europe by Hudson Bay would represent a saving on that to Europe by the St. Lawrence, of from 15 cents to 25 cents per bushel.

Fort William enjoys communication with tide-water for six months and two-thirds. Port Nelson at Professor Hinds' estimate, would enjoy intercourse with the Ocean for but four months. For two and two-thirds months the above economy of the line by Norway House would cease to apply. But the benefits of the outlet by Fort William would remain during the navigation of Lake Winnipeg—nearly the whole of that period. That alternative would involve, it is true, two "breaks of bulk;" but it would compensate for these by the economy of substituting for 150 miles of additional transportation by rail, a cheaper though longer stretch of transportation—by Lake Winnipeg. And. for the winter—say five and one-half months—the all-rail route by Norway House compared with the all-rail route by Fort William, would give an outlet from the Far-West to Halifax 240 miles shorter.

All this proceeds on the supposition that Peace River Pass can be connected by railway with the Pacific. The division from Quebec to Norway House having been touched on above, and that too from Norway House to Hudson's Hope, at the mouth of the Pass, what now of the division from Hudson's Hope westward?

A foregone conclusion has dealt with the question of the discharge-point of the Pacific Railway on the western coast, under test-lines radiating from Yellow Head Pass. The results having been favorable, necessarily, to the ports situated best in reference to that Pass, they supply no just basis of comparison in reference to other passes. The adoption of Peace River Pass involves, unless under the pressure of over-ruling considerations of topography, the rejection of Bute Inlet and all the harbors farther south. In this it disposes of the highly objectionable, if not absolutely inadmissable,† expedient of a ferry to a harbor on the west coast of Vancouver, and the equally objectionable alternative of carrying the Pacific commerce of Canada under the guns of San Juan. It disregards the local interests of ten or fifteen thousand people; and, proceeding on Imperial and National interests, addresses itself exclusively to the selection of a mainland port from those that offer free intercourse with the ocean.

This review will touch on the question of the Pacific-port in relation to but the railway approaches. It may state, however, that objections can be raised by mariners to *any* port. As some of those urged against the northerly harbors of British Columbia seem of no great importance practically, it may be well to say that to guard against

* Inadmissable so far as it may be held a wanton exposure of the traffic to hostile disturbance by ships on the line of ferriage, and so far as it increases the cost of transportation between the two oceans by a wanton and very considerable increase of the length of railway.

discriminations not based on the working of things, all that is actually *essential* in a harbor is room, depth and land-margin. With a million of bushels of wheat deposited on a bank having at its base twenty feet of water enjoying free approach from the open sea, all technical objections are worth little consideration except so far as they may be made intelligible to "land-lubbers" in terms of the cost of towage and insurance.

The water-shed of the Peace seems to be divided from the water-shed of the Skeena by a long, narrow, handle of the basin of the Fraser—a handle which is interjected between the two for 120 miles, at a width averaging 20 or 25 miles. That projection is a part of the lake-dotted plateau of British Columbia; and being almost certainly lower by, say, 1,000 feet, than Yellow Head Pass, gives some promise of a practicable crossing from Peace River Valley into the longest slope and by the shortest line which offer in that quarter for descent to the Pacific—down the Skeena. But this turning out to be impracticable, the general body of the plateau—south of Lake Babine—remains open for trial with a view to an outlet on Gardner Channel or on Dean Inlet.

Imperial considerations concurring with those which call for the route from Quebec by Hudson Bay and Peace River Pass, demand that the extension of the Railway be made through British Columbia to a northern port. As nothing should remain undone to maintain that harmony of the project, the region between Peace River Pass, or Pine River Pass, and the Pacific Ocean, cannot be allowed to continue as it is declared on the map to be, "unexplored." But isolated explorations will hardly meet the necessities of the case. The Indian, the miner, the buffalo, do not supply "trails" in exhaustion of all the resources of engineering. Whether the true route from the forks of the Peace shall turn out to be into the Skeena, into the Dean, into the Bella Coola, or into even Portland Channel, the final decision cannot be arrived at satisfactorily, especially in a region remarkable for not only rents completely through its mountains but for, also, deep clefts in their sides, until surveys shall have been made with a view to the discovery of, besides the existence of "passes" the existence of such conjunctures of clefts as may offer a solution of the problem by tunneling.

No opinion can be given here as to the best route from Peace River Pass, or its alternative, Pine River Pass, to the Pacific. If the physics of the intermediate country offer no serious reason to the contrary, the route most desirable with a view to a harbor, is, probably, that down the Skeena—with the contingency of extension to Port Simpson. As the much-spoken-of commerce of the east does not supply a very safe expectation to count on for freights where it supposes transportation over 2,500 miles of railway, it may be well to say that not the least advantage of placing the terminus of the Canadian Pacific at a northern port, is the resulting settlement of

Queen Charlotte's Islands. Forty miles at one end and a hundred miles at the other end from the mainland, they stand in front of the shores of British Columbia from Nepean Sound to Alaska, an advanced base for naval operations in the Northern Pacific. About one-fourth of the area of Vancouver's Island, they offer a valuable source of traffic for the Pacific Railway and a citadel of British power beyond the shadow of the power of the United States. They contain abundant supplies of coal on the very edge of tide-water. Their resources in the metals are extensive and rich. Mr. Poole, an engineer sent from England to superintend mining operations there, says in his book, "Queen Charlotte's Islands" (pages 300 and 304):

"The temperature during my two winters was never lower than 8° below the freezing point, and during my two summers never higher than 80° in the shade. * * Snow fell rarely and always in small quantities, soon disappearing. * *

"Vancouver Island has plenty of good arable land; but I saw nothing there, either in quality or quantity, to equal what is to be seen on every side along the shores of Queen Charlotte's Islands. The soil fit for farming purposes is not only extensive beyond all present calculation, but is rich beyond description."

This paper does not speak as a partisan of its own ideas. It contents itself with submitting evidence in the way of memoranda designed simply to set men thinking on the subject. It omits, therefore, to sum up the reasons on which it has suggested that the surveyed route of the Canadian Pacific by Lakes Huron, Superior and Winnipeg ought not to be adopted until surveys shall have first decided against the route from Quebec by Norway House and Peace River Pass.*

The mode of construction and the mode of exploration adopted in the case of the Canadian Pacific Railway seem to be unsuited to the circumstances of the case. Some remarks on both of these subjects may now be offered for what they are worth, beginning with the construction.

The cost of provisions in the preliminary service of the Pacific Railway has been extraordinarily high by reason of the cost of transportation. The conveyance of very considerable quantities of food for men and horses for great distances over a roadless wilderness ought to be made unnecessary in a land teeming with agricultural richness. That economy should certainly be effected immediately, if

* Physical difficulties being found to involve a great excess in length of track to the Ocean by way of Peace River Pass, that excess may perhaps be reduced with working economy by passing the Rockies, as Mr. Marcus Smith proposes, by way of Pine River Pass. But *every* summit, be it recollected, has its equivalent in distance. Mr. Fleming's objection to Pine River does not seem good in fact or in principle. In the first place, when assuming that a summit as high as Yellow Head must be crossed beyond Pine River Pass, there is reason to suppose him mistaken. In the next place, the level of Yellow Head not being maintainable across the plateau leading to the Pacific slopes —*en route* to a northern port—the avoidance of that pass in favor of the lower one, that of Pine River, would, it is submitted, be still a mechanical saving.

but to anticipate the great demand for food incident to the work of construction. But the correction of that mistake is not only an expediency of the construction of the railway; for it is also a necessity of the settlement of the country. Ordinary settlers on the route must receive their supplies from local production, and at rates possible to but production on the spot. *A thousand dollars would plant and feed for twelve months four settlers, in buildings common to the four, at, say, every tenth mile of the railway track; and thus would an advance of $200,000, to be paid back in provisions, place 800 men at the production of agricultural surpluses at 200 different points along the line. These initiatives being established promptly, they would receive additions spontaneously; and would expand steadily to a breadth of production which, in two or three years, would be ample for the uses of both the railway "hands" and the "colonizers."

Generally flat, the country from the dividing ridge north of the St. Maurice to Pine River Pass will admit, probably, of a special mode of railway-construction. Placing the road-bed on an embankment is practicable for very likely three fourths of that interval; and the embankment made sufficiently high, will not only save trouble from snow, but also add in the line of "borrowed" earth at its edges, an outfall for drainage highly valuable to the first settlers, within at all events the basin of Hudson Bay. $2,500 or $3,000 a mile would be expended under this system on work that may be executed by manual labor. The cost of clearing, grubbing, cross-tieing, etc., etc., added to this, each mile would represent a wage-fund of, say, $4,000, and would therefore pay eight men for two years at the rate of $250 a year. The pioneer-settlers paying for Government advances in provisions, these eight men could sustain eight others working under a system of partnership-settlement, the latter preparing land on joint account for cultivation; and the former sustaining them while doing so from their railway-earnings.† At the end of two years the sixteen starting with a supply of provisions for the third year, could go on with the work of farming, a railway at their doors being ready by that time to bring their surpluses to market. By only some such proceeding can the real difficulty of this British Pacific Railway be

* Every able-bodied laborer settled on the line of the Pacific Railway, ought to be worth to the owner of that long line of railway transportation, at least fifty dollars a year as a producer of freights. An annual surplus of 300 bushels of grain might be produced by one man on the rich soils of Peace River; the shipment of that product alone to Quebec would contribute to the revenue of the railway three times that sum.

† All this proceeds on the supposition that the work shall be carried out, not by contractors, but by salaried officers. There is nothing novel in that, however; for works under the Act of 1844 or 45 for the drainage and navigation of rivers in Ireland, were executed in all parts of that country by gangs of laborers serving as contractors under the direct supervision of engineers, overseers and gangers, who acted under the Board of Works—executed economically for the Crown, and with profit and satisfaction to the tens of thousands of laborers thus employed.

met, the difficulty of setting *a limit to its cost* by providing it as it goes on to completion, with traffic for its self-support.

The Canadian Pacific Railway should not cost at first a dollar more than necessary to make it passable by trains. Interest kept down thus, the opening should take place as soon as possible so as to begin the process of developing business. Running through a country perfectly new, it will not require at the outset the class of works proper to great traffic. The bridge-piers are, in truth, the only constructions that demand permanence. Its road-bed high, well-drained and well cross-tied, it can dispense as long as necessary with ballast, fences, cattle-guards, road-crossings. Except at such places as the intersection of rivers, station-buildings will not be necessary. A colonization road whose object at first is that of simply opening up the country for settlement, it may resort freely to undulating grades, sharp curves, wooden bridges, and almost unbroken stretches of single-track-embankment. Rock-work, deep cuts, high embankments, etc., being all avoided by, where unavoidable otherwise, substitutions of one sort or another, the road and rolling-stock ought not to cost for the purpose of opening for traffic between Quebec and Peace River Pass, more than $15,000 or $16,000 per mile. Any subsequent addition of ballast, subtitution of trestling by filling, replacement of undulating gradients by heavy work, etc., etc., may be made in employment of idle rolling-stock—made by degress at the charge of revenue and in the continued production of revenue, by a system of labor associated with the encouragement of settlement.

The political policy which England has placed on trial in the creation of the Dominion of Canada involves a great British interest. In the fore-front of that policy lies the Canadian Pacific Railway. Based on Halifax, its summer-outlet at the fortress of Quebec—on the defensible waters of the St. Lawrence—and opening up communication from the rear with Europe by way of Hudson Bay, and perhaps by way of Mackenzie River, it supplies a line of transportation three hundred miles north of the frontier, for maintaining the defense of British interests on the great lakes and on the Northern Pacific. Giving to English commerce and enterprise the vast wealth of land and water within the basin of a great inland sea; grasping the fisheries of the Northern Ocean for a hardy population south of them; opening, probably, a direct route by way of that ocean between England and the boundless wheat-region drained by the Mackenzie; and planting British power in a position on the shores of the Pacific from which it can overshadow rivalry in the surrounding waters, the Canadian Pacific Railway stands in relation to Imperial policy in the creation of this Dominion, as an essential base of its development, the very spinal column of another North American Empire! The route suggested above places that great enterprise fairly within the objects of British statesmanship; and raising it out of the Colonial into the Imperial, makes it a legitimate subject for Imperial support.

The country east of Norway House is not suited to settlement by Europeans. Their inexperience in woodcraft, their awkwardness in the use of even the axe, their want of adaptation to the work of ploughing, planting, or harvesting between the stumps and tangled roots of a "clearing" in a dense forest, make it inexpedient to trust the work of civilising the wild lands of Hudson Bay to emigrants from an old country. The civilisation of that region must rest with the forest-bred Canadian. His experience in settlement under these conditions, his familiarity with the production of timber, and the "rafting" of it to the sea—to be worked up in the present case at the mouth of the Moose, of the Albany, etc., into ships—will enable him to cut out his homestead in the woods of Hudson Bay with success.

West of Norway House the land is suited exceptionally well to settlement by men fresh from Europe. If not actually up to the door of that House, certainly four or five days' march beyond it the soil is extraordinarily fertile. The rivers being several hundred feet below the general surface, that surface is well drained. Rolling gently it throws off its rainfall into those deep outflows, and presents, therefore, very few cases of swamp. Its forests alternating with prairies, it supplies abundance of wood for building, fencing, firing; and offers, in conjunction with that necessity of settlement, adjoining tracts of treeless soils ready this moment for the plough. A country so rich, so admirably suited to English emigration, is not available elsewhere on the globe. That it is perfectly accessible to that emigration by way of Hudson Bay has been fully established by the fact that in 1846, Port Nelson (Fort York), on the river discharging into Hudson Bay from Norway House, was reached in a ship from Cork by Col. Crofton on his way to Red River, with heavy guns, heavy stores, a battalion of infantry, a detachment of Royal Engineers, a detachment of artillery—in all 383 persons, including 36 women and children. Transportation to Australia being costly, and wild lands in the United States being now obtainable at but vast distances from the seaboard, English interests, Irish interests, Scotch interests, have reason at a time when commercial stagnation makes the population of the three kingdoms dangerously redundant, to regard the opening of the rich wheat-territory extending from Norway House to Peace River Pass, a result worth realization at the cost of their common taxes. The Canadian authorities assuming the construction of the Pacific Railway from Quebec to the point at which the special interests of England, Ireland and Scotland begin—Norway House—the British Government is certainly interested sufficiently in the enterprise to carry it out to the Pacific in consideration of, say, fifty millions of acres of the fertile lands lying along the route ready to reward millions of British workers twelve months after their arrival, with the bread of independence.

The proposition to enlist the Imperial authorities in the Pacific Railway demands special work to give it practical shape. This leads to the second head of these closing remarks, that as to the mode of exploration.

The general considerations which suggest the route by Norway House bring in question the antecedent proceedings. That four millions of dollars—nearly $2,000 per mile of railway—have been expended on surveys which have steadily ignored what seems on *prima facie* evidence to be the true line until the contrary shall have been established, is a fact so grave as to set men thinking radically. But, is the mode of exploration pursued the best—the most economical, the broadest? Colonel Dennis, the Canadian Surveyor-General, may be supposed to have answered that question in his adoption of the survey-system under which the Government of the United States makes the work of exploration subserve the uses of settlement. It is proposed here that that system shall be extended to the region traversed by the route suggested above for the Pacific Railway, so that the monies spent on the latter service in future shall accomplish a permanent result by establishing in the field, in the note-book, and on the map, a fixed guide for the sale and the settlement of the Crown Lands. If the four millions of dollars expended up to this time on Pacific Railway surveys where facts may—in all likelihood *will*—prove these expenditures to be mere waste of money, had been expended on section-line surveys after the American system* adopted by Colonel Dennis in Manitoba. Canada would be in possession to-day of an immense breadth of accurate knowledge of the topographical and agricultural facts of her great North-West. And these surveys embodied in such a map as the Surveyor-General's map of Manitoba, the determination of the best route for the Pacific Railway could be made by running across the continent five or six thousand miles of experimental lines at a cost not exceeding a hundred and fifty thousand dollars.

It is proposed here that "explorations," whether topographical or botanical, on special routes for the Canada Pacific, shall be stopped. Instrumentation whether on trial or on location, involves when made in advance of general knowledge of the country, a still more costly waste. "Section"-line-surveys—at intervals of a mile apart—are hardly necessary for guiding the determination of the proper route of the Pacific Railway; for "Township"-line-surveys—at intervals of six miles apart—will probably be found sufficient. It is suggested, therefore, that these latter be run out, "blazed," noted, and mapped, along the proposed route from Quebec by way of Norway House and

* The system carried out by Col. Dennis seems to differ from the American system in elaboration; and therefore in cost. If the *impression* be correct that the work done by the United States involves but one-half the expense of that done by the Dominion, the enquiry arises whether there is any practical result accomplished by superior accuracy in the latter case, when the former is found to answer all useful purposes, whether of exploration or of settlement.

Peace River Pass, to the Pacific. The breadth of the survey at the eastern end may be narrow, the east and west lines, or "base"-lines, being "offsetted" on meridians wherever necessary to conform to the general direction of the proposed route. Beyond the Rocky Mountains these surveys—in the region marked on the map as "unexplored"—would take a wide range, so as to embrace the lacustrine plateau between the Rockies and the Cascades for, say, three degrees of latitude. The "Township" lines having supplied the facts, agricultural and physical, somewhat generally, it might be found necessary subsequently, to fill the intervals at some places with "section"-lines so as to obtain these facts in specification. But, be the detail in which the work may be carried out whatever experience shall demand, every dollar spent on it would be spent on a result of permanence, on a very necessity which must be met sooner or later, as a basis of agricultural settlement.

About 400 miles of the belt proposed above for settlement-survey lie within Quebec. The cost of that part of the whole would be chargeable in fairness to the Crown Lands Department of the Government of that Province. Ontario would, doubtless, meet the obligation of paying for the survey of her lands lying within the proposed belt, for a length of about 300 miles. The 600 miles remaining east of Norway House applying to lands of the Dominion, would constitute a legitimate charge upon the Dominion. If the Imperial Government accept the fact of its deep interest in this great British Railway, it will not hesitate to make the proposed surveys from Norway House to the Pacific, itself. A company of the Royal Engineers set at that work, its completion would place before the English people the offer of fifty millions of acres in a preciseness of knowledge as to the character of the land and as to the construction of the railway—in substitution for mere general statements as to the soil and to the topography—which is absolutely necessary to supply satisfactory grounds of consideration for an acceptance involving so grave a commitment.