Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

- [x] Coloured covers/ Couverture de couleur
- [ ] Covers damaged/ Couverture endommagée
- [ ] Covers restored and/or laminated/ Couverture restaurée et/ou pelliculée
- [ ] Cover title missing/ Le titre de couverture manque
- [ ] Coloured maps/ Cartes géographiques en couleur
- [ ] Coloured ink (i.e. other than blue or black)/ Encre de couleur (i.e. autre que bleue ou noire)
- [ ] Coloured plates and/or illustrations/ Planches et/ou illustrations en couleur
- [ ] Bound with other material/ Relié avec d'autres documents
- [ ] Tight binding may cause shadows or distortion along interior margin/ La reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure
- [ ] Blank leaves added during restoration may appear within the text. Whenever possible, these have been omitted from filming/ Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.
- [ ] Additional comments:/ Commentaires supplémentaires:

- [ ] Coloured pages/ Pages de couleur
- [ ] Pages damaged/ Pages endommagées
- [ ] Pages restored and/or laminated/ Pages restaurées et/ou pelliculées
- [ ] Pages discoloured, stained or foxed/ Pages décolorées, tachetées ou piquées
- [ ] Pages detached/ Pages détachées
- [ ] Showthrough/ Transparence
- [ ] Quality of print varies/ Qualité inégale de l'impression
- [ ] Continuous pagination/ Pagination continue
- [ ] Includes index(es)/ Comprend un (des) index

  Title on header taken from:/ Le titre de l'en-tête provient:
- [ ] Title page of issue/ Page de titre de la livraison
- [ ] Caption of issue/ Titre de départ de la livraison
- [ ] Masthead/ Générique (périodiques) de la livraison

This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	12X	14X	16X	18X	20X	22X	24X	26X	28X	30X	32X
						✓					

FEBRUARY, 1900.
VOL. XIII, No. 11

THE OTTAWA NATURALIST.

Published by the Ottawa Field-Naturalists' Club.

CONTENTS.

Feb. 6th.—Microscopical Soiree, in Normal School Hall.

Feb. 20th.—Lecture on Labrador, by Mr. A. P. Lowe, in Science Hall of Ottawa University.

OTTAWA, CANADA:
OTTAWA PRINTING COMPANY (LIMITED)
3 & 5 MOSGROVE ST.

Entered at the Ottawa Post Office as second class matter.

THE OTTAWA NATURALIST.

VOL. XIII. OTTAWA, FEBRUARY, 1900. No. 11

RANGIFER DAWSONI.

PRELIMINARY DESCRIPTION OF A NEW CARIBOU FROM QUEEN CHARLOTTE'S ISLANDS.

BY ERNEST SETON-THOMPSON.

In August, 1899, while at Ottawa, Canada, my attention was called by Dr. G. M. Dawson, of the Geological Survey, to the fact that Caribou exist on the northernmost and largest island of the Queen Charlotte group, and later, on my asking for fuller details, he wrote me as follows :

"When engaged in geologically surveying the Queen Charlotte Islands in the summer of 1878, I heard of this animal but did not see it, and from Indian accounts came to the conclusion it was the Wapiti, which as you know occurs on Vancouver Island. In my report for 1878-79, p. 113 B, I therefore referred to it as follows : 'There is pretty good evidence to show that the Wapiti occurs on the northern part of Graham, but it is very seldom killed. The small Deer *(C. columbianus)* is not found on the islands, nor is the Wolf, Grizzly Bear, Mountain Sheep or Mountain Goat.'

"At a later date I ascertained that the animal in question was not the Wapiti but the Caribou, from Mr. Charles, formerly connected with the Hudson's Bay Co. in Victoria. He had a skin of the animal, imperfect, but with horns and hoofs sufficient to show its general character.

"The only published reference I have made to the occurrence, that I can remember, is in a paper on the Later Physiographical Geology of the Rocky Mountain Region in Canada. Trans. Royal

Society of Canada, Vol. VIII, Section IV, 1890, pp. 51-52. This is as follows :

"'One further circumstance may, in conclusion, be referred to here as being readily and intelligibly explicable on the hypothesis of a considerable elevation of the land at about this time, (close of the glacial period.) This is the existence at the present day of Caribou in the northern part of Queen Charlotte Islands.

"In a former report on these islands I have spoken of the occurrence of the Elk or Wapiti on them. This statement was, however, based merely on Indian report, as none of the animals in question were seen. Since that time I have learned from Mr. W. Charles, that the animal in question is really the Caribou, and I have been shown by him the skin and antlers of one of these animals. The Caribou is not now found anywhere else in the region of the coast, either on the islands or on the Coast Ranges, though it roams over high plateaux to the east of these ranges. The shortest distance between any point of the Queen Charlotte Islands and the nearest islands of the Coast Archipelago is thirty miles, and the intervening strait is subject to rapid tidal currents. The isolation of the Queen Charlotte Islands is in fact so complete that the Deer, which inhabits all the other islands of the coast, is not found in this group.

"It is, therefore, in the absence of the Caribou from the neighboring coast and its adjacent islands, and in consideration of the width of the waterway which would have to be crossed, at least highly probable that this animal reached the Queen Charlotte Islands under the present conditions. I am thus led to believe that the Caribou colonized the islands at a time at which either the glaciers extending from the mainland attained to the Queen Charlotte Islands, or by a land connection during a period of greater elevation.* The latter is in every way the more probable supposition, and, if it be entertained, it may further be assumed that the animal came to the islands at the date of the immediately post-glacial elevation above indicated, and that it has since, as an isolated colony, succeeded in maintaining itself there.

* This minimum amount of elevation required would be about 200 feet above the present level,

"The Indians of the Queen Charlotte Islands have evidently long employed the antlers of the native Caribou for the manufacture of various implements, clubs, etc., as some of the oldest of these in our collections are of that material, which was evidently prized. These Indians are not great hunters and in fact dislike going into the interior of this island and on the higher ground where the small bands of Caribou occur.

"You will notice from my remarks above quoted that these animals must in all probability have been a long time entirely separated from any others, and I should think it highly probable with an animal so variable as the Caribou that they may have developed considerable peculiarities."

A fortnight later I was in Victoria, Vancouver Id., and had an interview with Mr. W. Charles, at his home on Fort St. Mr. Charles was Hudson Bay Co.'s factor at Victoria for years, and the Queen Charlotte Islands came within his official district. He informed me that while visiting at Masset in the north end of Graham Island, he several times heard reports that Caribou were found on the island. But the Indians never brought any in, for they have a superstitious dread of the interior and of the west coast, where the Caribou are found. They believe that if they go there they will be devoured by some fabulous monster that comes up from the sea. At best they are poor hunters, and rarely think about the chase when they can get a meal of fish. One day in 1882 (?) when Mr. Charles went as far as the west slope of the mountains on the Pacific side he noticed a great extent of beautiful level upland pastures, and remarked that if there are any Caribou on this island this is the place to look for them. Accordingly Mr. Alex. Mackenzie, an ex-employee of the Hudson's Bay Co., set out with some Siwash Indians and found near the place a large herd of Caribou, and opened fire on them. The first to fall had only one horn. They brought its skin and skull to Mr. Charles, who states that the skin was of a mouse colour and the animal too small for the Woodland Caribou, and too dark to be the arctic species. He is of the opinion that it is closely related to the Barren Ground Caribou. The skin was destroyed, but the fragmentary skull with its one horn was deposited in the Provincial Museum of Victoria, B.C.

Dr. Dawson has called my attention to the following passage in Mackenzie's "Notes on Certain Implements and Weapons of Graham Island. (Trans. Roy. Soc. Canada, Sec. II, 1891, p. 50.

"*Reindeer antler Tomahawk* (Haida, *Scoots-ăłth-at-low.*) [No. 1302]—This very ancient and interesting relic is made from one of a species of Reindeer which inhabits the mountainous interior of Graham Island. In ancient times these Reindeer were hunted by the Haida and killed by bow and arrow, being highly prized both for meat and skin. [See Marchand's Voyage, Chap. V, 1791.] This weapon was the property of the Masset doctor, or medicine man, who is still alive but aged. To him it was bequeathed by his predecessor who died many years ago.....It is undoubtedly a relic of the times before these natives had intercourse with white men."

Through the courtesy of Mr. John Fannin I have had the opportunity of making a thorough examination of the skull in question and am convinced that the animal is entitled to formal recognition. I propose therefore to name it in honour of Dr. G. M. Dawson of the Canadian Geological Survey, the eminent explorer of the Queen Charlotte Islands, who first called the attention of the scientific world to the existence of the animal.

RANGIFER DAWSONI, *Sp. nov.*

Sp. character.—Its small size, about that of *Rangifer arcticus*, and its color, which is darker than that of *arcticus*, but much lighter than that of *montanus* from the interior of British Columbia.

Habitat.—Queen Charlotte Islands. The type being from the interior of Graham, which is the northmost large island of the group.

The nearest point on the mainland where Caribou are found is 150 miles away in the interior of British Columbia.

This individual was peculiar in having but one horn, but this is merely an accident and is probably the reason that the specimen was brought in by the hunters.

The following measurements will be of use in conjunction with the figures:

In figure 1, the length of the antler from below the burr following the outer curve to the top of the highest point, 28¾ inches

(730 mm.); girth of antler at base above the burr, 4¾ inches (120 mm.).

In figures 2, length from the point of the occiput A to the posterior point of the nasal bones B, $6\frac{9}{16}$ inches (166 mm.); greatest width across the orbits C. D. 6 inches, (153 mm.).

My thanks are due to Dr. J. A. Allen, of the American Museum, for the opportunity to compare its skull with that of its giant relative *Rangifer montanus*.

DESCRIPTION OF A NEW SPECIES OF CALCAREOUS SPONGE FROM VANCOUVER ISLAND, B.C.

BY LAWRENCE M. LAMBE, F. G. S.

LEUCANDRA TAYLORI. *(Sp. nov.)*

Sponge small, solitary, sessile, nearly spherical, terminating above in a well developed oscular fringe. Surface hispid, owing to the presence of projecting, stout oxea. The three specimens representing this species are of about the same size and shape, the one figured (figs. *a* and *b*) measuring 4.5 mm. in breadth and about 6 mm. in height, including the oscular fringe, which has a length of a little over 1 mm.

The walls of the sponge are thick and the gastral cavity is cylindrical and narrow, being slightly less than 1 mm. in width. The inhalent pores are scattered on the dermal surface and the flagellated chambers (*f c*, fig. *c*) are small, averaging about .06 mm. in width, rounded and disposed irregularly in the wall. The exhalent canals leading into the gastral cavity have not been satisfactorily seen.

Skeleton.—The skeleton consists of triradiate spicules of the parenchyma, of gastral triradiate, of dermal triradiate and large oxeote spicules, of slender, linear, dermal spicules and slender oxeote spicules of the oscular fringe.

1. *Triradiate spicules of the parenchyma.*—Slightly sagittal; the basal ray straight, up to about .117 mm. long, the

lateral rays generally slightly curved, about .091 mm. long; the three rays tapering to a point and about .009 mm. in diameter at midlength; oral angle slightly smaller than the other two. Thickly scattered irregularly in the wall (figs. *c* and *d*).

2. *Gastral triradiates.*—Similar to the triradiates of the parenchyma except that the basal ray reaches a length of .209 mm., the lateral rays a length of .157 mm. and all the rays are about .006 mm. in diameter at midlength. Lying parallel to the gastral surface (figs. *c* and *e*).

3. *Dermal triradiates.*—Slightly sagittal with equal angles, the basal ray reaching a length of .072 mm., and the lateral rays a length of .045 mm.; all the rays are rounded at their extremities and measure .004 mm. in diameter; an aborted fourth ray is sometimes apparently developed. Occurring in three or four layers parallel to the dermal surface (figs. c. and f.)

4. *Large oxea.*—Varying in length from .616 to 1.096 mm. and in diameter at midlength from .041 to .068 mm.; slightly curved, the curvature being most pronounced near their outer ends; at right angles to, and with generally about one-third of their length projecting beyond, the dermal surface. Some of the smaller spicules of this kind are entirely embedded in the wall or protude but a little beyond the surface (figs. *c*, *g* and *h*).

5. *Minute linear spicules.*—Very slender, about .131 mm. long and .002 mm. in diameter. Numerous and lying irregularly, with the dermal triradiates, parallel to the outer surface (figs. *c* and *i*).

6. *Oxea of the oscular fringe.*—Slender, about 2.5 mm. long and .09 mm. in diameter, forming a well developed fringe around the osculum.

Three specimens of this sponge were collected by the Rev. George W. Taylor, of Nanaimo, B.C., who found them adhering to the under side of boulders, between tides, at Boat Harbour, six miles south of Nanaimo, on the 24th of June, 1899. Mr. Taylor has also sent to the writer two small sponges that on examination

prove to belong to the species *Sycon protectum*, Lambe, described originally from a specimen dredged by Mr. J. F. Whiteaves in 1872 eight miles south-east of Bonaventure Island, Baie des Chaleurs (*vide* Transactions Royal Society of Canada, second series, Vol. II, 1896). The specimens of this second species were found also at Boat Harbour growing on the under surface of boulders between tides.

Figure *c* of the plate accompanying the above description represents part of a horizontal section of the sponge.

ANNUAL ADDRESS OF THE PRESIDENT OF THE OTTAWA FIELD-NATURALISTS' CLUB, H. M. AMI, M.A., F.G.S., DELIVERED NOVEMBER 28TH, 1899.

In four brief months our Club will have attained its majority, and it may not be considered out of place to look backward for a moment and cast a cursory glance over that period of time which has elapsed since the Club was organized in 1879.

The special object which the Club had at its inception, of investigating the natural history resources of the district about Ottawa, was constantly kept in view, and I think no one can deny that the Club has prospered and accomplished a considerable amount of work in the direction of so worthy an object.

The Ottawa Field-Naturalists' Club now counts within its membership a large proportion of the active and working naturalists of Canada, which constitute a small army of observers in the field of Nature. The three original members of the Club, Dr. James Fletcher, Mr. W. H. Harrington and Mr. R. B. Whyte, who were the leading spirits in formulating the character as well as the aims of the Club at its beginning, are still with us, and as active as ever.

Previous to 1879, the Ottawa district had received a certain amount of attention at the hands of the late Mr. E. Billings, the late Dr. VanCortland, and of Dr., now Sir James Grant. The first obtained a large amount of geological material, especially from the Trenton formation so well developed in our neighbour-

hood, which enabled him to publish those excellent Decades, or Descriptions of Canadian Organic Remains, and give to the world much information respecting the ancient life of those early seas which once covered this portion of the North American continent.

Outside of this but little systematic work had been published or recorded from this locality until the Club made its appearance, and sought to develop and search out the geological, botanical, entomological and other resources at our very doors. In the department of Entomology, and through the writings of Dr. Fletcher, of Mr. Harrington and of Mr. T. J. McLaughlin, the Transactions of The Ottawa Field-Naturalists' Club, in the first six parts, and in THE OTTAWA NATURALIST, which followed, contain probably more information regarding the insect life of our district than can be found recorded for any other city in Canada. In the department of Botany the good work of Dr. Fletcher, in his early edition of the Flora Ottawaënsis, which served to guide many of us in the pleasant paths of flowering plants, with his enthusiastic co-worker, Mr. R. B. Whyte, in the opening year of our Club, gave an impetus to the study of plants which was only enhanced by the advent of Prof. John Macoun, M.A., F.L.S., and his family to our city. In Ottawa, the active, genial and militant professor was made welcome, and he has given the Club the constant benefit of his wide experience, urged everyone to more objective work and greater effort in carrying out the objects of our Club. "What are you doing for the Club, or for natural history?" was the constant question put. It is a notable fact that the botanical branch of our Club has been ever the most popular. The second edition of the Flora Ottawaënsis, in which Dr. Fletcher gives the precise locality in which each species can be found, besides its name, common and scientific, proved a further boon to botanical students. A careful use of this work and dilligent search after the rarer specimens of plants about Ottawa, invariably led those devoting their attention to this fascinating branch to discover their prize and complete their herbaria.

Whether on the mountain top or in the valley, or again by the riverside or along the brooks or lakes of our district, in the swamps and rocky places, in the diversified regions such as we

fortunately possess about Ottawa, in shady as well as in sunlit spots of the district, there are a thousand and one gems of beauty in plant life awaiting the keen observer in a delightful as well as healthful pursuit.

Turning our attention to the field of Geology in the Ottawa district, a year has not passed since the Club was organized but some discovery was made of some species or form unknown to science, or in the tracing more exactly the trend of the various geological formations which we have. The important work done by the late E. Billings, and of the Geological Survey in the fifties, served as a basis for operation, and a systematic table of the geological formations about Ottawa together with their characters, their fossils, the thickness of the strata, and other interesting notes, giving a very comprehensive and concise history of the district in pre-human times, is now available for reference. Details in stratigraphy have been recorded, and rare specimens of fossils discovered during the excursions of the Club, many of which have proved of considerable value to the Geological Survey department, have been recorded in the Transactions of the Ottawa Field-Naturalists' Club. Information thus obtained by our members, who happened to be members of the Geological Survey staff, has enabled the latter to describe with greater degree of accuracy various geological features of the Capital besides other portions ot Eastern Ontario, which have come within the sphere of the Club's activity. In the field of Geology there is yet much to be done. In the Archæan formations alone, which are so well and extensively developed to the north of our city, and from which mica, apatite, graphite, asbestus and iron, as well as other minerals of economic value to men are obtained, there is a wide sphere of research open to the geologist. More especially in the sub-division of Petrography, or that science which deals with the microscopical character and structure as well as the origin of the rocks, is the field extensive and important as well as interesting. We shall not understand the proper relations of the various members of that great Archæan complex until a careful study has been made of the numerous and varied rock masses which are the oldest that we know in the earth's crust, and which supplied the materials from which all the subsequent and

newer deposits were derived. In this field alone there is work for a dozen members of the Club, for a whole lifetime each, without exhausting the subject. There is no better field in North America.

Ever since the formation of the Club, the subject of Conchology, or the study of shells, has engaged the attention of some of the members of the Club. Mr. Gilbert C. Heron, Dr. James Fletcher, Mr. W. H. Harrington, Mr. J. F. Whiteaves, Hon. Mr. Porier and lastly and conspicuously, Mr., now the Hon. F. R. Latchford, have contributed valuable papers regarding the various species of land and fresh-water shells of the Ottawa district, and recorded such notes of observations and descriptions of species as will enable any amateur, or other collector of shells, coming within this district, to ascertain definitely what species may be found, and will enable also outsiders to see in what manner satisfactory results may be obtained and information derived bearing on the shells of whatever district in which they may be residing.

In Ornithology, Messrs. W. L. Scott, W. A. D. Lees, A. G. Kingston, Miss Harmer, Miss Ballantyne, Messrs. G. R. and T. Whyte, and the Messrs. Saunders have contributed valuable notes to the literature of the Club, whilst in Zoology proper, Mr. H. B. Small, Mr. W. P. Lett, Mr. J. B. Tyrrell, Prof. Prince, Mr. Odell, and Prof. Macoun have all given us a fair idea of the fauna of the Ottawa district and elsewhere. In the department of chemistry many important papers and contributions of special interest to the Ottawa public and Canadian investigators, have appeared from time to time from the pens of Mr. F. T. Shutt, Dr. R. F. Ruttan and others.

In the field of Archæology, the Club has of late had a new field of research open, and one full of promise. For a number of years past it has been known that the Ottawa Valley was the home of many tribes of aborigines, who left behind them in the sites of their abandoned villages rude implements of the chase and of war, relics of a bygone civilization which have only just begun to be investigated. For years past, an intermittent stream of specimens has come to the notice of the Ethnological division of the Geological Survey from various points in the Ottawa Valley, and in Mr. Sowter's paper "On the Archæology of Lake Deschênes,"

read before this Club last winter, we have what I believe will form the first of a series of most interesting papers describing the early history of Man in this district long after the close of the Glacial period and subsequent to the Champlain period of submergence, which is followed by that in which we now live, the "Recent" period of elevation.

In all these branches of the Club's work there has been marked activity in the field. To this may be added the reports of the leaders of the branches, which form, and ever ought to form, an important feature in the Club's work, for in them suggestions for work to be done as well as to avenues open appear from time to time in order to stimulate work.

For a number of years the main object of this Club was the study of this locality alone, but with the growth of our city, and the addition of a considerable number of scientific men on the staff of the various departments of the Government service, as well as with a considerable influx of members from other parts of the Dominion who desired to join us, and who contributed papers upon the natural history of the districts in which they happened to reside, our Club was of necessity compelled, in 1890, to widen its sphere of activity, so that, to-day, besides investigating and reporting upon the natural history and geology of the Ottawa district (which it is understood comprises an area with a radius of twenty miles, with Ottawa as a centre) also publishes reports and papers bearing upon the natural history and geology of other parts of the Dominion of Canada.

Ottawa is no doubt fast becoming one of the leading centres of scientific research on this continent, and outside of the technical and professional reports, issued by authority of Parliament, there ought to be a most active and live organ or medium of publication in our midst, worthy of our Capital. Freedom in the discussion of the various scientific problems that occur in the study of any field of natural history or geological inquiry, as well as encouragement in the search for additional light upon these problems, with facility for publication, ought to be the share of every investigator. Such encouragement to research must necessarily help in developing our material resources, which must form a potent factor in building up our nation.

Our medium of publication, THE OTTAWA NATURALIST, which constitutes and includes the Transactions of the Ottawa Field-Naturalists' Club, has been regularly published since 1880. In its 13 volumes there are more than 2000 pages of text, and there may be found stores of information bearing upon local natural history, in which the economic as well as the scientific side of the subject is recorded. It is not my purpose to shower encomiums or praise on the workers of the Club for what they have accomplished. The pleasure and interest as well as the health and exercise derived from such researches are sufficient remuneration for whatever toil, trouble and drudgery they may have experienced. To develop the powers of observation and comparison in man there is no better occupation. It is excellent training for the mind as well as the body.

One feature of the Club's work to which I need scarcely draw your attention is in connection with the educational institutions of the city. It is very gratifying to the executive of the Ottawa Field-Naturalists' Club to have our meetings and excursions prove of interest to those engaged in training the mind. We are pleased also to have the good-will of the worthy principal of the Normal School—Dr. MacCabe—who has always been a friend of the Club. It is one of the ambitions of the Club to assist in a measure not only to awaken a live interest in natural history researches, but also to build up a reference collection of specimens illustrating the recent as well as extinct faunas and floras in the Ottawa district, so that the students of botany, entomology, conchology and geology, as well as ethnology can have access to it for the sake of comparison.

We are pleased to see that already a number of collections have been donated by various members of the Club to form the nucleus of such a useful series. The best thanks of the Club are due to Dr. MacCabe for the use of this fine Assembly Hall for three evenings of the course of winter soirées.

TRIBUTE TO THE LATE E. BILLINGS.

It was my purpose at one time to give you this evening a short paper on the more important localities where the most interesting geological phenomena may be studied to advantage about

Ottawa. Such a paper seems necessary at this juncture, but I will postpone this to a later date, and if you will bear with me for a few moments I desire to introduce a subject which long before this ought to have received attention at our hands.. I refer to the life and works of the late Elkanah Billings, the great Canadian palæontologist, who founded the Canadian Naturalist and Geologist, was elected Fellow of the Geological Society of London and of numerous other societies, and assisted Sir William Logan in laying the foundation of our knowledge of the geology of the older provinces of Canada. Billings was a citizen of this city, and in a suitable manner such a society as ours ought to do something towards perpetuating his memory.

As one who for the last twenty years has come in almost daily contact with the works and writings of the late Mr. Billings, I cannot refrain from giving utterance to the statement that it is impossible not to see in him one of the greatest men that Canada has produced. It is further owing to Billings that some one should undertake to give to the world a complete and systematic list of the various genera and species of fossil organic remains which he described, in a compact form, and likewise to place together in their chronological order his numerous and important writings. These various lists, which comprise some fifty-eight new genera and as many as 1,051 new species of fossil organisms, besides a list of his writings, I have undertaken to prepare, and now beg to submit to you for publication. I shall not trouble you by reading these over, but would supplement these remarks by throwing out a suggestion which I humbly ask you to consider. Is it not our duty as well as our privilege, as a Club organized to look after the interests of science and scientific research, to see that a suitable memorial or tribute to the memory of such an illustrious Canadian as Billings ought to be erected in our midst? Two suggestions have occurred to my mind, and both appear feasible and appropriate. These are:—1. By means of a portrait or oil painting of the late E. Billings; 2, the erection of a memorial tablet to be placed in some conspicuous locality on the strata of our Capital.

With regard to the former, I may say that when the subject was first mooted, some months ago, a number of gentlemen in-

terested in geology in Canada volunteered to subscribe toward obtaining a portrait of Mr. Billings. An excellent painting of him is now in the Museum of the Natural History Society of Montreal.

Inasmuch as Billings not only developed a taste for and carried on researches in Geology and Palæontology in Ottawa, it seems particularly appropriate for some such institution or society as our Club to undertake the task of raising a small fund towards perpetuating his memory in our midst, and I now desire to present the case to your mind, with the subscription list open for your kind and generous consideration, to which list a number of names are already attached.

With regard to the second suggestion made, of erecting a memorial tablet and placing it in some conspicuous position in our city, this seems to meet the approval also of a number of persons to whom the subject has been broached. A similar memorial tablet has been erected and placed in a conspicuous outcrop of one of the geological formations of Prague, in Bohemia, in honour of the late Joachim Barrande, the great palæontologist of Central Europe who himself in his lifetime was in communication with Mr. Billings, whom we are seeking to honour for the marvellously large amount of most excellent work which he performed, not only in Canada as a whole, but more especially in Ottawa.

I shall not attempt to give you a biographical notice of the late Mr. Billings, inasmuch as there exist already a number of fairly complete notices of his life history. It will suffice to offer for publication in our Transactions such records of his writings and works which in our opinion are greatly needed by all working palæontologists, and which in our humble judgment ought long ago to have been prepared.

THE LATE SIR WILLIAM DAWSON.

I would be remiss of my duty as president of a Club like ours if I did not refer to the loss which science in Canada has so recently sustained in the person of one who during his entire career has taken a most active part in the progress and advancement of geological research in our country. I refer to the late principal of McGill University, Sir William Dawson.

His life was one of unremitting toil in the interests of education, science and religion. Sir William Dawson accomplished

enough in each of these three classes of work to satisfy any three hard-working individuals! He leaves behind him such monuments of industry and perseverance as few men do. The Peter Redpath Museum of McGill University alone is a monument which for ages will give food for thought to the coming generations both of students in the University and to the geologists who seek to unravel the problems of geological science in different portions of Canada, but more especially with reference to those of the Maritime Provinces, his native land.

Sir William was born in the town of Pictou, Nova Scotia, on October 13th, 1820, and just as the first hour of the day of rest dawned last Sunday, November 10th, 1899, he departed to his long rest. He has done more to stimulate and encourage the study of the natural sciences, and especially of geology, in Canada than any other individual. His vast store of knowledge, acquired by diligent labour in the broad field of nature as well as in the laboratory, embraced several of the leading sciences, and at one time, owing to circumstances in connection with the University over which he presided for a period of forty years so successfully, his courses of lectures included chemistry, botany, zoology, together with geology, palæontology and mineralogy.

As a palæo-botanist, Sir William's reputation was world-wide, and his descriptions of the fossil floras of Canada from the earliest Palæozoic, through the Carboniferous on to the Mesozoic and later Tertiaries, to those of more recent times are too well known to be dwelt upon on this occasion.

No less than seventy-nine distinct papers or articles upon fossil plants have been published by him, and amongst these are included descriptions of the fossil flora found in the Leda-clay formation of the Ottawa Valley. As a student of recent plants he did much to stimulate activity and build up the magnificent herbarium now existing at McGill. His "Acadian Geology," in which are described the succession of the geological formations of Nova Scotia, New Brunswick and Prince Edward Island, as well as their mineral resources, is a most fascinating work. In it he describes not only the various organic remains peculiar to the Atlantic Provinces, but enters into unusually interesting discussions regarding the origin of coal, the climatic and other condi-

tions which characterized the formations which were laid down with the coal. To these are appended notes of ethnological value regarding the Micmac language, and other notes of interest.

In the land animals of the Coal Period, Sir William Dawson discovered much that was new to science, and opened up this subject in a masterly way, and it has since expanded to a marked degree. His descriptions of the Microsauria which he found buried in the basal portions of the fossil trees, along the famous Joggins section of Cumberland County, Nova Scotia, will ever remain as one of his most conspicuous and important writings. In them he has reconstructed an extinct fauna of quadrupeds which inhabited the shores and shallows of the Eastern Atlantic coast, and of the estuaries and lagoons of the great Coal period, besides describing shells and insects of those lakes and bays—all air-breathing types of intense interest—the first of many races that were to follow in the chain of geological times and develop to higher forms in subsequent times. His numerous writings upon "*Eozoon Canadense*"—the "Dawn of Life" organism—have perhaps more than any others tended to make his name famous in the field of Science. In periodicals and magazines on both sides of the Atlantic, Sir William contributed a great number of papers and articles bearing upon the origin of the masses of laminated rock found in the Laurentian rocks of Canada which Sir William Logan, Dr. T. Sterry Hunt, Dr. W. B. Carpenter, Prof. Murie and many microscopists, naturalists and geologists held to be of organic origin.

Sir William was highly systematic in all the work he undertook. His was a busy life, but he was always calm, and met even the humblest child with courtly grace, generous spirit and dignity, commanding the respect and admiration of all who knew him.

The McGill of to-day is the result of his arduous labours in connection with that educational centre. He had the peculiar faculty of enlisting support and co-operation on the part of those with whom he came into contact.

As a writer, who sought to present in a popular form the results of geological science to a larger audience than greeted him on the college benches, he was eminently successful. Such works as the "Meeting Place of Geology and History," "The

Story of the Earth and Man," "Facts and Fancies in Modern Science," "Fossil Men and their Modern Representatives," "Salient Points in the Science of the Earth," "Modern Ideas of Evolution," are some of the more interesting, of his popular works. The many editions through which these various writings passed, testify to their popularity on both sides of the Atlantic. Throughout the English-speaking world his name was a household word, and a letter of introduction from him was a passport in every country in Europe.

As a Bible expositor, Sir William stood high. He ploughed deep in the books of Holy Writ, and subjected those writings to the same keen critical sense to which he referred other problems in the scientific world, and brought out many hidden truths from the Word of God which had been hitherto obscure. "Egypt and the Holy Land; their Geology and Natural Resources," "Eden Lost and Won," "Archaia," "The Mosaic Cosmogony," "Modern Science in Bible Lands," "The Origin of the World According to Revelation and Science," form part of a series of writings of an apologetic character, which in his day Sir William Dawson deemed necessary to combat certain views which were thrust npon the more or less observant and thinking world regarding the origin of man, as well as of other species living upon this planet. These have no doubt played a conspicuous part in establishing the present more or less evident equilibrium which exists in the think-world regarding the relations which exist between our beliefs in religion as well as in science. They are two distinct spheres, and our earnest endeavours ought to be directed towards the perfection of our knowledge in one direction as well as in the other, in order to satisfy these two sides at least of our nature.

Between four and five hundred titles of papers bearing directly on the Geology and Palæontology of Canada and other countries have been gathered together, and it is my purpose to append to this brief sketch of the life-work and history of one of Canada's greatest sons as complete a catalogue of his writings as possible in chronological order.

His first work was published in Edinburgh, Scotland, in 1841, while yet a student at the university, and the last of his writings is yet unpublished.

His was a well-spent life, unselfish in all its aims and purpose, unsparing in his efforts to advance the interests of his fellow citizens and of humanity in general, exercising withal a power and influence for the moral good and welfare of all in a high degree. Of him it might be truly said what Socrates once said of a well-spent life, "For noble is the prize and the hope is great."

And to those of us who have had the privilege to listen to his marvellous flow of language, his lucid descriptive power, as well as those of us who have sat under him, may it be said that we have caught something of the fire and earnestness of his life and spirit which helped to complete his noble life. And when we see the many results achieved during this useful life, to those who ask, we say, "*Si quæris monumentum, circumspice.*"

THE NATIONAL MUSEUM.

Another point which such a Club as ours is in duty bound to notice, is the erection in our midst of a National Museum. As a citizen of Ottawa, the Capital of our great Dominion, if not as an officer or simple member of this Club, I desire this evening to unite our voices and sentiments with those expressed at the opening meeting of the Canadian Institute.

Mr. Byron E. Walker, F.G.S., President of that Institute, and Manager of the Bank of Commerce, condemned in very strong terms the inadequate outlay upon the Geological Survey of this country, and the condition of the Museum. "We will stand disgraced," he said, "until we bestir ourselves, and show that we possess intelligence in this matter..... At least $250,000 should be appropriated annually by the Dominion for our Geological and Natural History Survey, whilst each of the Provinces should in addition grant $10,000 for the same purpose. The Dominion Government at Ottawa and each of the Provincial Legislatures should have museums belonging to the people. The housing of the present collection at Ottawa in an unsafe building is a crime."

Apart from what you may consider professional reasons in making such a statement regarding the Museum, as a Canadian, as one who has at heart the development of our vast mineral as well as forestry and fishery resources—which represent Canada's best and most valuable commercial asset, our need of a National Museum, of a fireproof building, sufficiently large to house pro-

perly not only the present collection, which is exhibited in the old building on Sussex street, but also the thousands of specimens which are either stored away out of sight, or which it is impossible to exhibit in so limited a space at our disposal, but a building large enough to meet the exigencies of a growing time, is very deeply felt.

It is gratifying to see the noble effort put forth by the junior member of parliament for Ottawa, who takes such an active part in forwarding this good cause. We heartily wish him success and hope that the coming session of the Dominion Parliament will not close without voting a sum of money with which to begin the erection of such a monument.

CONCLUSION.

And now a word, in closing, about the work of our Club at Ottawa. There is a vast amount of work to do in any one branch in which the Club is engaged at present. It is earnestly hoped that the endeavours which are being put forth by this Club to stimulate and encourage the study of botany, geology, entomology and other sciences in our midst, will be appreciated by the Ottawa public, who are invited to attend the present course of lectures. Copies of the programme of this course of free soirées are here for distribution.

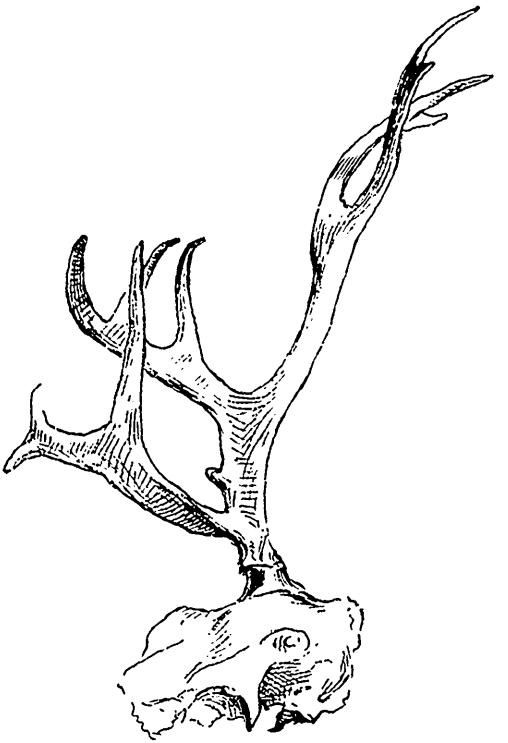
The membership ot the Club, though fairly large, is not one-half what it ought to be in a city like Ottawa with a population of nearly 60;000 souls. It is gratifying, however, to notice a constant addition to our membership at each of the meetings of your council.

Without desiring to encroach upon the report of work done since the last annual meeting, it is particularly encouraging to observe that the seven Monday afternoon lectures, held in the Normal School building during the months of April and May, were very largely attended, as also the excursions and sub-excursions of the Club in the early part of the year. Let us all remember that the leaders of the various branches of the Club's work, as well as the editor and his staff of associates, are ever willing to give all the assistance they can to anyone desiring either to enlist in the army of the students of Nature or to contribute articles for our official organ, THE OTTAWA NATURALIST.

This is the first opportunity which I have had as your presiding officer to thank you for the honour you have done me in placing me in the chair. I make this statement being fully aware of my incompetency and mistakes, but depending upon you all for co-operation and good-will in carrying on in our midst the good work of my predecessors. Coming after such a series of illustrious men as Dr. James Fletcher, Dr. R. W. Ells, Dr. G. M. Dawson, Mr. F. T. Shutt, and Prof. E. E. Prince, not to go back any farther, I feel that the task assigned to me as well as the honour bestowed upon me, might have fallen upon much worthier shoulders. It shall be my utmost endeavour during the remainder of my term of office to promote the interests of this Club in all its branches.

We are not allowed to know very much in this world. Life is intensely short. The world of Nature around us contains myriads of attractive objects from which the highest lessons can be learned and our minds improved. Let us try, then, in some measure, to acquire some accurate idea of something in our vicinity.

Fig. 1.



RANGIFER DAWSONI (Thompson)

Fig. 3.

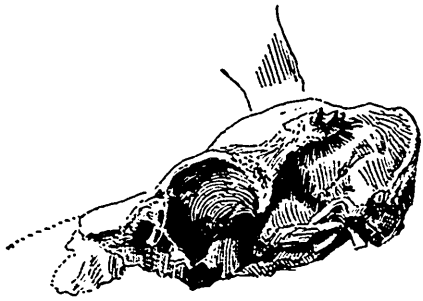
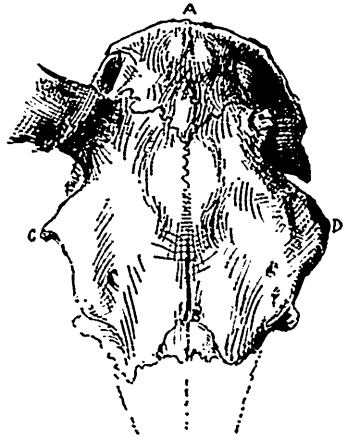
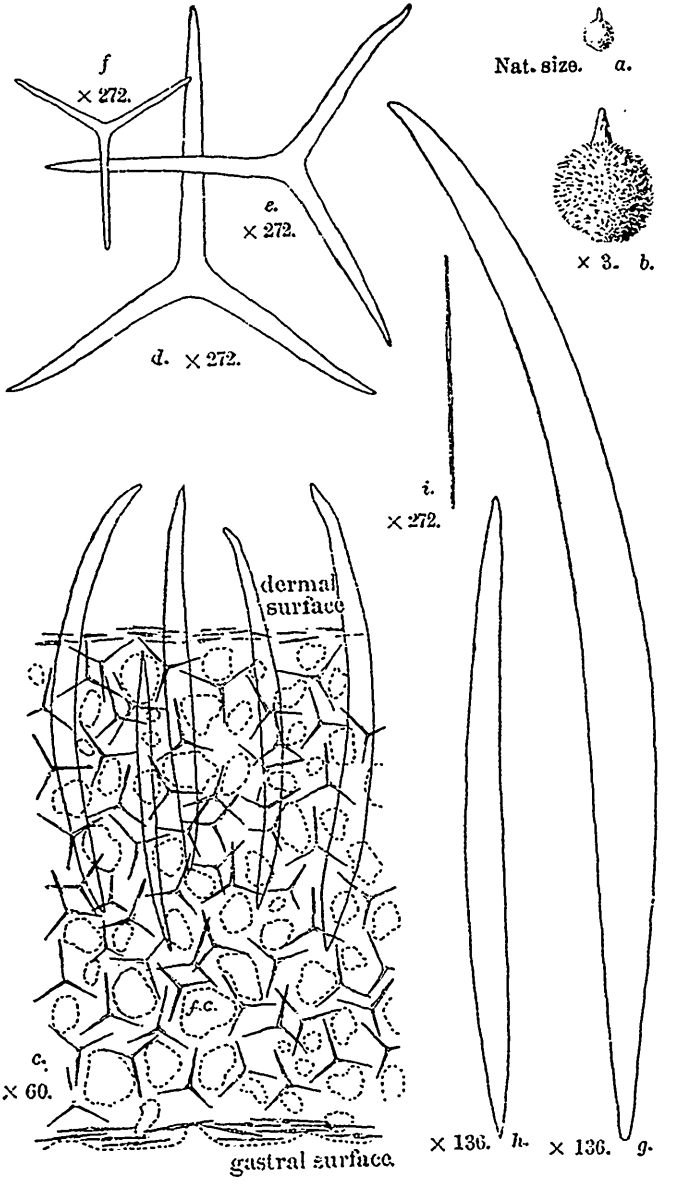


Fig. 2.



RANGIFER DAWSONI (Thompson.)



L. M. LAMBE, DEL.

LEUCANDRA TAYLORI.

THE OTTAWA FIELD-NATURALISTS' CLUB, 1899-1900.

Patron:

THE RIGHT HONOURABLE EARL OF MINTO,
GOVERNOR-GENERAL OF CANADA.

President:

HENRY M. AMI, M.A., D. Sc., F.G.S., F.G.S.A

Vice-Presidents

Prof. JOHN MACOUN, M.A., F.L.S., F.R.S.C. A. G. Kingston.

Librarian:

S. B. Sinclair, B.A.
(Normal School.)

Secretary:

W. J. Wilson, Ph, B.
(Geological Survey Dept.)

Treasurer:

Dr. James Fletcher.
(Central Experimental Farm.)

Committee:

W. H. Harrington.
W. S. Odell.
J. M. Macoun.
Mrs. A. E. Atwood.
Miss G. Harmer.
Miss Marion Whyte.

Standing Committees of Council:

Publishing: J. Fletcher, J. M. Macoun, W. H. Harrington, W. J. Wilson, A. G. Kingston.

Excursion: S. B. Sinclair, John Macoun, J. Fletcher, W. S. Odell, Mrs. A. E. Atwood, Miss Harmer, Miss Whyte.

Soirées: A. G. Kingston, J. M. Macoun, W. H. Harrington, W. J. Wilson, Miss Whyte, Miss Kee.

Leaders:

Geology: R. W. Ells, L. Lambe, W. J. Wilson, T. J. Pollock.
Botany: J. M. Macoun, R. B. Whyte, D. A. Campbell, R. H. Cowley.
Entomology: J. Fletcher, W. H. Harrington, C. H. Young.
Conchology: J. F. Whiteaves, F. R. Latchford, A. Halkett.
Ornithology: W. T. Macoun, A. G. Kingston, Miss Harmer.
Zoology: John Macoun, W. S. Odell, A. Halkett, A. E. Attwood.
Archæology: T. W. E. Sowter, H. B. Small, J. Ballantyne.

THE OTTAWA NATURALIST.

Editor:

JAMES M. MACOUN.

Associate Editors:

DR. R. W. ELLS, Geological Survey of Canada,—Department of *Geology*.
DR. H. M. AMI, Geological Survey of Canada,—Department of *Palæontology*.
MR. R.A.A. JOHNSTON,, Geological Survey of Canada,—Dept. of Mineralogy.
MR. A. E. BARLOW, Geological Survey of Canada,—Dept. of *Petrography*.
DR. JAS. FLETCHER, Central Experimental Farm,—Department of *Botany*.
MR. F. R. LATCHFORD.—Department of *Conchology*.
MR. W. H. HARRINGTON, Post Office Department.—Dept. of *Entomology*.
MR. W. T. MACOUN, Central Experimental Farm.—Dept. of *Ornithology*.
PROF. E. E. PRINCE, Commissioner of Fisheries for Canada.—Dept. of *Biology*.
PROF. JOHN MACOUN, Geological Survey of Canada.—Dept. of *Zoology*.

Membership Fee to O.F.N.C., with "Ottawa Naturalist," $1.00 per annum.