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THE OTTAWA NATURALIST.

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THE OTTAWA NATURALIST.

VOL. X.

OTTAWA, FEBRUARY, 1897.

NO. 11.

RECENT EXPLORATIONS IN CANADA.

INTRODUCTORY SKETCH—By GEORGE M. DAWSON, C. M. G., F. R. S., F. G. S.

In March 1890, now nearly seven years ago, I had the pleasure of addressing the Ottawa Field-Naturalists' Club on the *Larger Unexplored Regions of Canada*. The subject is one in which those who have actually taken part in exploratory work naturally feel much interest, but I was surprised by the amount of general interest evidenced in it, and by the wide currency given by the press to the remarks then made. It was in fact a surprise to many people to learn that, although they had been accustomed to see the northern part of the continent shown in apparent detail on maps of very small scale, much of the detail was really based upon no actual geographical knowledge, and that there were vast areas which had never even been traversed by reconnaissance surveys, about which practically nothing had been ascertained, and in which the courses of rivers, the position and even the existence of great lakes and other features was practically unknown.

An appeal for the further exploration of such tracts, was made, based primarily on their possible economic value, but it was also pointed out, that whether valuable or not, a certain sentimental and territorial responsibility rested upon Canada, to at least inspect and examine all parts of her vast landed property. The back of Canada's farm lies somewhere near the North Pole, and between our cultivated fields and that point, lie immense reserves of timber, lakes, and seas well stocked with fish, and above all where other resources fail, great possibilities in the way of mineral wealth. We may reasonably look forward to a time, when even in the Arctic lands important mining communities will be planted.

It was necessary to assume some method in defining the regions characterized as unexplored, for in such a matter there is no hard and fast line. After leaving the districts which may

be counted as more or less completely *surveyed*, it was in consequence assumed that along each reasonably accurate line of exploration, a belt of country about fifty miles in width was removed from the unexplored category. This was a very liberal assumption, for no explorer, however competent, could know much about the country twenty-five miles away from his route on either side. Still he would have obtained a general idea of the character of the land—there could scarcely be any prominent mountains which he would not see, nor very large lakes or rivers of which he would not hear from the natives. Drawing broad belts of this kind across the map, some very large and very many small areas remained, but of such areas none under 7,500 square miles were considered. Neither were the Arctic islands, to the north of the continental land, taken into account.

Proceeding on the plan above mentioned, sixteen unexplored areas of large dimensions were outlined,* of which the aggregate area was computed to be about 954,000 square miles, an area between one-third and one-fourth that of the entire Dominion.

Since the date of the address to which I have been alluding—partly perhaps in consequence of the facts made known—a great deal of good exploratory work has been done, and the map then drawn to represent these facts, now requires to be largely modified. Most of the work has been done by officers of the Geological Survey, and it has thus been possible to combine geographical exploration with geological work and the scientific inspection of the resources of the regions traversed. Detailed reports and maps have been made or are in course of preparation. You are all, no doubt, already familiar with some of these, but it has been urged by the gentlemen engaged in arranging the programme of evening meetings for this season, that some short account at first hand of the results achieved would be acceptable and interesting.

I will not now occupy more of your time, except to say that in the near future it devolves upon us to remove what remains of the unexplored dark tracts upon our map, and further

* See map Vol. 4, No. 2, May, 1890.

than that, having arrived at a knowledge of the more promising regions in each case, to institute more comprehensive and exact surveys of these, of such a kind as to enable their resources, whatever they may be, to be utilized. If some of them are at present too remote to be profitably employed, it is still well to know that they exist and lie in reserve until it may be practicable or necessary to draw upon them.

THE BARREN LANDS.

By J. B. TYRRELL, M.A., F.G.S.

Dr. Dawson has asked me to give you a brief account of the explorations carried through the unexplored regions west of the northern part of Hudson Bay. The more southern of the two districts explored has an area of rather more than 60,000 square miles, which is somewhat larger than the Province of New Brunswick and the State of Maine put together, or than England and Wales.

In 1892 Dr. Selwyn, then director of the Geological Survey, instructed me to explore this country as far as could possibly be done in one season, and Mr. Dowling was detailed to act as my assistant. As the district is large and there were no trading posts in its interior from which supplies could be obtained, it was necessary to divide the party in order to carry sufficient provisions for the journey.

Mr. Dowling proceeded to Edmonton and thence to Athabasca Landing, and from there, with a canoe and small sail-boat carrying supplies for the greater part of the season, he descended Athabasca river, which had previously been surveyed by Mr. Ogilvie, and thence made a compass and boat-log survey of the south shore of Lake Athabasca as far east as Fond du Lac, a little outpost of the Hudson Bay Company.

I proceeded by rail to Prince Albert, thence north-westward to Green Lake, and in two canoes descended Beaver River to Ile à la Crosse Lake, carrying the supplies that would be needed until a union with Mr. Dowling was effected.

From the north side of the Churchill river, a short distance below Ile à la Crosse Lake, we struck northward into the unexplored country, ascending a small rapid stream that had been called by the Indians Mudjatick (bad deer) river. A sandy plain, forming the height of land, was crossed at the head of this river, and Cree Lake, a beautiful sheet of clear water, 45 miles long, was entered, lying, like so many of the great Canadian lakes, along the line of contact of the Archæan and overlying Palæozoic rocks. The surrounding country was now almost sterile sandy plains, thinly wooded with Jack-pine. Between the scattered tree-trunks one could see long distances in any direction. Saying nothing of innumerable swarms of black flies and mosquitoes, porcupines were about the only living things to be seen on these sandy plains, and where these animals are plentiful you may be sure that human beings rarely come, for they are very easily killed, and the Indians are very fond of a nice roasted porcupine.

Cree river, a wild torrential stream, flowing in a shallow channel, was descended to Stone river, and this river was descended to Fond du Lac on Lake Athabasca, where Mr. Dowling and I arrived within a few hours of each other, more than six weeks after we had separated at Regina on the C.P.R. 650 miles further south.

The united party then turned eastward, and carried an instrumental survey to the west end of Athabasca Lake, up Stone river to its source in Wollaston Lake, from which lake Mr. Dowling continued the survey to Reindeer Lake, down Reindeer river and up Churchill river to the Frog Portage where it was connected with the instrumental survey made by Mr. Fawcett down Churchill river. An instrumental survey had thus been carried entirely round this extensive area, forming an excellent basis for further explorations either in the interior or further north.

At Wollaston Lake I left Mr. Dowling, and, accompanied by three Indians who, however, knew nothing of the country, ascended Geikie river to the height of land, and descended Foster river to Churchill river, thus carrying a second line of exploration, almost parallel to Mudjatick and Cree rivers,

through the middle of the unexplored country, arriving at Ile à la Crosse as the September equinoxials set in, having been absent in the north three months, and having carried all the provisions that we needed for the journey.

During this season I learned, in talking with Chippewyans, of three canoe-routes into the far northern country, followed by the Indians in their search for deer, as these animals come from the north down to the edge of the woods. These routes led across the height of land to unknown rivers flowing towards the north, but to what ocean the rivers flowed the Indians had no idea.

These routes seemed to furnish a means of entrance into the great unknown country, of 178,000 square miles, lying west of Hudson Bay, an area as large as Vermont, New York, Pennsylvania, Ohio and Kentucky put together; or three times as large as England and Wales. This area includes the south-eastern and eastern part of the barren lands of Canada, an area of 350,000 square miles, of which almost the only reliable information that we possessed was derived from the explorations of Franklin, Back and Richardson, made in the early part of the present century. Throughout this whole region there is not a single white inhabitant, and the explorer must depend for provisions solely on what he is able to carry with him, or on his net and gun.

This country lies entirely north of the possible limit of successful agriculture, and if it possesses any considerable wealth that wealth must be in its minerals. Consequently any exploration that stands a chance of being of economic value must be carried out by the geologist and the prospector.

In the spring of 1893 I was instructed to explore this unknown country, and the route northward from Black Lake on Stone river was chosen as the one most likely to lead through the very centre of the great unexplored area on the west side of Hudson Bay.

Descending Athabasca river, loaded with supplies for the whole summer, we reached Fort Chippewyan about the 18th of June, and on the 21st we left it with our three canoes loaded down to the gunwales, for there was no prospect of again

seeing white men or obtaining supplies from others until the close of the season of open water.

Early in July we began the ascent of Chipman river, with-*out anything to guide us but the determination to keep constantly forcing our way up the stream until we had reached its source.* To give you some idea of the difficulties of travelling in this way, I may mention that we spent the whole of one valuable day searching the shores of a small lake, and at last we found the river that we wished to ascend only four miles, or one hour's travel, from where we had entered it. On the shores of Selwyn Lake, at the head of the river, we met a small band of Indians, but they declared that they knew nothing about the country further north, except that it was swarming with cannibal Eskimos who would certainly eat us. This may seem very ridiculous to us, but it was very dispiriting to our Indian canoe-men, some of whom immediately endeavoured to leave us.

From the north end of Selwyn Lake we crossed the height of land, here an almost level plain, to the shore of Daly Lake, and our search for its outlet began. When the river was found we determined to follow it, if possible, wherever the current would take us, whether to the Arctic Ocean or to Hudson Bay. The Chippewyans had told us that a river called Telzoa (or wide shallow) river flowed northward from this lake to To' bon Lake, that their fathers used to travel down it as far as that lake, but that its character was unknown to them.

We descended this river for 700 miles, often with many misgivings, and with many precious days lost in search of our course, until, on the second of September, we reached the head of Chesterfield Inlet where some of the old explorers of last century, in search of a north-west passage, had been before us. We had accomplished what we had started out to do, and had surveyed a line through the very middle of the unknown region. Thence we travelled down and surveyed Chesterfield Inlet and the west shore of Hudson Bay as far as Fort Churchill, where we arrived, very much exhausted, on the 16th of October.

On the following spring I was again sent northward to further explore the same region, and this time I was acc-

panied by Mr. Munroe-Ferguson, A.D.C. to His Excellency, the Governor General. After a paddle of 650 miles to the north end of Reindeer Lake, we struck northward into the unknown country, made 53 portages, averaging a third of a mile each, across rough stony country, and then descended Kazan River to Yath-kyed Lake, from which we portaged twelve miles across flat marshy land to Ferguson Lake, and then descended Ferguson River to the west coast of Hudson Bay. From there we surveyed the shore southward to Churchill, where we arrived on the first of October.

The total distance surveyed in these three years amounts to 4,200 miles, 2,150 of which was on lines, marked in red on the map exhibited on the wall, through country previously untrodden. To accomplish these surveys it was necessary to travel, in all, either in canoes or on foot, 7,800 miles.

Both tracts of country here spoken of have a generally even contour, and as a rule they slope gently northward or north-eastward towards the Arctic Ocean, or Hudson Bay. They are the homes of a couple of thousand of the people of Canada, and though these people may be Indians and Eskimos, they contribute to the revenue and to the support of the Government of Canada the same as we do. Without some knowledge of the people and the country they live in, it is impossible to govern them wisely and justly.

But what are the possibilities of settlement for civilized men? Large districts have been shown by these explorations to be underlain by Huronian and Keweenaw rocks, which are almost everywhere found to be rich in precious minerals, and if extensive deposits of these were discovered the country would soon be opened up. The surface is moderately level, so that railways could easily and cheaply be built, and ocean-going steamers could readily run into Churchill Harbour, or into any of the other numerous and good harbors along the north-western shore of Hudson Bay.

THE LABRADOR AREA.

By A. P. Low, B.A.Sc., F.G.S.A. &c.

INTRODUCTION.—Dr. Dawson in his paper, read before the Ottawa Field Naturalists Club in 1890, estimated the unexplored area of the Labrador Peninsula at 389,000 square miles out of a total area of 511,000 square miles, making it the greatest unexplored area in the Dominion. Since that date we have run exploratory lines from east to west and from north to south through this great area, so that it is now divided into six smaller areas ; and allowing, as in the previous paper, that a line through any region gives a knowledge of the country for twenty-five miles on both sides of it, the total area is now reduced to less than 200,000 square miles. At the least, we can now claim to have a fair idea of the climate, distribution of the forest and *some of the natural resources of this vast region, and have found that although poor enough, it is not the desolate wilderness of rock and snow which it was popularly supposed to be up to a recent date.*

During the past five seasons it has been my duty to undertake explorations in the Labrador Peninsula, and the total length of the surveys through the unexplored area is approximately 3,500 miles, made up as follows:—In 1892, 500 miles ; in 1893, 700 miles ; in 1894, 1,300 miles ; in 1895, 400 miles, and in 1896, 500 miles. Much of this work was commenced far from railways and civilization, so that the total amount of travel in canoes and boats, or on foot, not counting railway or ship transport, amounts to upwards of 8,000 miles.

In 1892 I was assisted by Mr. A. H. D. Ross, and we started from Lake St. John, which is situated about one hundred miles north of Quebec city, at the end of the Quebec and Lake St. John Railway. From there the Ashouapmouchouan River was ascended in a north-west course, some two hundred miles to its head, at the watershed dividing the rivers flowing south into the St. Lawrence from those flowing westward into Hudson Bay.

Having crossed the height-of-land, a north-west course was followed sixty miles through three large lakes to Lake Mistassini. This great lake was navigated for sixty miles to the Rupert River, its outlet on the north-west side. This portion of the route had been previously explored from Lake St. John to Mistassini by J. Richardson in 1870* and Lake Mistassini by myself in 1885.*

The Rupert River, a short distance below where it leaves Lake Mistassini, is divided into two nearly equal channels by a large island; these channels do not again unite for nearly one hundred miles. Our way followed the east channel in a northerly direction for fifty miles, when the stream makes a sharp bend to the westward, and continues in that direction until it joins the other channel. The Rupert River was left at this bend and passing still northward for fifty miles, over a portage route of small lakes and streams connected by long portages, either of a swampy character or formed of packed boulders, the East Main River was reached about three hundred miles above its mouth. This stream was ascended about thirty miles to where it was joined by the Tichagami branch, and then turning westward its course was followed to its mouth on the east side of James Bay. The return trip was made by skirting James Bay to the mouth of the Moose River, which flows into its south-west corner. The Moose River was ascended to Missinaibic Station on the C. P. Ry., and so Ottawa was reached in October.

The results of this exploration, besides the survey of the route from Lake Mistassini to James Bay, include the discovery of large areas of Huronian rocks along the East Main River, and as these rocks have a close resemblance to the gold-bearing rocks of the Lake of the Woods area, the precious metal will probably be found in them. Other important observations on the climate, forests, plants, animals and fisheries were made, which go to show that this northern region is not nearly so barren

*Geol. Surv. Canada, Report 1870-71. †Geol. Surv. Canada, Report 1885.

as had been believed, and that the climatic and other conditions about James Bay and for a hundred miles inland are such as to allow of settlement, and the growth of the more hardy cereals.

In 1893, accompanied by Mr. D. I. V. Eaton, we again started from Lake St. John, but instead of following the Ashouapmouchouan River in a northwest direction to its head, we passed directly northward up the Chef branch of that river, and thus lessened the distance to Lake Mistassini by about fifty miles. The route explored in 1892 was followed to the East Main River, and the work of the season started from the end of the last season's survey, this time ascending the river. The main stream was ascended, with numerous portages past falls and rapids, about one hundred miles, when the river was left and the route passed up a small northern tributary, called Long Portage Creek, which is on the route followed by the Hudson's Bay Company to their post at Nichicun. This stream was ascended thirty-five miles and then the route led eastward through a number of lakes for thirty miles to the watershed between the East Main and the Big river which is the next large stream to the north flowing into James' Bay. From there six miles of lakes were passed through to the Big River, which flows from the southward, and is a large stream where we joined it. Eight miles below, the river enters Nichicun Lake, which is a large irregular body of water about thirty miles long, and 1760 feet above sea level.

From Nichicun the route explored continued eastward through a bewildering system of irregular lakes drained by tributaries of the Big River, for forty miles to the height of land dividing the Big River from the waters flowing north into Ungava Bay; and from there twenty miles farther to Lake Kaniapiskau, another of the large lakes found throughout the Labrador Peninsula. The Kaniapiskau River flows out of its north end, and was followed downward to its mouth on the southwest side of Ungava Bay. For sixty miles below the lake, the river, like all the streams of the central area, flows nearly on

a level with the general surface, or rather fills all the depressions along its course, and in consequence is made up of a succession of lake expansions connected by short stretches of rapids, where the river is often broken into several channels by large islands. Below this distance the channel contracts and in five miles the river descends more than 200 feet into a distinct valley well below the level of the surrounding country ; and from there to its mouth always follows a distinct ancient valley cut down into the solid rock from 300 to 1,000 feet below the surrounding country. Between the first and the second gorge, which is about eighty miles lower down stream, the river is almost a continuous succession of heavy shallow rapids so bad that the stream is not used by the Indians. At the second gorge, or Eaton Canon, the river passes through a narrow cleft in the rocks and falls more than 300 feet in less than a mile. Below Eaton Canon the river continues with a very rapid current for 175 miles to where it joins the Larch River, a very large branch from the westward, which was subsequently explored in 1896. From the confluence to these two large streams to its mouth ninety miles below the Koksoak River varies from half a mile to two miles in width, and has everywhere a swift current, so that the discharge is probably greater than any other stream in Labrador.

It had been intended that the party should winter at Fort Chimo, a Hudson's Bay post situated about thirty miles above the mouth of the river, but on our arrival there, we learned that during the previous winter the Indians and Eskimo belonging to this post had suffered grievously from famine, so that, of the former, upwards of 150 persons had perished of starvation, while among the latter several families had been nearly wiped out. This calamity was due to the failure of the herds of barren-ground caribou to make their usual migration from the barren grounds southward to the wooded regions in the late autumn and winter. As the Indians of the region depend almost wholly on the deer for both food and clothing, the failure of the supply reduced them to abject poverty, and was the direct cause of the

death of about one half of the entire Indian population from starvation and exposure. For this and other reasons, it was thought advisable to leave Fort Chimo, and to pass the winter at North-west River post at the head of Hamilton Inlet ; and to do so we took passage on the H. B. Co's steamship "Erik" to Rigolet on Hamilton Inlet. From Rigolet the supplies were sent in a small schooner to North-west River ; and from there the men were dispatched with the canoes up the Hamilton River, with instructions to go on as far as possible before the river set fast ; they ascended about 130 miles before being stopped by ice. In January an attempt was made to send provisions inland up the Hamilton River, but after ascending it 70 miles, the work was abandoned owing to the impassable nature of the ice in the rapids above. In the beginning of March the party, reinforced by a number of natives, again started inland, and this time succeeded in passing the rough ice, which in the interval had been filled in and levelled with snow. From the beginning of March to the end of May, we were engaged daily hauling on sleds loads of provisions and outfit for the coming summer's work. Finding that the work of the extra men did not assist materially they were soon discharged, and the work of moving five months' outfit devolved upon our party of six. To do this it was necessary to make at least three loads and often four, so that the same ground was passed over from five to seven times, adding great monotony to the heavy work. In this manner we proceeded inland, and when stopped by the break-up of winter, on the 20th May, we had reached a place near the Grand Falls, or 250 miles inland from the mouth of the river. During the entire time while thus engaged, we lived on a diet compound exclusively of rusty pork and flour, there being no chance to secure game or fish in the river valley at that season of the year ; and the advent of spring, bringing with it ducks and geese, and the opening of the rivers and the lakes, so that we could obtain an unlimited supply of fish, was heartily welcomed. The Hamilton River, like the Koksoak and all the

other large rivers of Labrador, flows in a distinct valley cut down far below the general level of the surrounding country. If Hamilton Inlet, which is only a portion of the ancient valley now sunk below sea level is included, the main valley extends inland nearly four hundred miles, and its present bottom is from 600 to 1,200 feet below the surface of the surrounding tableland. The upper portions of the river flows nearly on a level with the lower portions of the central tableland, and like the Kanapiskan spreads out into lakes, or in other places is broken into several channels by large islands, so that it is often difficult to define or follow the principal channel. Near the Grand Falls, the river changes from a meandering stream, that follows the lower levels of the general surface, and contracting into one channel, is precipitated into the ancient, deeply cut valley. In twelve miles this great river, with a volume nearly equal to that of the Ottawa where it flows past the Capital, falls 760 feet from where it issues from a narrow canon into the wider valley. The first part of the descent is seven miles of rapids with a total fall of 200 feet. The river then contracts into a narrow inclined, rocky trough down which it rushes with a tremendous velocity and is spurted out in a solid mass over a steep precipice into a circular basin 300 feet below. The mighty roar of this falling, seething mass of water, which can be heard ten miles away as a vibrating rumble, the mighty display of power and the whole grandeur of the scene fills the beholder with awe so great that the poor Indians of the region cannot be induced to look at it. The basin into which the river falls is about two hundred yards wide, and is nearly surrounded with vertical rocky cliffs, that rise 500 feet above the water. The bottom of the cliffs are lashed continuously by the mighty waves generated in the basin by the fall; while rising high above the walls of the basin is a column of spray that forms a conspicuous mark visible from any hill within 30 miles of the falls. From the basin the river rushes out through a narrow canon cut vertically into the rock at right angles to the falls. This canon, on

the level with the surrounding table-land, is from 100 to 300 feet wide, but at its bottom is often less than 50 feet across. Down this narrow zig zag gorge the river rushes in a continuous rapid with a fall of 260 feet from the basin to where it issues into the wider ancient valley some eight miles away.

Fram June 1st to July 15th we were engaged exploring the western or Ashuanipi branch of the river; and an idea of the almost level nature of the central area may be obtained, when it is stated, that during this time we did not make a single portage of the river. The last two weeks in July were spent exploring Lake Michikamau, which, next to Mistassini is the largest lake in Labrador being upwards of seventy miles long and twenty five miles across in the widest part. This lake, like all the other large lakes of the region, is abundantly stocked with fine large fish, including lake trout, brook trout, land-locked salmon, whitefish and pike, and I may here mention that the finest trout fishing in Labrador, which means the finest in the world, is to be found on the Hamilton River above the Grand Falls.

On August 1st we started southward up the Attikonak Branch of the Hamilton, and followed it to Attikonak Lake at its head; from there a short portage route lead to the Romaine River, which was descended to within 100 miles of the coast, when it becomes unnavigable, and a portage route sixty miles long was followed south-westward to the St. John River and that stream descended to its mouth near Mingan on the Gulf of St. Lawrence. From Mingan the party crossed to Gaspe and so returned home.

The principal geological discovery of these two years was the finding of a large area of stratified Cambrian rocks, which extend from the upper part of the Hamilton River in a north-northwest direction across the Koksoak River. These rocks contain a quantity of valuable iron ore so great that, in the exposures seen, it was estimated by millions of tons. From the notes taken much information was added to the knowledge

possessed regarding the climate and natural resources of the country passed through.

During the month of July and August, 1895, again accompanied by Mr. Eaton, I was engaged in an exploration of the country about the head-waters of the Manicougan River, which flows southward into the St. Lawrence about 220 miles below Quebec. The river was ascended 200 miles to the upper end of the Lake Mouchalagan, to where the Quebec Crown Lands survey ended. From there the course of the river was traced 125 miles to its source in Summit Lake, which, as has already been stated, is also the source of the longest branch of the Koksoak River. In order to reach the head of the river we were obliged to leave the stream thirty miles above Mouchalagan, and to pass by many long portages, that lead either over ridges of boulders or through deep swamps to and from small lakes situated on the highlands along the west side of the river. The country passed through is the highest and roughest in Labrador and its elevation varies from 2000 and 2500 feet above the sea level.

Before reaching Summit Lake a trip was made westward to the head-waters of the Big River above Lake Nichicun, in order to connect with the survey of 1894. Having with great difficulty gained the head of the river, we carried the survey down it, and in doing so had to pass for 50 miles through a narrow gorge, where it was impossible to make portages out of the valley and where the river, by its heavy grade, forms a continuous rapid. This work was exceedingly dangerous and in running a heavy pitch a canoe upset and one of our Indian canoemen was unfortunately drowned.

The results of this season's work was a number of surveys in this almost inaccessible region which give a good idea of the location of the central watershed. Along the portage route and the river above Lake Mouchalagan great thickness of crystalline limestone were discovered, and associated with them extensive beds of valuable iron ore.

In 1896 I was assisted by Mr. G. A. Young and started with canoes from Missinaibi Station on the C. P. Ry., from there we descended the Moose River to James Bay where a Collingwood fishing boat, the property of the Department, was fitted up, and in it we sailed 450 miles along the east coast of Hudson Bay to Richmond Gulf. Leaving the boat here we passed inland with canoes and ascended streams flowing from the eastward some 75 miles to Clearwater Lake. This lake was thoroughly explored, and was found to be about 35 miles long by 18 miles across in its widest part; it is abundantly stocked with large trout and whitefish. Continuing eastward by a short portage route Seal Lake was reached, and was followed 35 miles to its east end, which is only a few miles from the watershed dividing the waters flowing into Hudson Bay from those emptying into Ungava Bay. Having crossed the heights-of-land we reached the head of the Stillwater or western branch of the Koksoak River, and descended it 350 miles to its mouth. From Fort Chimo passage was taken in the "Erik" to Rigolet where a change was made to a schooner bound for Quebec, and so Ottawa was reached on October 10th. Among the practical results of this exploration was the discovery of an extension of the Cambrian rocks with their immense beds of valuable iron ore which were found for upwards of 30 miles along the Stillwater River; the elevation of the watershed was found to be about 900 feet above sea level, or much lower than at any other place where it has been crossed.

The results of the explorations of the past five seasons embrace the survey of the East Main, Hamilton and Koksoak rivers and portions of the Rupert, Big, Romaine, St. John and Manicouagan rivers in all some 3,500 miles; the limits of the forest areas and of the different trees composing it have been approximately mapped, and sufficient data has been collected to give a good general idea of the climate and natural resources of the interior of the peninsula. The interior, formerly supposed to be chiefly occupied by barren Laurentian granite and gneiss has been found to contain a large area of iron bearing Cambrian rocks and in other places rocks of the metal-bearing Huronian system have been discovered, while the Laurentian areas which occupy the greater part of the interior, represent all the different rocks found in that series elsewhere.

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