Geological Survey of Newfoundland

REPORT

OF

James P. Howley, F.G.S.,
for the Year 1890

ST. JOHN'S, N.F.
Robinson & Company, Limited, Press
1917

R. T. Sandover-Sly

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ON

Crown Lands, by the Surveyor General, for the Year 1890

To His Excellency Lieutenant-Colonel, Sir J. TERENCE N. O'BRIEN, *Knight-Commander of the Most Distinguished Order of Saint Michael and Saint George, Governor and Commander-in-Chief in and over the Island of Newfoundland and its Dependencies.*

May it Please Your Excellency,—

I have the honor to submit, for Your Excellency's information, the annual report of the Crown Lands Department, with the usual tabulated statements and accounts for the year ending 31st December, 1890:—

MINERAL LANDS.

There were filed during the year twenty-one notices of staking, one license to search for gold, one application for a gold mining lease, and four applicttions for leases of mining locations of one square mile each. The fees on these applications amounted to one thousand one hundred and twenty-five dollars. Particulars are fully shown in returns marked Nos. 1 and 2.

TIMBER LANDS.

Six leases of timber limits were issued during the year for four hundred and eight square miles, as shown in return marked No. 3.

AGRICULTURE LANDS.

Returns marked Nos. 4, 5 and 6 show operations in agricultural lands. There were issued during the year two hundred and ninety-six grants, containing one thousand two hundred and twenty-six acres three roods and twenty-eight and three-quarter perches;

four free grants, containing forty-two acres one rood and thirty-three perches; and three location tickets for homestead grants for three hundred and eighty acres.

Under the Acts for the promotion of agriculture, there were received two thousand one hundred and twenty-five applications for licenses to clear land, making in all, during the existence of the Acts, a grand total of eight thousand two hundred and two applications, and five thousand three hundred and seventy-five acres one rood and thirty-five perches were certified to have been cleared and made ready for cultivation on four thousand five hundred and forty-two certificates, upon which the sum of sixty-five thousand eight hundred and twenty dollars and fifty-one cents was paid, a detailed statement of which is submitted herewith marked Nos. 6 and 7.

In the early part of the year suspicious circumstances in connection with certain claims for land-bonus led to the necessity of making special surveys for the purpose of verifying the reports on which these claims were based.

I regret to state that in one district very extensive frauds were discovered, by which persons in collusion with a dishonest surveyor, under the Act, had wrongfully obtained large sums of money from this Department; but, as these parties have been brought to justice and duly punished, it may not be expedient to record their names in this report.

In view of this discovery I thought it my duty to make a full investigation of the lands recently cleared and paid for under the Act, and it affords me pleasure to report that, with very few exceptions, in cases where errors arose from ignorance of the law, the lands have been well and faithfully cleared—this is especially true with regard to Belle Isle in Conception Bay, and the West Coast, from Cape Ray to Bay St. George.

The large amount expended in the payment of bonus the past year is accounted for by the desire of the people to take advantage of the Act before its expiry in December last; but I have no hesitation in asserting that this money has been well spent, and represents a large increase of prosperity to those who have thus been aided in the cultivation of the ground. At the same time I am of opinion that an Act having the same object in view, but with provisions somewhat different, should be formulated and placed upon

the statute-book at the next session of the Legislature, an essential feature of which should be the encouragement of continuous cultivation of the soil, extending over a period of several years. In this connection I would strongly urge the appointment of competent district surveyors, paid by the Government, who could also be called upon to report on applications, and furnish surveys of mining locations at less cost to the people who, in many cases, are debarred from access to our mineral lands by want of means to provide the needful survey.

Turning from this subject to the equally important one of our mineral lands, I would most respectfully call the attention of your Excellency to the limited number of "staking mining locations" during the past year, which, taken in connection with the fact that large sections held by various parties for a number of years under licenses, the conditions of which have not been fulfilled, will be set free and revert to the Crown in September next in accordance with notices served upon them, points to the necessity for an amendment of the present Mineral Act, that will render our mineral lands more accessible to the people generally throughout the Island. There can be no doubt whatever, from the information already in our possession, that our mineral resources are far in excess of their present development, and capable of largely supplementing other industries of the country if vigorous measures are taken to bring them under the notice of foreign capitalists. It is my intention, with the permission of the Government, to offer some amendments to the Crown Lands Act for the purpose of encouraging the search for minerals on the part of our people, and, by carefully guarding their rights, assist them to find the capital they require in order to test the value of their claims.

Geological Survey.

In connection with this survey, Mr. James P. Howley, F.G.S., was instructed to survey and explore the country westward from the Exploits Valley to the Bay of Islands and Bay St. George, for the purpose of ascertaining the merits of that route for railway extension across the country. I have much pleasure in referring to his very able and exhaustive report, which confirms the contention of those who hold that this country abounds in agricultural and grass lands capable of supporting a large population from this re-

source alone: especially would I point out the testimony of Mr. George Nichols, a successful farmer at the head of Deer Lake, that both the soil and climate are better than those of his native province of Nova Scotia.

I have the honor to be,

Your Excellency's most obedient servant,

H. J. B. WOODS,

Surveyor General.

Preliminary Survey across the Island from the Exploits Valley to the West Coast, for the purpose of ascertaining the feasibility of constructing a Railway to connect the Eastern and Western Sections of the Country.

Geological Survey Office,
St. John's, March 24th, 1891.

Honourable Surveyor General:

SIR,—I have the honor to furnish you, for the information of the Government, with the following report of the past season's survey operations.

You are aware that the Government decided in the spring, on having a survey and exploration made of the country westward from the Exploits Valley, lying between it and the Humber Valley, and thence by the latter valley to Bay of Islands, and by way of Saint George's Lake and Harry's River Valley to Bay Saint George. The survey was undertaken chiefly with a view of ascertaining the feasibility of that route for the extension of the railway system to the western side of the island. The selection of the staff of the Geological Survey to perform this work necessitated some delay at the outset, owing to the changes requisite on the alteration of the route of the survey. In order to carry out, as far as possible, the lesire of the Government, it was deemed that the work might be facilitated by a division of our party, one half, under the charge of Mr. Albert J. Bayly, Assistant Geological Surveyor, was despatched westward with the greater portion of the season's outfit.

Mr. Bayly had instructions to land at the Bay of Islands, proceed up the Humber River, portage across to the Grand Lake, and thence ascend the Sandy Lake River to the latter lake, where the provisions, etc., were to be stored for the convenince of both partis.

The second, under my own immediate charge, proceeded northward in the S. S. Conscript, landed at Botwoodville (now Botwood), Bay of Exploits, and with all possible dispatch proceeded in canoes up the Exploits River to the junction of the Badger Brook. At this point a transit line, running north forty degrees west, magnetic, was commenced and continued across country in the direction of Kitty's Brook, a tributary of the upper or eastern branch of the Humber, flowing into Sandy Lake. In the meantime Mr. Bayly, after reaching the Grand Lake, commenced a line at the exit of Junction Brook from that lake, and continued running south-eastward, across the head of Grand Lake and the Sandy Pond River valley, till a junction of the two parties was effected. This work, as well as the laborious journey up from the Bay of Islands, he performed with the most praiseworthy diligence and perseverance.

My own party, necessarily a small one, consisted of only three axe-men, an assistant, Mr. Thomas Thorburn, a cook, Indian boy and self. We commenced running our line north-westward on the 16th of July, and continued our course N., 40° W., till July 31st, when we had a first sight of the three remarkable tolts of the White Hill plains, known as the Three Topsails. In order to pass between these, the course was slightly altered to N. 36° W., and on the following day, August 1st, having obtained a nearer and more distinct view of the country ahead, the course was again changed to N. 29° W., so as to take the lowest part of the summit level, of which the three tolts above-named form the most prominent projections.

On the 8th of August, after crossing a steep wooded ridge on the west side of Rowsell's Brook valley, we entered upon a vast tract of barren country known to the Indian hunters as the White Hill plains. The small stock of provisions which we had carried along with us from the Exploits being now nearly exhausted, I was obliged, on the 11th, to despatch one of the Indians ahead to look for Mr. Bayly's party, and procure a fresh supply. He returned to us on the 13th, with a small stock of flour and a few other necessaries. He had had a very long toilsome tramp, had

not seen anything of Mr. Bayly's party, but succeeded in finding his cache, and brought back as much as he could carry. During his absence we had pushed forward about ten miles, had been reduced to a very small daily allowance of food, there were no deer to be had on the open country at that season, and very little game of any kind. One of the other men fortunately shot half-a-dozen young geese, which kept us from actual hunger. We now pushed on rapidly, but on the 19th our stock of flour again gave out. We had reached the head waters of Kitty's Brook, but being now run out of all sorts of provisions and not knowing exactly where we might meet Mr. Bayly's party, I concluded to go in search of them, in order to obtain a sufficient supply to enable us to complete this section of our line, and to direct the operations of both parties so as to effect a speedy junction. Two days excessively hard travelling, chiefly through burnt woods, brought us to Sandy Lake, where we found them encamped. Having arranged with Mr. Bayly to run a line up Kitty's Brook Valley towards my line, and made all other necessary preparations, my party returned with a fresh supply of provisions to resume our work inside. The weather having now set in extremely wet and boisterous, we were greatly delayed at this juncture and did not succeed in effecting a final connection of our lines till the 8th of September; thenceforth, we worked conjointly for the remander of the season. After selecting a suitable crossing of Kitty's Brook, near a picturesque fall on the river, we soon gained the flat country of the Upper Humber or Sandy Lake River Valley, whence the line was continued down towards the head of Grand Lake. From the outlet of the latter lake, or Junction Brook, we struck across for the head of Deer Lake, following the telegraph line for the greater part of the distance. The south side of Deer Lake and the Lower Humber were followed, thence to the Head of the Humber Arm, Bay of Islands, and an admirable site selected for a terminus, near Corner Brook, exactly 100 miles from our starting point at the Badger River. From Corner Brook, the further extension towards St. George's Bay was continued through a break in the coast hills, and a level lead of country towards St. George's Lake on the Harry's River. We had reached within two miles of the latter river, when we were beset by extremely severe winterish weather for the season. Our provisions also began to fail us again; but, above all, the sudden death of one

of our party, Michael Cole, picket-man, effectually put a stop to further operations. This melancholy event taking place as it did, without any premonition, at such a distance from the water-side, threw a cloud over the whole party, and was a sad termination to our season's work. He had been at work the day before his death, apparently in the best of health and spirits, took sick during the night and was dead at four o'clock next day, November 13th. He was a good, sober, willing and thoroughly reliable man, never murmured or shirked his work, active and alert on all occasions; and was, without exception, the best picket-man I ever came across. He had been with me for the past six years and always gave the utmost satisfaction. This small tribute is due to the poor fellow's memory. It took five days of excessive labor to get his body out to the sea-shore, where it was laid at rest in the little grave-yard in Birchy Cove on the south shore of the Humber Arm.

The weather had now become settled down to regular winter, for which we were in no way prepared; consequently the continuation of the survey, under such conditions, was out of the question, accordingly we availed of the arrival of the S. S. Volunteer on the 21st of November to return home.

It had been a very trying season throughout. The months of July and August proved excessively hot and dry. The country was parched with the heat and we suffered extremely thereby, as it was during this very period the heaviest work of packing and cutting our way through the dense forest was accomplished. The flies of all sorts were never found more annoying, and to add to our other discomforts, we were surrounded with forest fires, from the first to the sixth of August. One of these especially, which overtook us in the valley of Rowsell's River, caused us much anxiety and extra labor. We were driven from our camping place, barely succeeding in saving our clothes and provisions, which had to be buried in a small swamp not more than an acre in area, in which we spent one very wretched night without covering or sleep. The fire raged fiercely on all sides of us during the whole night. As soon as there was sufficient light next morning, we packed up and make all haste ahead, so as to gain a position to windward of the fire. In doing so, we had to run the gauntlet several times through the still blazing timber, our clothes and boots narrowly

escaping destruction once or twice. Even then our trouble was not ended, for a change of wind next day caused the fire to sweep down on us again. We had to run before it a second time, nor did we feel thoroughly secure till we reached the great open barren tract already alluded to. All this trouble and great destruction of valuable timber was ascertained to have been caused by the culpable negligence of two individuals travelling from the direction of Halls' Bay, who had killed a deer near where our line crossed Rowsell's River, roasted some of the meat, left the rest to rot, and walked off without any attempt to extinguish their fire. Who the individuals were we could not ascertain, but we saw all the evidence of their careless and wanton action. No doubt some of the other great fires which raged furiously away to the south and east of our position, in the Valley of the Exploits, had a somewhat similar origin. A vast amount of valuable timber must have been destroyed in this manner during the past season; which, together with previous destruction by forest fires, is rapidly depleting the great forest wealth of the colony. I would venture to say that nearly a third of the timber of the island is now destroyed in this manner. Can nothing be done to put a stop to this wholesale demolition?

The latter part of the season, especially the months of September and October, proved excessively wet and boisterous, and we had the misfortune, just at that time, to get into the low flat country of the Humber Valley. All the brooks and streams became swollen to the dimensions of rivers, the marshes became almost ponds; and, of course, travelling was of the most toilsome and wretched character imaginable. Later on, it set in very cold and winterish, rendering it still more trying, especially under canvas.

Although some twenty-three miles of the line to Bay St. George remain unfinished, still all the more difficult part of the route is surveyed and a previous knowledge of the country along the Harry's River Valley enables me to state that little or no difficulty presents itself on that section, in the way of railway construction. The country from St. George's Lake is very level, much of it being occupied by large marshes, but of good character—that is, shallow, with solid clayey bottom, very little of it partaking of the nature of swampy land.

GENERAL CHARACTER OF THE LINE OF ROUTE FOLLOWED.

On leaving the Badger River, the first mile of the line runs over a very level tract on the west side of the Exploits River, It then begins to ascend a long heavily wooded ridge for a distance of two miles further, when the country assumes a tolerably level or rolling aspect, chiefly well wooded, which it maintains for the next five miles. Within this distance there are several extensive tracts of prairie land, often supporting a fine crop of wild grass. Very little of the soil on these tracts comes under the true designation of peat; it partakes rather of the character of mud, or clay and vegetable matter, mixed in about equal proportions. I believe a judicious system of drainage would render these exceedingly valuable pasture lands; and the labor attending their cultivation would not be nearly so great as that required to remove the timber, stump, and clear the more densely wooded areas. Between the tenth and twelfth mile, a ridge of heavy burnt timber is crossed. The soil here is good, though sometimes rocky. Extensive marshes intervene between the twelfth and fourteenth miles, when another burnt ridge was crossed, extending beyond the fifteenth mile. The wide valley of the main branch of Rowsell's River, flowing into Hall's Bay, is here crossed; reaching to the nineteenth mile. At this part the country is poor, with a good deal of marsh and protruding low granitic ridges, where the soil is thin; yet there are small areas of good land, especially along the margin of the rivers. A high wooded ridge, with one bare-topped summit, intervenes between the nineteenth and twentieth mile, which latter is the commencement of the great barrns. For ten miles further there is very little woods, except in isolated groves and patches; and this chiefly of a stunted growth. The surface is strewn with boulders, in all directions; sometimes piles of huge masses of grnite are congregated in immense quantities. The bed rock, which consists entirely of granitoid varieties, frequently crops out on the surface, forming low rocky ridges, while occasionally, as in the case of the Three Topsails and several other similar tolts, it rises in sharp peaks several hundred feet above the general level. Much of the lower grounds of these plains, however, consists of alluvial deposits of fair soil; and I was surprised to find here, in many places, considerable tracts of good grazing ground. The vegetation consists of a short thick grass mixed with sedge (Sheeps

fescue), and seems well adapted for food for cattle of any kind. Should it prove to be so, there is ample pasturage for at least five months of summer, for a large stock of cattle and sheep over these plains; and they possess this advantage, that nowhere are there any dangerous swamps or bogs in which cattle would run the risk of becoming mired. The soil is not deep, and in all cases it rests on a solid foundation of rock or stiff clay. At the thirty-fifth mile the head waters of the eastern branch of Kitty's River were struck, when timber again became more abundant; still, this valley is a poor one. The timber is generally small; there is a good deal of barren and marsh land, and as it cuts through the great hill-range bordering the Humber Valley, it is pretty rugged and uneven throughout. After crossing the main branch of Kitty's River at the forty-fourth mile, we soon entered the Humber Valley proper. A long sloping wooded ridge, which forms the south side of the valley, and extends from Kitty's River Fall to the south-eastern angle of the Grand Lake, afforded a good sidling line whereby to ease the grade down from the higher land. The northern slope of this ridge was followed westward till the lower ground was reached, thence the line struck across the valley towards the Sandy Lake River, and on across the head of Grand Lake to the outlet of Junction River. Most of this section of country is extremely flat, and is composed of low wooded ridges, interspersed with numerous marshes and ponds, and several stout brooks—all tributaries of the Humber—Kitty's River and Goose Pond Brook being the two largest of these. The latter makes a suite of large ponds, occupying a considerable portion of the area. The soil on the higher wooded ridges is very sandy, and contains many boulders; but its character improves on approaching Sandy Lake River. The marshes are however, for the most part, very soft, and are not of as good a character as those towards the Exploits side. There is a good deal of fine interval land along the main river margins, and about the head of Grand Lake. From Junction River towards Deer Lake the country is again quite flat and, for over half the distance across, very marshy; but beyond that it is densely wooded to, and around the head of Deer Lake. The land here is of excellent quality. Both sides of Deer Lake are thickly wooded with a fine growth of forest timber, extending away to the tops of the hill ranges which bound the valley on either

side. Nearly all this wooded tract where not too steep to be availed of for agricultural purposes is occupied by a superor soil, very free from large boulders or rocks, and is well adapted for settlement. The average breadth available on the south of the lake is about one mile; while, on the north side, towards the head of the lake, it extends back over two miles. The Main Humber River flowing into the head of the lake, and extending upwards towards the bottom of White Bay, has, in former reports, been shown to contain many large areas of fine land; a great deal of which is interval. A good test of the capabilities of this soil is to be found on the farm of Mr. George Nichols, a little above the head of Deer Lake. Mr. Nichols is a Nova Scotian lumberer, who has been settled here for some fifteen or twenty years past. He has an extensive clearing, keeps a fine stock of cattle and sheep, and, from all appearances, is in very comfortable circumstances. His vegetables, especially root crops, some of which we had the pleasure of testing last fall, amply prove the adaptability of the soil for such crops. Mr. Nichols informed me that, not only is the soil much superior to that of his native province, Nova Scotia, but that the climate is better; that he can raise any kind of root and grain crops without difficulty. He has annually grown a small quantity of wheat, which yields a fine grain; and considers he could easily raise enough for home consumption had he the means of grinding it into flour. The mutton raised by him was of a superior character. The wool, too, is of the very best quality which Nichols' family spin and weave nearly every article of clothing worn by themselves, besides disposing of a large amount of woollen goods of home manufacture. If one industrious family can do this, and make a comfortable livelihood so far from the seaboard (some thirty miles), there can be no reason whatever why hundreds of others might not do likewise. Nichols assures me that he would rejoice at the prospect of a railway and the speedy settlement of this valley by a large population.

The valley of the Humber below Deer Lake is narrow, and, towards the mouth of the river, is hemmed in by lofty hills of slate and limestone; yet there is a considerable margin of available land on either side, more especially along the steady portion of the river below Deer Lake, which is about eight miles in extent. This marginal fringe is particularly good, perhaps some of the best land seen. I estimate roughly that the main Humber Valley including Deer

Lake and the river above, but excepting Grand Lake and the Sandy River branches, must contain nothing less than 100 square miles, or 64,000 acres of good land, suitable for agricultural purposes, and it is, without exception, one of the most favorable locations for settlement in this Island. The beautiful Deer Lake, sixteen miles long, affords an open coast-line of some thirty-five miles, and a highway, easily accessible from the seaside, not equalled in many places.

Around the head of Bay of Islands and mouth of the Humber the country is pretty rugged, but extremely picturesque; perhaps some of the finest scenery in the Islands is to be found in this bay. About the most difficult part of the entire route for railway construction presents itself here. Getting down to the waterside at the head of the Humber Arm, and up again over the coast hills, though not at all impracticable, will be decidedly the heaviest work on this western extension of the railway system.

Although the coastline is so broken about the Humber Arm, still there are many small patches of fairly good land; that about Corner Brook being considerable. The settlers here are beginning to take a lively interest in the cultivation of the soil; and the opening up of a few lines of road, extending inland from the shore, has proved an incentive to many to settle down in earnest and carve out homes for themselves from the wilderness. The people, on the whole, appear to be fairly prosperous; and, indeed, most of them are quite well-to-do. There was no poverty or dread of hard times during the coming winter expressed by any one whilst we were in the bay. After leaving the coast hills to proceed towards St. George's Lake, we found the country to the south of the Humber Arm very hilly at first, but nearly all densely wooded. Our line followed the narrow valley of Bell's Brook till the summit level was reached; here we found a level lead stretching away toward the latter lake which gave us a fine line for several miles till approaching the lake, when a pretty high ridge had to be surmounted before the lake itself could be reached. The soil along the level is of a very fair quality, tolerably free from rocks and boulders. The slopes of the hills also present a fair quality of soil, in most instances. There are several small marshes on the lower ground, but most of these are grassy. The timber here, as well as all along the route, consists chiefly of spruce, fir and birch. Pine was once

abundant on the lower reaches of the Humber and around Deer Lake, but it is now nearly all culled out. Numerous stumps, often of immense size, were come across. I measured some, four and five feet in diameter, and was informed trees even reaching six feet in diameter were at one time found here. Most of the spruce and fir are of fine size and good quality; but the birch scarcely equals that of the Exploits Valley. Witchhazel, or yellow birch, also occurs and is fairly abundant; it, however, does not attain such large dimensions as at Bay St. George, Codroy, or other places further south. Of the less frequent varieties of timber, tamarack, mountain ash, black or swamp ash, aspen, poplar, &c., there is a fair sprinkling. The black ash only grows on the shores of the lake and river. The inhabitants of Bay of Islands avail very much of their splendid timber supply for all purposes connected with their fishery, especially of the fir for making herring barrels. During our traverse down Deer Lake and Humber River last fall, we met them at every turn, passing up or down, encamped in some favored spot cutting timber, making staves, hauling out logs, &c. I noticed that there is an immense amount of waste going on, and vast destruction of valuable timber, especially by the stave-makers. They frequently cut down dozens of fine fir trees, saw off one, or at most two, stave lengths, and leave the remainder to encumber the ground.

The timbered portions of the Grand Lake country and Sandy Lake River are still nearly untouched; but much of the latter country has been overrun by fire. There is still a good deal of green pine about Goose Brook, where also was seen some of the red variety (pinus resinosa). Some magnificent tamarack were observed about the forks of Kitty's River—I think the finest I have ever seen. The timber on the Exploits side is again chiefly spruce, fir, pine, tamarack and white birch; yellow birch being absent altogether. Pine is scattered all along the route for the first eight or ten miles, but is not very abundant anywhere after leaving the valley proper, except on the shores of Lake Bond, on the eastern branch of Rowsell's River where pretty fair groves were observed. As already referred to forest fires are doing a vast amount of damage to our timber resources, each successive year witnessing the destruction of miles upon miles of our forests. The past season has been a more than usually destructive one. Owing to the

great heat and long-continued drought, everything in the country was rendered most inflammable; even the very moss and grass on the marshes, usually so moist, were seen to burn like tow. I very much fear that the entire destruction of our forests in this way is only a question of a short time.

Geological Notes.

In an extensive instrumental survey such as that of last season, and for a purpose so opposite to that of a purely geological exploration, it was impossible to devote much attention to a subject which is sufficient to occupy all the time and thought of any individual. My time was necessarily so fully devoted to the work in hand, and my constant presence at the instruments almost precluded any attempt at geological investigation. In any case, the country traversed offered few opportunities of studying the rock structure, it being for the most part hidden by the subsoil and encumbered by forest. Very few exposures of rock were met with at all before reaching the bare granitic region. A tough, bluish slate-rock occurs in a little brook near the third mile; and again, on the shores of Lake Bond a few outcrops of altered slate, with trapean intrusions and much scattered debris of red slate, were come across. These all appeared to correspond with the slates of the Exploits Valley, described in former reports, evidently of lower silurian age. In the Rowsell's Arm valley the granitoid rocks first made their appearance. A conspicuous tolt, about two miles to the left of our line, sends a spur down the valley, which we crossed. It is composed of a coarse, friable, flesh-colored pegmatite. A ledge of similar coarse pegmatite crops out on the ridge forming the eastern slope of the main valley of Rowsell's River, near the fifteenth mile. Altered slate was again seen in the bed of this brook, while the bare-topped ridge on the west side of the valley is composed of contorted mica schist. A great ox-bow bend of the river takes palce here. It sweeps around the ridge near the nineteenth mile, and is crossed again near the twenty-first. Here the bed of the river is occupied by massive beds of a beautiful red granite, eminently suited for ornamental or monumental purposes. It struck me as being almost identical in color and consistency with the celebrated red granite of St. George, New Brunswick, which latter is of very considerable economic importance.

This beautiful rock is worth from $10 to $18 per ton at the quarries, or about $1 per cubic foot in the rough state. The total value of granites worked in the latter Province in 1887 was estimated at $48,281.00. The total value of Canadian granites manufactured and marketed in that year sold for $350,000.00.

All over the barren tract of country, extending from the twentieth to the thirty-fourth or thirty-fifth mile, innumerable outcrops of granite and syenite occur, presenting a variety of building and ornamental material not often surpassed in beauty or durability. Rocks of similar character occur on the Kitty's River; and, at the fall, immense cliffs of syenite bound the river on either side. In the low country of the Humber valley little rock is exposed anywhere. The country is known to be occupied by the carboniferous formation, which spreads out over a very large area, extending from the shores of Deer Lake up the main valley of the river to Addies' Pond, and reaching within a short distance of the head of White Bay; and, on the other hand, across to the Grand Lake, along its shores as far as the eastern end of Sir John Hawley Glover's Island, and up the Sandy Lake River to Sandy Lake—comprising, in all, a total area of not less than 500 square miles. So flat is this district, and so few and far-between are the exposures of the carbonferous strata, that it is difficult to form any conclusion as to the prospects of workable seams of coal occurring within this area. It would take an extended and close investigation of the entire region, the mapping out of every detail of the structure possible to ascertain, before a decided pronouncement on that head would be warranted. It is true, during the years 1879 and 1880, a small section near the head of Grand Lake was partially tested by boring, and the result did not prove satisactory—only four small seams of coal, the largest but sixteen inches thick, were met with. Two others were uncovered, on the surface, on a small brook flowing into the south-eastern corner of the lake, known as Coal Brook; one of these was 11 inches, the other 14 inches in thickness. I can scarcely conceive that in such an extensive area of over 500 square miles, where the presence of coal is indicated at all, there should not be some more promising deposits; and I think it well worthy of consideration as to whether this great central carboniferous trough does not warrant such an extensive exploration as that hinted at above. While on this subject, it may be as well to

remark that, previous to last year's investigation of the St. George's Bay carboniferous area, it was generally thought that the latter also was destitute of workable coal seams. It had been regarded as occupied almost entirely by the lower unproductive measures of the formation, viz.: the carboniferous limestone and millstone-grit formations. I now have the satisfaction of informing you that, upon referring the fossil plants then collected to Sir William Dawson, Principal of McGill University, Montreal, and one of the most eminent authorities upon fossil botany in North America, he has, in one of his letters to me, made the following reference thereto: "I may say that the specimens now sent indicate a development of "the coal measures not unlike that of eastern Cape Breton, with "which, I fancy, your beds may be connected under the Gulf. This "is much more evident in the specimens you have sent than in "those previously collected by Mr. Murray, which had the aspect of the lower coal measures, or even of the millstone-grit series."

This is a most important announcement, coming as it does from so distinguished a source. In a later letter, Sir William adds: "Your Government might make a point as to the West "Shore, by informing the English Government of the value of the "coals on the West Coast, and their prospective importance to "Britain and Newfoundland, as well as to the other colonies. *You "have the nearest coal to England on this side the Atlantic.*"

A thorough investigation then of this central trough, might have the result of proving that here also the measures are not entirely confined to the lower portion of the formation. This supposition is further borne out from the fact that some at least of the latter, especially the gypsiferous strata, are not known to exist at all so far as the central trough has been examined up to the present time. In traversing the shore of Grand Lake, many fragments of good coal were observed strewn about the beaches which may, or may not, have been derived from those small seams, whose existence was ascertained by the boring operations.

The hills around Deer Lake and the lower valley of the Humber are chiefly composed of a finely micaceous slate rock, interbedded with greyish quartzite, through which numerous quartz veins penetrate; some of these look as if they should carry gold, traces of which, along with silver, were shown, by analysis, to exist in some quartz specimens from Humber Arm, procured by Mr.

Murray; though none was observable by the naked eye. A little over a mile from the mouth of the Humber, the great deposits of marble, so frequently referred to, occur. Until the past season I never had an opportunity of examining this marble before, and certainly had no idea of its enormous volume. There are many varieties of shade and color, ranging from black to pure white; the latter greatly predominating. It rises on either side the river to heights of over 1,000 feet, forming conspicuous and most picturesque scenery. In fact this part of the river presents some of the grandest scenery in this Island. On the left bank an enormous mass, which I have named Marble Head, towers above the river. It is merely the shoulder of a lofty range, extending across to Wild Cove, and how much further I cannot say. The river cuts through this range in a deep narrow gorge, but the hills rise again on the right side, forming an immense bare cliff of white marble, which strikes inward in a south-westerly direction. It has never been traced out, nor is it known how far it extends either way; fragments of white marble were, however, met with on some of the small brooks towards St. George's Lake, ten miles to the westward. That this enormous development of beautiful marbles can fail to become of economic importance some day and form the basis of a great marble industry, it is difficult to believe. Mere surface specimens, such as have hitherto been tested, cannot, in my humble judgment, be accepted as a fair criterion of the character of the deposit throughout. Some purplish slates were observed on the shores of the Humber Arm, which appeared well adapted for roofing purposes. Limestones of various qualities abound, and good building material, with admirable whetstones and grindstones, can be procured amongst the lower carboniferous strata on Junction Brook, or the shores of Grand Lake.

Feasibility for Railway Construction.

With the exception of three or four places, the entire route offers every facility for railway construction, and no insuperable difficulty presents itself. The rise over the wooded ridge, after leaving the Badger River, is somewhat steep at first, being about 250 feet in the first two miles; this gives an up-gradient of about 1 in 42. It can be considerably eased, however, by taking the rising ground obliquely as shown on plan, and then sweeping around the

summit with a wide curve; moreover, as there is a fall of twenty feet in the next quarter of a mile, a cutting of ten or twelve feet at the highest point would still further lessen the grade. After surmounting this ridge the country is gently undulating for the next five miles to the head of Lake Bond, the highest level being about fifty feet. Lake Bond is 257 feet above the Badger, or only seven feet above the summit of the ridge at the second mile. Between the seventh and eleventh miles the surface is more uneven, there is a rise, by aneroid, of 170 feet in the first mile-and-a-half, or about 1 in 46. Then a fall of eighty-three feet to Rowsell's River (East Branch), in a distance of fifty-five chains. This equals a down grade of about 1 in 44. The summit of the ridge on the west side of the valley, one-and-a-half miles further, gives a rise of 195 feet, or about 1 in 40. I believe this section can be greatly modified and sufficiently easy gradients obtained, by locating the line more to the left, winding around the hills as shown on the plan, so as to take the lowest elevations of the ridges and a somewhat higher level in crossing Rowsell's River Valley. For the next two miles the country is fairly level till reaching the ridge on the east side of the valley of the main branch of Rowsell's River, where a considerable fall occurs of 321 feet down to the river, in a distance of one mile and three-quarters. Here again a tract of level country intervenes a mile-and-a-half in extent on the opposite side of the river. A still higher ridge with bare summit forms the west side of the valley, which attains to a height of 558 feet above the level of the brook, with a fall on the opposite side of about 207 feet. All these very considerable elevations and depressions occur within a total distance of only five miles, and would appear to present almost insuperable obstacles, were it not possible to avoid or lessen them in some measure. This, I conceive, can be effected by making a considerable double curve, beginning about the tenth mile, and at an average distance of a mile to the left of our line. Such a curve, winding around the two steep ridges of the eastern valley, would bring the line out through a gap in the hills of the main valley at a point higher up, and directly opposite which on the west side is a gorge, through which the Main River sweeps around the higher hill at a much lower level, probably little less than 200 feet below the summit of the ridge. An examination of this latter route convinced me that it is decidedly the most feasible, although

another might be found to the right of our line if it were considered more direct on actual location. From the commencement of the barrens at the twentieth mile, the country assumes a more evently rolling aspect, with no very considerable elevations or depressions, along the immediate route followed. Isolated tolts rise here and there on either side, the most conspicuous of which are the so-called Topsails, which lie in a direct line, at nearly equal intervals apart on the central ridge or summit level of the country, trending nearly east and west magnetic. This ridge was crossed between the twenty-seventh and twenty-ninth miles, at an elevation of 1,036 feet above the Badger River, or about 1,380 feet above sea level. The nearest or main Topsail, distant about a mile and a half to the east of our line, rose above this point 306 feet, which gives it an elevation of 1,686 feet above sea level. Once past this dividing ridge, a regular down grade takes place to the headwaters of Kitty's River, about the thirty-fifth mile. The total fall in a distance of eight miles only amounts to about 200 feet, that is, 1 in 211 —a very easy gradient. From the thirty-fifth mile the fall down Kitty's River valley becomes more and more rapid. It reaches 130 feet at the first crossing of the river, just at the thirty-seventh mile, making a down grade of 1 in 81. In the next four miles, which reaches just below the fork of the river, a fall of 235 feet occurs, equal to 1 in 90, and in the next three miles, to the crossing of the main branch above Kitty's Brook Fall 344 feet, or about 1 in 46. From Kitty's Brook to the commencement of the flat country bordering the main river, or Sandy Lake branch of the Humber, there is a fall of some 200 feet in a distance of about three miles, or about 1 in 80. The total fall from this to the head of Grand Lake is not much over 150 or 160 feet more in about nine miles. Here a choice of several routes may be selected across this valley; but that represented on the plan is the most direct. It passes inside the suite of ponds on Goose Brook, and strikes across the head of the Grand Lake in a nearly straight line, avoiding, as far as possible, the more marshy or swampy ground. Sandy Lake River is crossed about one mile from its entrance into the Grand Lake just beyond the fifty-fifth mi,le of distance. Five miles more reaches across the head of Grand Lake and the outflowing, or Junction River. The line over this section is made to curve slightly to the left, so as to avoid some very extensive and heavy marshes further inland, and

also to touch the shore of the Lake at a convenient point for a station. The crossing at Junction River is also well adapted for a stopping place, forming as it does a convenient and safe harbor of refuge for boats or other craft which may be employed on the lake. The country between Grand and Deer Lakes is extremely flat and occupied by extensive marshes, to avoid which as far as possible, and at the same time make the most direct course, the line is located on the plan to the west of the telegraph line, which latter was here followed; and not far from the base of the high wooded ridge of hills forming the neck of land between the two lakes. The distance from lake to lake is just nine miles, with a total fall of not much more than 100 feet. An almost perfectly level line might be constructed here, if required. The sixty-ninth mile nearly touches the shore of Deer Lake close by the present telegraph station. Between the seventy-second and seventy-third miles there is a most eligible site for a railway station, at a place called Little Harbor, which affords a safe refuge for boats or small craft. The line extends along the south shore of the lake to this point at a short distance back, but beyond the seventy-third mile a pretty steep ridge, with a considerable fall to Pinn's Brook necessitated striking more inland. It would cross the latter brook about a mile and a half from the lake side, and, with a wide, gentle curve, sweep out towards the lake, tapping it again at the eightieth mile. From this point another sweep inland is required to cross the low valley of South Brook. The shore is tapped again at the eighty-third mile and followed thence closely to the foot of the lake, two miles further. The gradients along the side of the lake, with a few exceptions, are quite easy, and there is ample room to locate the line anywhere between the shore and the base of the wooded ridge, extending along its course at an average distance of about a mile back. From the foot of the lake the south side of the lower Humber is followed, at a short distance from the river, to the end of the Steady Water, eight miles below. Here the hills begin to close in, and the valley becomes very narrow and precipitous. After vainly seeking for an opening through the hills leading out to Humber Arm, we were compelled to follow closely the river bank as the only practicable line at all offering at this point. From the ninety-third to the ninety-sixth mile will be a most difficult section. The river bank must necessarily be closely followed, and at

two points considerable rock cutting will be required; first, near the niety-third, and again between the ninety-fourth and ninety-fifth miles. At the latter point a sheer precipice abuts the river, leaving no margin at all for about 60 or 70 yards. The face of this cliff will have to be cut down some 30 or 40 feet; but I think tunnelling would be much preferable. In the former case a dangerous cliff would remain above, always menacing destruction to a passing train; and in any case there would be a very sharp curve required to get around the cliff. By tunnelling all danger from the falling debris would be avoided and the sharp curve almost if not entirely removed. The cliff is composed of a rather soft mica slate and as the tunnel need not exceed 100 yards in length I do not think it would be a costly undertaking. Once beyond this, a fairly good line is found down to the mouth of the river; but there is a pretty steep up-grade at one part, near the ninety-sixth mile. Fo rthe next two miles, where it sweeps gently around the point of land at the head of Humber Arm, between the main river and Corner Brook, it is excellent. On approaching the latter, however, a very considerable difficulty again presents itself. The land falls quite suddenly from a height of about 100 feet above H. W. M. to a little over 20 or 30 feet. The valley of Corner Brook is very uneven, with several isolated hills and deep depressions succeeding each other at short intervals. To overcome these difficulties it was found necessary to make a short backward curve running up the side of the deep valley, then another sharp curve around the head of the valley, so as to gain the opposite side, and then run down to Corner Brook, which was crossed about a mile from its outlet, where still another sharp curve is necessitated. To some extent the curves might be lessened, and grades eased, by a heavy trustle-work across the first ravine, or possibly the line might be located further out towards the shore. Another possible route, which is indicated in a broken line on the plan, may be found by going back to the ninety-fifth mile, or perhaps to the tunnel, and beginning to rise from thence, with a pretty stiff up-grade, so as to gain the top of the ridge above Brake's Landing, and thence come down inside the outer range of hills, crossing Corner Brook at the position of the present mill-dam. The distance would be about three miles and a half, and the total rise and fall about 300 feet. After crossing Corner Brook the line runs up a gap in the

hills, along the valley of a small tributary known as Bell's Brook, where a rise of over 600 feet takes place in about three miles. This would give a very steep grade of about 200 feet per mile. It will be seen from the above that getting down to the water side at Humber Arm, and up again over the hills in the direction of St. George's Lake, present the greatest engineering difficulties met with on the entire route. A much more extended examination will be required at this point before it can be satisfactorily determined as to whether these difficulties can be sufficiently modified to admit of a feasible line here. At present, the only way I could see of partially overcoming this was by means of a Y line, to run out along the shore, after crossing Corner Brook, for about a mile and a half thereby gaining some 100 or more feet in rise; then back with a curve around the side of Bell's Brook valley, with a steep upgrade till the height of land is reached, about the hundred and third mile. The Y would also reach the shore of the Arm at an admirable point for a terminus, where the water is deep close to the shore, and a projecting point affords shelter for a wharf. This terminus is just beyond the hundredth mile from Badger Brook. Provided the difficulty at Corner Brook can be surmounted, and the height of land rendered accessible, no other presents itself till nearing the end of our line, or the one hundred and thirteenth mile. From the one hundred and third to the one hundred and twelfth is an admirable line, almost level; but it then begins to rise rapidly, and reaches a height of over three hundred feet where we left off. I believe the grades here can be rendered sufficiently easy by crossing the valley at the head of Cole's Pond, taking the rising ground near the eleventh mile or further back, and thus climbing gradually the side of the hill, so as to distribute the rise over some two and a half or three miles. On the other side of this ridge there will probably be a fall again to St. George's Lake of from 200 to 250 feet; but beyond that, in the further extension to the head of St. George's Bay, I do not anticipate any very heavy gradients, considering the total fall from St. George's Lake is not much over 600 feet in a distance of twenty miles.

The bridging along this route is comparatively light—no very heavy or expensive structures being required. For the first thirty-seven miles from the Badger to the crossing of the eastern branch of Kitty's Brook there will be scarcely one structure worthy of the

name. The line, as located on the plan, passes round by the great bend of Rowsell's River, thus avoiding entirely two considerable bridges. The east branch of Kitty's Brook, where crossed, presents very steep banks on either side, where some heavy abutments will be needed; but the actual span in the centre will not exceed 100 feet. There is a low, rocky islet at this point, which might be utilized for a central supporting pier. The crossing of the main brook above Kitty's Fall is admirably situated. A high wall of solid syenite rises on either side, forming natural abutments, with a span across the top of only 86 feet. If, upon further survey, a more favorable line were found down this valley by following the south side of the eastern branch and crossing the main river above the fork, the necessity for the first of these bridges would be entirely obviated. Two branches of Goose Pond Brook are crossed, but the bridging of these will be light work. The two most extensive structures on the line are at the crossing of Sandy Lake River above Grand Lake, and the Junction River near its exit from the Lake. The former gives a span of about 300 feet, and the latter about 550 feet. In each case, however, the water is shallow, the bed of the river hard gravel, and no danger need be anticipated from ice, as it does not raft here as elsewhere on our rivers. Owing to the flat nature of the country, the comparatively even flow of the water, and the great expanse of the Grand Lake, the ice breaks up gradually, or rather thaws out slowly. No indication of rafting, such as the barking of the trees close to the water's edge, as is seen on the Exploits and other large rivers, was observed anywhere; consequently, these two rivers can be bridged with piers erected on their beds, with short spans between, thus rendering the construction really more feasible than on many smaller but more turbulent streams. None of the numerous small streams crossed between Grand Lake and Bay of Islands have spans of over 100 or 150 feet; but in many instances they have cut so deeply through the heavy clay and gravelly soils as to leave deep ravines often 100 yards or more wide at the top. All these can be filled in from either side or crossed by means of trestlework with short central spans. Corner Brook will require one of the heaviest structures on the entire line; but a good deal will depend upon the actual site selected. Should it be desirable to bridge the river at the place where the present mill-dam is situated, a very sharp bend

just above will necessitate three spans, close together, of considerable extent. In this case, I would recommend cutting across this bend, diverting the course of the brook into one straight channel, and then filling up the portion drained. It would be easy to accomplish this, and only means a matter of dollars and cents as to which would be the least expensive course or most durable work.

So far as the line has been surveyed towards St. George's Lake, but few bridges, all light structures, are required. On the unfinished part of the section towards St. George's Bay, there will be two bridges of considerable size—One over the Harry's River below St. George's Lake and the other across the Bottom Brook, or St. George's River, at the Head of the Main Gut. This latter will be a pretty expensive structure, as the river here is wide and rather rough. Two other small structures will be required at the crossings of the Spruce and Trout Brooks, tributaries of Harry's River; but the span over these latter will be short, probably not over fifty or sixty feet in each case. Should the line be continued to the Seal Rocks, south side of Flat Bay, and the latter made the terminus on the West Coast, another bridge of large proportions will be necessitated at the crossing of Little Barrachois River.

Nowhere along the route does any scarcity of material eminently suitable for a road-bed exist. Building-stone for abutments and culverts can be procured in abundance, especially over the granitic region, and there is ample timber for sleepers and all the lighter wooden structures required, except over that section of barren country between the twentieth and thirtieth miles.

The Museum.

This institution continues to maintain its attractiveness, and is the constant resort of a large concourse of visitors on every open day. During the past summer it was deemed advisable to keep it open every week day, to accommodate the many strangers coming here from abroad, at that season of the year. Many additions have been made to the collection of specimens, chiefly the voluntary contributions of those who take an interest in the institution. Others were acquired, as usual, by purchase. Amongst those who have presented valuable and interesting specimens, I may mention the following:—Rev. M. Harvey, a skull of the bottle-nose whale; Mr. Adolph Nielsen, two small bottles refined cod-liver oil from Nor-

way; Mr. John Martin, one grenadier fish; Mr. W. W. Bonnyn, C. E., several interesting coins; Mr. Golder, Harbor Grace, a fine sturgeon; Hon. James Pitts, one porcupine fish; Mr. Eugene Forsey, Grand Bank, a young crab in the shell of a *Lunatia heros;* Mr. John Burke, Little Placentia, head of an orc, *Delphinus orca;* Mr. Jas. Murray, M.H.A., one golden-winged wood-pecker, *Colaptes Auratus;* Mr. Studdy, M.H.A., some eggs of the same bird; Mr. McNeil, some bird's eggs from Labrador; Captain Delaney, an Esquimaux stone pot, from Labrador; Mr. Gibson, Canada, a splendid specimen of Canadian asbestos; Mr. Brockington, several articles of manufactured asbestos, by Chalmers, Spence & Co., of Boston, from specimens of Newfoundland mineral. A case of stuffed native birds; also one young horned owl, *Bubo virginianus;* one shrike, *Lanius borealis;* one Canada jay, *Perisoreus Canadensis;* one rusty grackle, *Selecophagus ferrugineus,* and one walrus skull, *Trichechus Rosmarus,* were purchased, besides two beautiful models, in alabaster, (selenite or crystalized gypsum) of an Italian gun-boat and steamer.

Having been supplied during the past season, in the field, with a camera and photographic outfit, I was enabled to obtain several very interesting views of the scenery in the interior, which are now on exhibition in the museum. This mode of illustrating the scenic and economic resources of the country is a great acquisition, and had I been placed in the same position years ago, I should now have had an exceedingly interesting and valuable collection of photographs of native scenery. There can be no doubt that such a means of exhibiting the internal resources of the Island to the public generally, would have conveyed a more adequate idea of what these resources really are, than all that has hitherto been written or published in the way of reports, &c.

In conclusion, I would again respectfully beg to draw your attention to the necessity of effecting some insurance upon this now very valuable collection.

Hoping this suggestion will meet with favorable consideration,

I have the honor to be, Sir,

Your obedient servant,

JAMES P. HOWLEY.