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April, 1890.

THE
* OTTAWA NATURALIST *

VOLUME IV. No. 1.

The
TRANSACTIONS.

Of the
* Ottawa Field-Naturalists' Club *

(Organized March, 1879. Incorporated March, 1884.)

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OTTAWA, CANADA:

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VOL. IV.

1891

THE
OTTAWA NATURALIST.

BEING VOL. VI OF THE

TRANSACTIONS

OF THE

OTTAWA FIELD-NATURALISTS' CLUB.

(Organized March, 1879. Incorporated March, 1884.)

OTTAWA:

W. T. MASON, BOOK AND JOB PRINTER, 48 AND 50 QUEEN ST.
1890.



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PROVANCHER, ABBÉ, Cap Rouge, Que.
SMITH, PROF. JOHN B., Rutgers' College, New Brunswick, N.J.

EDITORIAL.

Being convinced that the publication of the OTTAWA NATURALIST, in monthly parts, is by far the best method of keeping the Club before the public, and also of keeping up the interest of our own members, the editor requested the Council to bring the subject up for discussion at the last annual meeting. It was there referred back to the Council, and at the first meeting of that body it was unanimously decided that for the future our magazine should be issued monthly. It will be observed that an important change has been made in the Council by the addition of three lady-members. It is the earnest desire of the council that the Ottawa Field-Naturalists' Club should be thoroughly successful in every way, and as we have a large number of ladies in the Club, it was considered that by having them represented on the Council, we might frequently get suggestions as to ways in which we could make the excursions or other proceedings of the Club more agreeable to this most important part of our membership. It has always been understood that our Club, while working hard at scientific development, at the same time wishes to be recognized primarily as an institution for teaching, popularising, and making attractive the by-ways of knowledge. The members of the Field-Naturalists' Club are not by any means all scientific; but we are proud to include in our ranks many young students as well as many old children, young in the knowledge of nature—the glorious and enchantingly beautiful world with which a beneficent Creator has surrounded us. The editor again appeals to the members to endeavour to increase the membership. The magazine is now open for the publication of papers on the natural history of any part of Canada, and we are most anxious to obtain members in all parts of the Dominion. The excellent papers now in hand authorize the statement that the magazine will be well worth the subscription even to outside members, who cannot reap the other advantages offered by the Club to its local members. The editor begs to remind the readers of the OTTAWA NATURALIST that although the subscriptions have heretofore been collected at the end of the Club year, they are payable in advance. If members would take this notice as an application and send in their subscriptions, it would save both much trouble and a considerable amount of postage.

J. F.

ANNUAL REPORT OF THE COUNCIL.

To the Members of the Ottawa Field-Naturalists' Club :

Your Council has to report that the club has been carried on during the year now closing with increased interest and gratifying success.

The number of new members elected during the year is 28 ; the membership now standing at about 230.

There were three general excursions held during the summer : the first was to King's Mountain, Chelsea, by vans ; the second was to Montebello by steamboat, and the third to Ox Bow or Big Gully, near Casselman, by rail. A fourth excursion was arranged to Kirk's Ferry, but the weather being unfavourable it was postponed from time to time, and was finally abandoned altogether.

The Saturday afternoon sub-excursions were not so successfully carried on as in former years. In the beginning of the season separate parties were formed in some of the sections, and went in different directions, which interfered considerably with the attendance and also the enthusiasm of the leaders, and the result was that comparatively few sub-excursions took place. It is to be hoped that an effort will be made this spring to establish the interest which previously existed in connection with the sub-excursions, and have them carried on as before.

The winter course of meetings comprised seven soirées and nine afternoon elementary lectures. At the soirées the following papers were read :—Dec. 13th, inaugural address by the president, Dr. R. W. Ells, on the "Geological Progress in Canada." Jan. 10th, "The Mistassini Region," by Mr. A. P. Low ; "The Serpentine of Canada," by Mr. N. J. Giroux. Jan. 24th, "Glaciation in America," by Dr. A. C. Lawson. Feb. 7, "Some Geological Facts Observed on a Trip to the Straits of Belleisle," by Dr. Selwyn ; "A Bird in the Bush," by Mr. W. A. D. Lees. Feb 21st, "Some Notes on the English Sparrow," by Mr. J. Ballantyne ; "The Wolf," by Mr. W. P. Lett. March 7th, "On Some of the Larger Unexplored Portions of Canada," by Dr. G. M. Dawson ; "A Naturalist in the Gold Range, B.C.," by Mr. J. M. Macoun. March 14th, annual reports of the leaders of the various branches. These soirées took place every alternate Friday evening ; the attendance was large and much interest was manifested.

The afternoon lectures were commenced on the 13th of January and continued every Monday afternoon till the 10th of March, as follows: one on geology (volcanoes and their associated phenomena) by Dr. R. W. Ellis; one on palæontology by Mr. W. R. Rillings; two on botany, one by Mr. Wm. Scott, and one by Mr. J. M. Macoun; one on zoölogy, by Mr. J. Ballantyne, two on ornithology, by Mr. W. A. D. Lees; one on entomology, by Mr. T. J. MacLaughlin; and one on conchology, by Revd. G. W. Taylor. The attendance at the lectures, especially of ladies, was exceptionally good. The interest in the work of the club by our lady members is becoming more marked every year, and the council desires to express the hope that the suggestions made and favorably discussed at previous meetings, with regard to the election of lady representatives on the council, will be carried into effect at the present meeting.

The treasurer's report will be submitted to you, from which it will be seen that the financial condition of the society still remains satisfactory.

The librarian's report will also be laid before you, enumerating the many valuable additions received during the year; from it you will learn that an effort is being made by that energetic officer to catalogue the publications on hand, and to have some of the more valuable volumes bound.

The proceedings of the club have been published in the OTTAWA NATURALIST during the year, together with accounts of excursions, meetings and all other matters of interest in connection with the work of the year, so that it is considered unnecessary to prolong this report. In conclusion, the council begs again to draw the attention of this meeting to the question of publication and in view of the general expression of regret, among the members, at the change from the monthly to the quarterly plan of publication, would recommend that authority be granted to return to the plan of publishing the NATURALIST monthly.

The editor has expressed his opinion, that with the material now in his hands, there will be no difficulty in keeping up the monthly issue.

All of which is respectfully submitted.

Signed on behalf of the council.

T. J. MACLAUGHLIN, *Secretary.*

TREASURER'S REPORT.

To the Council of the Ottawa Field-Naturalists' Club.

GENTLEMEN,

I have the honour to report that the finances of the club are in a better condition than they have ever previously been, Owing to some unforeseen circumstances, including a short illness on my own part, just before the annual meeting, by which I was prevented from collecting several subscriptions and advertisements which were due the balance shown on the balance sheet, is much smaller than it would otherwise have been. The arrears have again been considerably reduced during the past year, and of those still unpaid, nearly all have promised to pay up before the next annual meeting. With the assistance of the Secretary and Librarian, I have been able to keep the expenditure down to the very lowest figure, as will be seen by the balance sheet submitted herewith, which I trust will be found satisfactory.

TREASURER'S BALANCE SHEET, 1889-90.

| RECEIPTS. | | EXPENDITURE. | |
|-------------------------|----------|---|----------|
| 1889. | | 1890. | |
| Mar. 20. Balance | \$30 69 | Mar. 18. The OTTAWA NATU- RALIST, Vol. III, Nos. 1-4..... | 182.28 |
| 1890. | | Postage..... | 6.76 |
| Mar. 18. Subscriptions | | | \$189 04 |
| 1889-90. | \$157.00 | Extras. — Flora | |
| Arrears..... | 24.00 | Ottawaensis .. | 4.75 |
| | 181 00 | Extras—Authors' | 10.46 |
| Advertisements | 23 00 | | 15 21 |
| Authors' extras..... | 12 75 | General Printing..... | 3 90 |
| Transactions sold..... | 11 52 | Stationery..... | 2 50 |
| Excursion receipts..... | 65 85 | General Postage..... | 5 22 |
| | | Rent of Lecture Room. | 12 00 |
| | | Binding..... | 8 40 |
| | | Excursion Expenses, Conveyances, etc. | 47.95 |
| | | Circulars..... | 5.23 |
| | | Postage..... | 4.84 |
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OTTAWA, March 18, 1890.

JAMES FLETCHER,
Treasurer.

THE MISTASSINI REGION.

 BY A. P. LOW, *B. App. Sc.*

(*Read January 10th, 1890.*)

For several years past an exciting controversy has been carried on in the public press as to the size, shape, and position of Lake Mistassini; and a number of writers on the strength of hearsay evidence, aided by brilliant imaginations, have indulged in many extravagant statements in regard to this "Great Inland Sea of the North-East," some affirming that it equalled, if indeed it did not surpass, Lake Superior in size, and that in comparison with it our other inland lakes were mere ponds.

This evening I propose to give a brief statement of the known facts about Mistassini from observations and measurements made by different members of the Geological Survey Staff, and at the same time to outline the route followed, to and from the lake, by the last expedition sent out by the Government.

Before entering upon this, a short historical summary of previous explorations may prove interesting to some present.

Although rumours of a great body of fresh water, larger than any south of the height of land, seem to have reached the French trading in the Saguenay country, soon after Champlain's arrival in Canada, it was not until 1672, that Père Chas. Albanel, a Jesuit missionary, visited the lake. He had been sent overland to Hudson Bay by authority of the French Governor, to visit the posts of the Hudson Bay Co., then but a short time established in the southern part of the bay.

The route followed on this occasion was up the Saguenay to Lake St. John, thence by the Ashouapmouchouan River to its head, across the height of land, and through lakes Chibougamoo and Obatagoman, large bodies of water feeding the Notaway River, which flows into James Bay. From here by short portages into Lake Wawaniche, and so into the S.W. Bay of Mistassini.

Père Albanel, from his account recorded in the "Relations des Jesuites," appears to have passed up this bay to the end of the point separating it from the S.W. Bay, and from there crossed the mouth of

the latter, and proceeded along the west shore to the outlet of the Rupert River, down which he voyaged to the James Bay.

The following is a translation of the account given by Père Albanel in the "Relations of the Jesuits" :—

"June 18. We entered Great Lake Mistassini, which is so large that it takes twenty days of fine weather to make the tour. This lake takes its name from the rocks of prodigious size with which it is filled. It has a number of very beautiful islands, ducks and fish of all kinds, moose, bears, cariboo, porcupine and beavers are here found in great abundance. We had already made six leagues to the traverse of the islands which cut the lake in two, when I perceived something like an eminence of land at such a distance that the eye could just reach it. I demanded of our people if it were near the point where we must go. 'Keep quiet,' said our guide, 'and do not look there, if you do not wish to perish.' The Indians of these parts believe that whoever wishes to cross the lake must carefully guard from looking at the route, especially at the place to which they must cross, a single glance, they say, will cause the rising of the waters and great tempests, which will surely upset them."

This is the whole of the description given by Père Albanel in connection with Lake Mistassini, but he must have made a rough map of the route followed, as we find on a map of Canada compiled by Père Laure in 1720, a plan of Mistassini with the route followed by Albanel on it. The statement that it took twenty days of fine weather to make the circuit of the lake, has formed the base on which all the extravagant estimates of the size of the lake have been built.

The arguments used being in about this style : If it takes twenty days to go round the lake, ten days would be required to go from end to end, and as an Indian can paddle from three to four miles per hour, and the paddling time of a summer's day would average from twelve to fifteen hours, therefore the lake must be from three hundred and sixty to six hundred miles long.

Unfortunately, like other estimates based on what might or could be, this falls to the ground, because the Indian, although he *can* paddle from three to four miles an hour, finds it too hard work when he is in no particular hurry, and also, that, although he may travel from twelve

to fifteen hours per day, he does not. From experience of Indian travel, I find that he loses considerable time taking down, and putting up his bark house morning and evening, and, while travelling, stops to look at every bird or animal that may come within range of his far-seeing eye; and not only this, but he stops at about every point which may happen to jut out in his way, where, if the kettle is not boiled, at least a slight lunch is made off a smoked fish or some similar luxury, and everybody gets out of the canoe, except the old squaw in the stern, who remains guard over the canoe and provisions, and keeps the accompanying dogs from a too free use of the latter.

To sum up, an Indian on his annual summer excursion, such as a trip around Mistassini would be, does not average more than ten miles a day, so that the estimate given by Père Albanel proves correct when taken in the proper way.

The French botanist, Michaux, visited the lake in 1792. He followed the route taken by Albanel, and quotes him in his description. Michaux found several new species of plants along the route, one of which he named after the lake, *Primula Mistassinica*.

In 1820, Mr. Jas. Clouston made an exploration of the country east of James Bay for the Hudson Bay Company. On his map, the south end of the lake, below the Rupert River, is well laid down; but he does not appear to have gone round the north end.

For nearly one hundred years the Hudson Bay Company have had a trading post on the lake, and early in the present century their great rival, the North-West Company, had a similar establishment at the south-west end.

In 1870, Mr. James Richardson was sent by the Geological Survey to explore the country north from Lake St. John to Mistassini. He visited the southern bay, and reached the Hudson Bay Post, but was obliged to return from there on account of his provisions running short.

The year following, Mr. Walter MacOuatt was sent to continue the work, and made a survey of the two southern bays and the west shore beyond the outlet of the Rupert River, when he was obliged to stop for the same reason as Mr. Richardson.

In 1882, some members of the Quebec Geographical Society having read Père Albanel's account of the lake, which, added to the extrava-

gant stories of Indian and half-breed hunters about Lake St. John, convinced them that they had a perfect inland sea, and the Government was petitioned to finish the surveys previously begun. Their request being granted, the party to which I was attached was sent out in 1884, with Mr. John Bignell in charge.

Mr. Bignell was recalled in the spring of 1885. On his return to Quebec, many startling statements as to the great extent and immense size of the lake appeared in the press of that city and were copied by the newspapers all over the land. On my return, in the fall of 1885, I reported on the measured size of the lake, but, as it fell far short of the previous stories, and as the press of Quebec continued to support Mr. Bignell's statement—based on Indian exaggerations,—the general public were in a state of uncertainty which to believe. During the past summer, however, Prof. Loudon and Mr. MacDonald, of Toronto, resolved to make a trip to the lake to solve the problem. A full account of their trip was published in the newspapers, which, I am happy to say, corroborated my report; and thus the matter is settled.

The great area of country stretching from the Gulf of St. Lawrence north-westward to Hudson Bay forms a low-lying plateau of Archean rocks. The height of this plateau averages about 1,500 ft. above sea level, rising slowly from about 1,000 ft. near the edge to about 2,000 ft. in the interior. The surface of this plateau is by no means flat, being covered with low rounded hills, which are roughly arranged in a series of ridges more or less parallel to themselves and the general strike of the rocks. These hills are the stubs of extensive and elevated mountain chains which, from exposure to subaëreal denudation for countless ages, and from having been subjected to the glacial action of later geological times, have been ground down to their present unimposing state. In the interior the difference of level between these ridges and the valleys separating them is small, the hills seldom rising 100 ft. above the general level. As the coast is approached the difference is more marked, the long action of ancient rivers having deeply cut out the principal valleys below the surrounding country, thus causing a more marked contrast in level and at the same time much finer scenery.

Near the height of land, the valleys between the low hill ridges are often quite wide, and are everywhere covered by innumerable lakes, many of which are of great area, but more often of small size.

These lakes are always connected by small streams, with rapids or falls between them. The streams flowing from these different lake chains join to form the many large rivers which flow out of this area. Along the lower courses of these large rivers, lakes are not common, the greater volume of water having cut through and removed the boulder drift and solid rock barriers, which cause many of the lakes in the interior. From this description it will be seen that our northern country is everywhere covered with a net work of waterways, navigable without much difficulty in any direction with light canoes capable of being transported across the intervening portages.

It was by one of these waterways, the Bersimis river route, that we reached Mistassini.

This river empties into the Gulf of St. Lawrence some 160 miles below Quebec. At the mouth is situated a large village of Montagnais Indians. These Indians are under the care of Roman Catholic missionaries, and are well advanced in civilization, many of them owning log houses and resorting to the woods only in the fall, where they hunt furs all winter, returning to the village in the spring, and there remain mostly in an idle state during the summer, living on the proceeds of their winter's hunt.

The journey was undertaken in small bark canoes, two men paddling each. The first 45 miles was a monotonous paddle along shore against a strong even current; between high vertical clay and sand banks, in a river valley from $\frac{1}{4}$ to 1 mile wide, with walls of gneiss rising from 300 to 600 ft. above the river. The hills and river bottom are covered with a dense forest, the trees being white and black spruce, tamarac, balsam fir, balsam and aspen poplar, white and yellow birch. There is no pine. These trees afford logs 24 inches in diameter at the butt, and are cut into deals by a steam mill at the river mouth.

At the end of this stretch, which took three days to paddle, the first of a long series of portages was reached. The first portage passes a double fall of 100 ft., with a large whirlpool between, on the edges of

which thousands of logs are piled up. Above this the river for 30 miles is a succession of falls with sluggish water between.

These portages culminate in one 10 miles long, the first 4 miles being up a mountain 1,000 ft. high, and unavoidable, as the river in this distance breaks through a high range of hills, and falls 500 ft. through a deep canyon with perpendicular walls.

In 1870 a great fire passed through this country, destroying hundreds of thousands of square miles of valuable timber, the area burnt reaching from the St. Maurice river on the west to beyond the Bersimis on the east, and from Lake St. John to the Height of Land. This vast region has a very desolate appearance, the blackened tree trunks standing or partly fallen on barren sandy soil or bare rocky hills, which have been whitened by the kaolinising action of the fire on their felspathic ingredients; a second growth, of small spruce and banksian pine is beginning to replace the old forests, and a profusion of blueberries grow everywhere, the only and great consolation for the desolate scenery. When the river was again reached, but one portage was encountered to Lake Pipmaukin, 40 miles distant.

Here our meagre diet of pork and flour was augmented by a supply of fish, large pike being taken on the troll below, while above the portage quantities of fine brook trout, averaging 3 lbs in weight, rose readily to the fly. These fish had apparently come out of the lake to deposit their spawn on the shallow gravel bars, in the swift running water of the river.

The date was the last week in August, and as I have since remarked these fish on the spawning grounds everywhere about this time, I think it would be well to have the present close season advanced a month, as now, the fish are taken upon the spawning beds with great ease in the open season.

Lake Pipmaukin is full of deep bays, and has an area of over 1,000 square miles. We were delayed here until Sept. 19th, partly owing to equinoctial gales which prevented us from crossing the lake in our small canoes. During the month of September the temperature fell every night to near or below freezing point, and sheet iron stoves were put up in the tents, which greatly added to our comfort.

From Lake Pipmaukin a portage route was followed up a small river emptying into the lake, and then through a number of small lakes westward into the Manouan River, a branch of the Peribonka, which flows into Lake St. John. This river was ascended to a large lake of the same name at its head. But few pleasant days had been experienced since leaving Lake Pipmaukin, and here on Oct. 5th we had our first snowstorm about 5 inches falling, part of which never left the ground. From here the men were sent by a similar portage route to the Peribonka River with half loads, as the small streams would not permit full loads being carried. On their return, fearing to be frozen up before ascending the Peribonka, it was resolved to push on as far as possible before the ice rendered canoe travel impossible, so the Peribonka was reached and ascended, a distance of 30 miles to a small western branch on the route to Mistassini. This branch was followed six miles to a small lake, which was found to be frozen over, and so our canoe voyage ended Oct. 23rd. No one was sorry, for the travelling, owing to the cold stormy weather, was extremely disagreeable; the paddles were often caked with ice, and only by vigorous paddling could a moderate warmth be kept in the body, while the feet were always cold, and several times we were obliged to stop during the day and build fires to restore the circulation in our benumbed hands and feet.

From Oct. 23 to Nov. 29th we remained at this small lake, the men being engaged making snowshoes and long narrow toboggans, on which our provisions and outfit were now to be transported. Here traps were set and hunting indulged in. The traps caught a couple of otters, some mink, and a few martens. Good sport was had shooting muskrats on the ice before the lake froze solid, and a stew of these animals proved very acceptable after our long diet of salt pork. Before winter set in little game had been seen, a few spruce partridges, sheldrakes, fish eating ducks, whistlers and sea gulls only being shot, but everything in the shape of fresh meat went into the pot and was eaten with relish. On Oct. 25th the first ptarmigan were seen, and from that time continued to be killed in moderate numbers.

These birds in the winter pass southward from their breeding grounds in the barren lands some distance north of Mistassini, and feed on the buds of willows growing in the marshes and around the lakes.

During seasons when the snow is deep and their food supply consequently scarce, they proceed as far south as Lake St. John, and have even been killed immediately north of Quebec.

On Nov. 27th we commenced our winter's journey to Lake Mistassini, and as each day's journey was the same, a description of one will do for all. Breakfast was taken in the tents at daylight, and then everything packed up and laid outside; the stoves were taken down and a fire lighted, at which the frozen bottoms of the tents were melted in order to fold them; these were laid on the sleighs, the baggage and provisions laid on, wrapped in the tents or coverings, and securely lashed with long lines; at this work considerable time was lost, so that the line of march was seldom taken up before 8.30 a.m. The guide, with a light load on his sleigh, led the way and broke the path, the rest following in Indian file, each dragging a load of 200 lbs. weight. Thus the party journeyed on through the desolate country over low rounded hills and across long narrow lakes lying north and south. As the height of land was approached, the timber was found to consist almost wholly of black spruce and tamarac of small size, which scantily covered the rocky hills and swampy lake borders. At noon a stop was made near a lake or small stream, and dinner prepared at a fire built on the snow, after which the march was continued until about 4 p.m., when we pitched our tents for the night.

A place being selected for the tents, the snow was evenly packed down by tramping on it with snowshoes, then the tent and stove set up, a good supply of brush laid on the bottom, and covered with waterproof sheet and blankets, a fire lighted, and soon the tent was perfectly warm and comfortable, even with the thermometer outside 40° below zero.

The men were employed until dark cutting the night's supply of fire-wood, after which supper was eaten, a pipe smoked, and then all turned into the blankets.

The weather during December alternated between extremely cold and clear, and wild stormy days; on the stormy days the camp was not changed and the men employed the time in hunting beavers in the small lakes about. When signs were discovered, the whole party proceeded to the spot; the ice was cut round the margin of the pond and stakes placed across the outlet and inlets to prevent the escape of the

beavers, any holes in the bank similarly stopped; attention was then turned to the house, a trough was first cut in the ice around it, when the outlets were found, a small stick was hung in front of each, and a man put on guard. The rest then broke into the house with axes and ice chisels and so routed out the inhabitants, when one started out he disturbed the stick and the man on watch plunged his arm into the water and in an instant had it on the ice where it was immediately dispatched with a club. If luck was good, two or three beavers would reward a day's work of this kind, but several times blanks were drawn.

In this manner the journey was continued and the height of land reached December 9th.

Here an escarpment running N. E. and S. W. was descended 300ft. to a comparatively level country stretching away to the northward. Just beyond the height of land is a large lake called Temiscamie; this was crossed and the river flowing out followed 16 miles, when a portage of 2 miles was crossed into the head of Lake Mistassinis or Little Mistassini.

This lake lies parallel to the big lake on its East side, and its level is some 40 or 50ft. above the latter. On its east shore, perpendicular cliffs of limestone rise in places 50 or 60ft. above the water; this limestone is of a greyish blue colour and is often quite cherty, a similar rock is seen on the shores of the larger lake, both in fact resting in great basins scooped out of these rocks, which seem to be an outlier of Cambrian rock, similar to those of the east coast of Hudson Bay, which here rest in an old depression in the Archean.

Little Mistassini was followed to its southern end, where a portage of six miles was made to the great lake and its shore followed some 35 miles to the Hudson Bay Post which was reached December 23rd. The last ten days journey was very hard as provisions ran out, first the pork and then the flour, and starvation was kept off partly by a generous contribution of fish from an indian encampment which we happened upon near the end of Mistassinis and by a small supply of provisions from the post, also by finding on lines set through the ice a few large turbot (*Lota maculosa*) called Maria by the Hudson Bay people and common to all the great lakes of the north. The post was reached in a blizzard, from the effects of which everybody suffered for several days, black patches of skin showing where the frost had done its work.

On Christmas day we dined at the Hudson Bay Post and were regaled on roast beaver and lynx, the former has the flavor of strong mutton while the latter closely resembles young pig, the flesh being white and delicate. These were followed by a real plum pudding. The ordinary fare at the post consisted of salt fish and watry potatoes, thrice a day, relieved with an occasional meal of partridges or rabbits, and with fresh fish once a week.

January was spent around the post, considerable cold weather being experienced, the mean temperature from 3 daily readings with max. and min. was 18.5° below zero, the highest being 16° above and lowest being 56° below zero, which point was reached twice during the month.

On February 2nd, I left with two men for Lake St. John, the men drawing our small outfit and provisions of flour, lard, and tea on their toboggans. The first night out we slept in the teepee of an indian who was to guide us over the height of land. This is made of a number of poles meeting in the centre and covered with birch bark ; it has a large opening at the top, for the escape of the smoke from the fire built on a few stones in the centre of the floor. The bottom and sides are lined with green boughs. It is a most uncomfortable dwelling, as the smoke which fills the upper part, renders standing up or even sitting upright impossible, when lying down the feet are roasted by the fire while the head and shoulders are freezing from the cold draughts which penetrate through the cracks and openings in the birch bark covering.

On the trip to Lake St. John the journey was very similar to that already described ; we passed from the southern end of the lake immediately over the height of land and then followed the Chef river of the Ashouapmouchouan and thus reached our destination.

Being unable, on account of heavy falls of snow., to drag our tent and stove, they were abandoned and we were obliged to sleep during the greater part of the trip in barricades. These are made by digging a hole in the snow 12ft. long by 6ft. wide down to the ground and lining one end with boughs with a fire in the other end. No great discomforture was experienced in this mode of sleeping, as we crawled into our blanket bag, made of woven strips of rabbit skin ; this, although the finger can easily be pushed through it anywhere, is a remarkable non-

conductor of heat, and thus retained all the body heat even with the thermometer far below zero.

The return journey from Lake St. John to Mistassini was commenced April 9th. Mr. J. M. Macoun and 6 men accompanied me. As the season was now getting late, the toboggans used in the winter were exchanged for low sleds shod with mill saws, the teeth of which were removed. This change was made on account of the soft snows in the spring sticking to the wooden bottoms of the toboggans and rendering them exceedingly heavy to draw; the higher sleigh also protecting the goods on them from the water lying upon the ice of the rivers and lakes.

The route followed by the party this time, was up the Ashouapmouchouan river to its head on the height of land, 50 miles westward of Mistassini, thence over the ice of three large lakes, Obatagoman, Chibougamou and Wahwaniche into the southern part of Mistassini.

The travelling at this time of the year was simply delightful. A start was made at break of day, breakfast being over and everything packed in readiness before that time. The cold during the night freezing the snow, melted by the sun's rays on the previous day, formed a hard crust everywhere, over which we travelled without snowshoes until dinner time between 8 and 9 o'clock. After this the sun softened the crust and snowshoes were worn, the walking becoming heavier and heavier until about 12 o'clock when the crust was wholly melted and all travelling impossible. Then camp was made and supper eaten, after which everybody went to bed to rise between 1 and 2 a.m. In this way the Hudson Bay post was reached April 29th. The only adventure was an involuntary three days' fast, owing to a period of soft weather setting in before reaching the post, rendering travel impossible and causing our estimated quantity of provisions to fall short by that amount. At this time four of the men walked sixty miles in forty hours without a bite to eat, which shows the endurance of these indian and half-breed hunters.

From April 29th to May 28th, a period of enforced inaction occurred owing to the breaking up of winter.

On May 24th the thermometer registered 80° in the shade, the highest temperature recorded during the summer, and we experienced the novel sensation of floating about on ice floes in the morning, bath-

ing in open water at noon, and sweltering in the shade in the afternoon, attended by swarms of hardy and energetic mosquitoes.

It was surprising to note the rapidity with which the ice disappeared from the S.E. Bay. On the morning of the 24th it was firm enough to support a man with a sleigh-load of provisions, by noon only loose pieces were to be seen floating about, while in the evening every sign of ice had disappeared. This rapid melting of the ice is probably caused by a general rise of temperature of the water of the lake from the number of small streams flowing in, until a point is reached sufficiently above freezing to allow an expenditure of heat sufficient to melt the ice in all parts simultaneously, which has been previously rotted and honeycombed by the sun's rays.

The ice in the main body of the lake, owing to its greater volume of water, did not break up for a week later. From May 28th until June 27th our men were away for provisions stored during the winter at Lake Ashoupmouchouan. During their absence Mr. Macoun and I were employed with latitude observations, attending to weather readings, noting the arrivals of the birds, and collecting and noting the growth and development of the various plants, besides this we also made and planted a small garden, putting in the seed brought in for experiment. The following birds were noted throughout the winter about Mistassini: The chickadee, winter wren, pine grosbeak, white winged crossbill, common red-poll, snow bunting, black snow-bird, whiskey jack or Canadian jay, downy woodpecker, day owl, spruce partridge, partridge, and willow ptarmigan. On May 2nd a flock of Canadian geese passed north. On the third a number of golden-eyed ducks alighted in the open water of the narrows. A single pair of the greater yellow legs was seen, and a robin was heard on the 7th.

Then came quite a rush during the next 10 days.

On the 10th a white bellied swallow, the 11th ruby crowned kinglet, sheldrake and ring-billed gull; on the 14th the cow-bird, rusty grackle, belted kingfisher and loon; on the 15th the sea coot, and tree sparrow; on the 20th, the water-thrush, Swain's sparrow, white-throated sparrow and dusky duck. Then before June 1st hermit thrush, yellow bird, magnolia warbler, black-capped yellow warbler, song sparrow,

raven, night hawk, ring-necked plover, surf duck, sheldrake, Forster's tern and the black throated diver.

While the following arrived between that date and June 15, Tennessee warbler, black poll warbler, yellow bellied flycatcher, golden-winged woodpecker and fish hawk. The cedar bird and night heron being noted later on in the season.

It was not until May 24th that a flower was found in bloom, when a few blossoms of *Epigœa repens* were discovered ; but a week later the whole of the woods about were carpeted with this lovely bloom.

During the first week in June the only herbaceous plants in flower were sweet colt's-foot (*Nardosmia palmata*), the strawberry, the white violet and the beautiful little *Primula Mistassinica*. In damp or wet grounds, however, leather leaf, sweet gale, the green alder, red and fetid currants, and the laurel (*Kalmia glauca*) were in great abundance.

During June about 100 species of flowering plants were noted, but with the exception of *Calypso borealis*, which is quite common about the lake, none were of particular interest or rarity.

Shortly after the breaking up of the ice in the lakes, the Indians belonging to the post arrived with their families, bringing in the furs collected during the winter. Mr. Millar and his assistants were kept busy gathering these and crediting the value of them against the accounts of the owners. The fur trade is run altogether on the credit system. The Indian receiving debt in the fall in the shape of shot, powder, tea, flour, sugar and clothing, the amount being regulated by the amount of fur brought in the previous year, and the prospects of a successful hunt during the coming season. No cash is known, and trade is carried on by a system of barter, the standard being a "mid beaver skin," by which is meant the skin of an average sized beaver. From this as a basis the values of other skins are determined ; for example, a large beaver is worth $1\frac{1}{2}$, a small $\frac{1}{2}$, a marten 2 a mink 1, an otter 3 to 4, a bear 4 to 8, a silver fox 9 to 15, and so on. The values of the articles of trade are regulated in a similar manner. One beaver will purchase any of the following :—6 lbs. flour, 2 lbs. sugar, 1 lb. tobacco, $1\frac{1}{2}$ lbs. tea, 2 lbs. pork, 1 lb. gunpowder, 2 lbs. shot, 1 cotton handkerchief and other things in proportion. Now, as the

average debt allowed each hunter is little over one hundred beavers, one can see that after purchasing the necessaries for the ensuing year but little remains for luxuries in the shape of red handkerchiefs, etc.

On the arrival of a new lot of Indians the women already at the post went to the water's edge to greet the new comers, which they did by embracing and kissing, and then indulging in a good cry all round ; their emotions being thus appeased they soon became merry and talkative. Twenty-six families belong to this post, about 150 persons in all. They speak a dialect of the Algonquin or Cree language, being a tribe of that great family which inhabits the country from the Rocky Mountains to the Atlantic. As a rule they are not of great stature, though some of the men are fine stalwart fellows, six feet tall.

From long contact with the Hudson Bay Co. and missionaries they are all pretty well civilized, everybody being able to read and write in a kind of syllabic shorthand, invented to fit the language by the English missionaries to the west. An Indian's writing materials consist of a piece of birch bark and a burnt stick, while a forked stick placed in a prominent position on a portage or at the forks of a river serves as a post-office.

They are all perfectly honest, and would not touch provisions left in the woods even to save themselves from starvation.

Although all are nominally Christians, they still cling to many of their old beliefs and superstitions ; anyone who claims to be a conjuror or medicine man is held in great respect and dread by the rest of the community. The conjurors claim to be able to commune in spirit with other conjurors, and also by the aid of spirits to foretell the future, and learn what is happening at the moment to persons at a distance. By the aid of charms and spells they are believed to bring sickness, and even death to anyone who may offend them. They also pretend that the spirits would supply them in times of hardship and famine with deer's meat, fish, and a little flour, but no tobacco or whiskey.

Allegorical animals are dreaded and propitiated by these Indians, the greatest among these is the big muskrat who travels under the snow, there is also a big beaver, and a big dog, who does not walk on the ground but upon the trees. In Mistassini is a large trout, so long that he cannot turn round, who causes all the storms on that lake by

moving its tail. They have also enormous giants living in the solid rock. They also believe that certain of the animals understand their language, especially the bear who is a close relation of theirs, and an indian never shoots one without first offering an apology for the act. Great respect is paid to the bones and flesh of the bear and beaver, their skulls are always scraped clean, and set up on poles facing the sun.

Cannibalism is abhorred; the belief being that anyone indulging in human food immediately becomes crazy and is forced to wander about in a starving state until death affords relief; on suspicion of such an act the suspected party is killed. Maniacs are tied to stakes and allowed to starve to death; this is a cruel practice but is thought necessary for the safety of the community at large, as no proper restraint can be put upon such dangerous persons.

All the able-bodied men are employed during the summer in transporting the furs down the Rupert river to Hudson Bay, and in bringing in the stock of provisions and goods for the next season's trade. Six large canoes, each manned by six men are required to bring in the outfit, and every capable male is required for this work, only the very young and old remaining behind.

On the arrival of our men with the provisions, we left the post June 30th, with a large and small canoe, having secured the services of two old indians who were too feeble to undertake the voyage to the coast with the brigade. Passing up the S. E. bay we soon reached the big narrows and continued up the lake through a string of large islands in its centre, until we reached a point opposite the outlet of the Rupert river, when we crossed to the W. shore taking one sounding of 37½ ft. Owing to the large stone employed in this operation and a threatening thunderstorm, we were unfortunately unable to take more. Passing the Rupert, the work of survey was taken up at the place where Mr. MacOuatt finished, and from there carried completely round the north end and down the east side to the big narrows, where connection was again made with MacOuatt's work, thus completing the work commenced by Messrs. Richardson and MacOuatt.

From the results of this work, it is found that Lake Mistassini is a long and narrow body of water, stretching from north-east to

south-west, with a perceptible curve between the ends, the concavity of the curve being towards the south-east. It lies between N. Lat. 50° and $50^{\circ} 24'$, W. Long. $72^{\circ} 45'$ to $74^{\circ} 20'$, or 300 miles directly north of Lachute. The length, in a straight line between the extremities of the north-east and south-west bays, is nearly one hundred miles, the average breadth of the main body being about twelve miles. At either end of the lake, a long point stretches out, dividing the ends into two deep bays. Between the points, and seemingly a continuation of them is a long chain of rocky islands, which, by overlapping each other, almost divide the lake into two parts, so that a view of the opposite side is rarely obtained in going around the shore. A slight decrease in the present level of the lake would result in the production of two separate lakes, as the water between the islands is quite shallow, and for us a contrast in this respect, with the great depth between the islands and shore on either side. Here the lake is very deep, the isolated sounding, made in crossing, having given 374 feet, at a point which, I was informed, was not the deepest part of the lake.

The bay at the south-east end of the lake is called Abatagush. This bay, sixteen miles from its mouth, is again divided by a long point into two other bays. About four miles from the end of this point, and on it, the Hudson Bay post is situated.

The eastern part, called Cabistachgan Bay, runs slightly east of south, in an irregular course, for about twelve miles, the Little Perch River coming in at its head. The western part is much larger and more irregular. It stretches south for sixteen miles, a small river from Lake Wakiniche falling into it at that distance. A side branch of the bay runs to the westward for upwards of ten miles. The general width of Abatagush Bay is one and one-half miles. The south-west, or Poonichaun Bay, for a distance of twenty miles from its entrance, has an average breadth of about five miles. Its shores are broken by smaller bays, and its surface is covered with islands, varying from six miles long by one and one-half wide, to mere boulders. After the first twenty miles, the bay narrows to an average breadth of less than one-half mile, and continues in a south-westerly course for a long distance, as the end was not reached after ascending it fourteen miles. The

Indians say that a large river empties into the lake at the head of this bay. The north-east and north-west bays are not so deep as the southern ones; the distance from the end of the point to the mouth of the Papasquatssee River, a large stream coming in at the head of the north-west bay, being fifteen miles, with an average breadth of rather more than four miles. From the mouth of the Toquaoco River, which enters the north-east bay at its head, to the end of the point, the distance is nineteen miles, the average breadth being under four miles. By this river a canoe route goes to a Hudson Bay post, called Nitchicoon, situated on a branch of the East Main River, to the north-east. This stream falls rapidly during the dry season, being an exception to the other rivers running into the lake, which, taking their rise in large lakes, are not generally affected by local rainfall.

Besides those above referred to, the large river flowing out of Lake Temiscamie, and passing through Lake Mistassini, enters the lake on the east side about twenty miles from the head of the north-east bay. Almost directly opposite this river, on the west side, a smaller stream, called the Wabassinon River, enters.

The shore of the lake is indented by a number of smaller bays, and many islands also occur along its margin. The shores are mostly rocky, with no marshes or beach, a fact accounting for the absence of any great number of wading birds or gram-naceous ducks. The western bank rises from thirty to sixty feet above the surface of the water, and is in many places perpendicular. The eastern bank is not so elevated, and rises more gradually.

To the south of Mistassini, and running north of east, is a ridge of hills forming an escarpment about 300 feet high, and constituting the Height of Land between the waters flowing to the St. Lawrence and those draining to Hudson Bay, and the present division lines between the Province of Quebec and the North-east Territory. To the north is another range, passing within ten miles of the lake and trending away to the westward. The highest of these hills does not rise more than 500 feet above the level of the lake.

The country in the vicinity of the lake is generally slightly rolling, with rounded hills, rising from thirty to sixty feet above the water, and interspersed with numerous small lakes and marshes.

On the main body of the lake, and to the northward, the summer season is shorter and colder than in the vicinity of the post. During the month of July, the low lands bordering the lake were frozen solid within one foot of the surface, in all places where the trees were at all dense. This marked difference is undoubtedly due to the proximity to such a large body of cold water, which lowers the general temperature of the air during the warmer portions of the year. The soil overlying the Laurentian gneisses and schists is light and sandy, only a thin layer generally resting on these rocks.

At the Hudson Bay post, the most favorable point on the lake for agriculture, a poor crop of potatoes is raised yearly. They are small, as the tops are always frozen before reaching maturity. In the spring, as soon as the frost was out of the ground, I sowed garden peas, beans, corn, and turnips. On August 20th the peas were beginning to fill the pods, the beans were in flower, and the corn only eighteen inches above the ground; the turnips also were growing nicely. I believe that barley has been sown here, but would not ripen.

Covering the higher ground, at the southern end, white spruce, poplar, balsam-fir and white birch trees were found, some of which had a diameter of eighteen inches, three feet from the ground. The swamps are covered with a thick growth of small-sized black spruce and tamarac, and the small areas of burned land are generally clad with a second-growth of banksian pine.

Having no pork, our men from lake St. John refused to remain longer, so Mr. Macoun and I were again alone at the post awaiting the arrival of the brigade from the coast, having engaged a passage down the Rupert river in the canoe returning there.

After the arrival of the canoes, we left on Aug 22nd, and traveling from daylight to dark in a large canoe with ten paddles, we reached Rupert House September 3rd. From that place we crossed the south end of James Bay to Moose Factory, and then went up the Moose River to the C. P. Ry. at the Height of Land, where we left the canoes after an interior water journey of over 1000 miles.



SUMMARY

— OF —

Canadian Mining Regulations,

NOTICE.

THE following is a summary of the Regulations with respect to the manner of recording claims for *Mineral Lands*, other than Coal Lands, and the conditions governing the purchase of the same.

Any person may explore vacant Dominion Lands not appropriated or reserved by Government for other purposes, and may search therein, either by surface or subterranean prospecting, for mineral deposits, with a view to obtaining a mining location for the same, but no mining location shall be granted until actual discovery has been made of the vein, lode, or deposit of mineral or metal within the limits of the location of claim.

A location for mining, except for *Iron* or *Petroleum*, shall not be more than 1500 feet in length, nor more than 600 feet in breadth. A location for mining *Iron* or *Petroleum* shall not exceed 160 acres in area.

On discovering a mineral deposit any person may obtain a mining location, upon marking out his location on the ground, in accordance with the regulations in that behalf, and filing with the Agent of Dominion Lands for the district, within sixty days from discovery, an affidavit, in form prescribed by Mining Regulations, and paying at the same time an office fee of five dollars, which will entitle the person so recording his claim to enter into possession of the location applied for.

At any time before the expiration of five years from the date of recording his claim, the claimant may, upon filing proof with the Local Agent that he has expended \$500.00 in actual mining operations on the claim, by paying to the Local Agent therefor \$5 per acre cash and a further sum of \$50 to cover the cost of survey, obtain a patent for said claim as provided in the said Mining Regulations.

Copies of the Regulations may be obtained upon application to the Department of the Interior.

A. M. BURGESS,

Deputy of the Minister of the Interior.

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