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THE  
CANADIAN NATURALIST

AND

Quarterly Journal of Science.

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THE REV. JAMES SOMERVILLE, FOUNDER OF  
THE SOMERVILLE LECTURES.\*

BY REV. ROBERT CAMPBELL, M.A.,

A formal memoir of Mr. Somerville was drawn up by his life-long friend, Dr. Daniel Wilkie, Rector of the High School of Quebec, in 1844, seven years after his death; while a shorter sketch appeared in the "Montreal Transcript," of the 8th of June, 1837, immediately after his decease, written by Mr. Thomas Blackwood, a prominent member of the Scotch Church.

Mr. Somerville came to Canada when only 27 years of age. and for thirty-four years he was minister of the Scotch Church in St. Gabriel Street; although for the last fourteen years of his life his connection with the Church was only nominal. Having been furnished with two colleagues, Rev. Henry Esson, in 1819, and Rev. Edward Black, in 1823, he withdrew from the active duties of the pastorate, on a retiring salary of £150, together with the £50. at that time given by the Imperial Government to ministers of the Scotch Church, in the Province of Lower Canada. He was ordained and inducted into office in 1803, by Dr. Sparks, of Quebec, and Mr. Bethune, of

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\* The Rev. Mr. Somerville bequeathed to the Natural History Society of Montreal the sum of £1000 to maintain an annual course of Lectures in connection with the Society, to be known as the Somerville Lectures. Rev. Robert Campbell, one of the Somerville lecturers for the present year, discoursed on the life and bequests of Mr. Somerville. We print this extract from his lecture, feeling that a sketch of Mr. Somerville's life should be placed on record in the Journal of the Society, for which he did so much.

Cornwall, father of the late Dean of Montreal, the only other Scotch ministers at that time in these inland Provinces. He took a leading part in all movements for promoting a wholesome state of society. To this end he connected himself with various organizations, the Freemasons among the rest. His, too, was the first name on the roll of the Montreal Curling Club, organized in 1807. In 1809 he succeeded in establishing a literary society, having its headquarters in this city. Dr. Wilkie will tell us its history. "He coveted the society of well-informed persons, and the free communication of ideas. Hence sprung up in his thoughts the conception of the Symmathetical Society, formed for the purpose of promoting mutual improvement, and possibly to be the germ of some greater association. He laid hold of the thought with eagerness and communicated it to a very few gentlemen, in whom he had confidence, in Montreal, and to one or two residing at a distance. The proposal was zealously embraced by the few friends to whom it was explained, and carried out with considerable regularity for a few years. A number of essays were furnished from time to time by each of the gentlemen associated, and these were pretty fully discussed at the meetings of the society. Remarks were likewise communicated in writing, and a regular account of all the transactions recorded by one of the members, appointed to act as secretary. A few of these papers were afterwards printed in the "Canada Review," in 1824. The subjects discussed were chiefly scientific, literary or commercial." His biographer tells us:—"During his whole life he was wont, when his health permitted, to take daily exercise in the open air. . . . In his rambles he used to carry a small hammer, with which he amused himself in examining the interior appearance of stones and rocks. If this was not done in a strictly scientific manner, it served at least to diversify his recreations and give them activity. Sometimes he collected plants and flowers, and he had ever a just appreciation of the beauties of natural scenery." "Sometimes he was joined" in his rambles "by one or more of his clerical brethren, who, it is well known, were always attracted by his lively conversation." He kept a diary from the time he was 22 years of age, and in it he made notes especially of the state of the weather, to the influences of which his frame was keenly susceptible. This record he kept up till within 48 days of his death.' It was probably not very scientific, as he is not

likely to have possessed very accurate instruments; but such as it was, in the absence of any better statistics of temperature and other elements affecting the weather, it would be at least curious, if not very valuable, could it only be discovered; but after full inquiry I have been unable to ascertain what has been the fate of this journal.

When he died, in 1837, he left the most of his property to religious and benevolent institutions. I will let Dr. Wilkie tell how he was led to do so:—"It has been seen throughout the course of this narrative that his mind was eminently sociable. Being at the same time of a strongly benevolent cast, his sociability gave rise finally, or at least greatly contributed, to two most excellent institutions—the Natural History Society and the Montreal General Hospital. His practice of rambling in the fields in quest of objects suitable for the study of natural history has been already noticed. His attractive conversation naturally drew to his society others who possessed similar tastes, particularly his two brethren in the church, and some of other professions. One gentleman especially, of highly scientific attainments, supposed to be A. Skakel, a teacher in this city, assisted to give accuracy and order to their observations. A considerable collection of natural objects was, in consequence, formed; a place was found necessary for their reception, the assistance of others was solicited and obtained, and out of these humble endeavours arose 'The Natural History Society' of Montreal."

In consequence probably of his connection with the origin of this institution, and certainly from his devotedness to the cause of knowledge and truth, he left a munificent bequest for the endowment of a lectureship in furtherance of its objects.

His sympathetic nature and public spirit seem to have had much to do also with originating the Montreal General Hospital. Here is what the memoir says on this point:—"He always considered the first suggestion of the Montreal General Hospital as due to himself. "The first idea of it," he said, "was suggested by his servant falling sick of an infectious fever. She had no friends in the city. He could not turn her out of doors. He was apprehensive for his own family. He thought how advantageous it would be for the patient, how satisfactory to his own mind, if there was an hospital to which she could be sent, where she would receive the necessary attention and care, while his family would run no risk of infection. Others might be in

similar circumstances. He proposed the subject to some medical gentlemen, and also to his colleague, who always had been forward to promote objects of public utility. The scheme was followed up with zeal and liberality. An institution arose far surpassing his utmost expectation." "Such," in the words of an intimate friend, with whom he often conversed, "was the development in his truly Christian mind of an institution which has since grown to be one of the honors of Canada—an institution of which Montreal will always be proud, and to which the late Hon. Mr. Richardson, after all highly valued labours, had the honour of making an important addition."

By his will, drawn up on the 21st of February, 1833, four years before his death, "he left bequests in the following order, and to the following amount:—For the purchase of a ground lot and erection of a manse, for the use of the minister of St. Gabriel Street Church, during thirty years the object of his warm and constant solicitude, £1000; to support a lectureship for the benefit of the Natural History Society of Montreal, £1000; to Mr. David Wilkie, at Quebec, his friend from early life, £1000; to the Rev. Alex. Mathieson, of Montreal, many years an intimate friend, £100; to the late Thos. Blackwood, Esq., one of his oldest and most confidential friends at Montreal, £100; and to the Trustees of the Montreal General Hospital, as residuary legatees, all that might remain after paying off all the above mentioned legacies." Dr. Wilkie remarks: "The remainder falling to the General Hospital must, it is believed, be very considerable, and will, no doubt, be suitably recorded."

In our time the amounts bequeathed by Mr. Somerville to public objects, do not seem large; but fifty years ago they must have been counted considerable, when there was comparatively little realized wealth in this country, and money was so much more valuable relatively, than it is now. Though not looking very large to the present generation, they were timely; and the several sums applied to the respective objects contemplated in his final benevolent disposal of his means were productive of more important and lasting results to those public objects than five times the amount would be to-day. His thoughtful generosity put the institutions which it aided on a prosperous footing, and once they got fairly under weigh, their success became assured.

It was not from his professional income, however, that the

money came which he had at last to leave. It was in the first instance a gift to his son and daughter by a female friend, prompted no doubt out of respect and affection for himself; and then when they were taken from him suddenly, and he became entitled to spend it in any way he pleased, he held it as consecrated by the hallowed memories of his departed children, not to be expended on personal gratification but to be a lasting monument of the loved ones through whose untimely decease it came into his hands and under his sole control.

Such was the man and such was the work he achieved, and I think your verdict will coincide with mine that he deserves to be remembered by the citizens of Montreal. I do not claim that he was a man of brilliant intellect or of surpassing powers in any way; yet his character and attainments were of a kind to maintain the credit of the order to which he belonged, and to exercise a very widespread and wholesome influence over the English-speaking society of this city, when it was a community so small that every clergyman had a personal acquaintance with its members.

But to the members of this society that which appeals on behalf of Mr. Somerville's memory with most effect, is the fact that the society itself owes its origin to his enthusiasm for natural science, and that this building which is associated with the memory of so many delightful scientific reunions was erected partly by means of the legacy which he bequeathed to the society. In what ways it has helped forward the objects of the society you all know far better than I; and it remains for others having means at their disposal, as you suggested, Mr. President, to complete the work begun by Mr. Somerville, by further endowing the society, and so setting the foundation free for the encouragement of original research in natural science, the results to be communicated to the public in the Somerville Lectures.

No word of mine is needed to set forth the benefits accruing not to Montreal alone, but to the whole of Eastern Canada from the establishment of the General Hospital. There is no public institution which has stronger claims upon the consideration of the people of Montreal, or for the existence of which they ought to be more grateful. It has profited by the generosity of many citizens since, 1837; and it is still receiving well deserved aid from bequests, probably much larger than that left by Mr. Somerville; yet, if what I have asserted as to his early rela-

tion to the institution, be granted, it owes more to him than to any of its benefactors.

And yet the remains of this man who did so much to mould the early history of Montreal, when its society was still plastic, planting the seeds of goodwill and honor and truth in its virgin soil, and who also is entitled to the credit of originating two of the most prominent and useful institutions in the city, lie to-day in a nameless grave in Mount Royal Cemetery. They were first deposited alongside those of the members of his family, who all died before him, in the Protestant Burying Ground, on Dorchester Street. His friend, Dr. Wilkie, to whom, as has been seen, he left a handsome legacy, erected a very tasteful monument to his memory. But when the authorities of the city resolved to convert the old place of burial into Dufferin Square, a proceeding against which a good many minds revolted, no delicacy of sentiment was shown in carrying the resolution into effect; and in the general demolition of monuments which followed, the beautiful memorial which Dr. Wilkie's friendship had dedicated to Mr. Somerville's memory was so injured before the attention of any person interested in its preservation was called to the matter, that it could not be re-erected except at a cost such as would almost suffice to replace it with a new one. As St. Gabriel Church profited by Mr. Somerville's generosity, I felt called upon, in the absence of any kindred of his left in the country, to take action and have his remains removed to Mount Royal Cemetery. A few members of St. Gabriel congregation subscribed about \$100, and a very eligible lot was procured in a prominent position, and there, we trust, his bones will lie undisturbed until the resurrection. But, while there are on all hands granite and marble monuments over the graves of citizens of less account, is it fitting that the last resting place of one who so well deserved to be remembered by the community, should be unmarked by so much as a marble slab? It may be said that he has erected his own monument, one more lasting than brass, in the bequest that he made to this society, the benefits of which to the citizens have been pointed out; and in the still more distinguished public charity, the General Hospital, the foundations of which he helped to lay. But that he did his duty does not release us of the obligation of doing ours. The citizens of Montreal are not likely to be ungrateful. They will not forget their benefactors. The people of St. Gabriel Church have already done a share of the

work—the appointment of Mr. Marler, the Treasurer of the Natural History Society, at the meeting on Monday night, to co-operate in any effort to be made to finish the work, gives promise that, so far as this institution is concerned, the members of it will do what is right in the matter. And now it remains for the authorities of the General Hospital to take action. The President has expressed sympathy with the movement, and has requested me to furnish him with a memorandum, setting forth the facts and requirements of the case, and he will bring the subject before the Board of Management. If they will appoint a representative, and St. Gabriel Church a third, to form with Mr. Marler a committee to take this matter in hand and carry it to completion, the end may be regarded as good as accomplished. Of course none of these religious or benevolent societies can be expected to vote any money from their respective treasuries, but if the influential gentlemen entrusted with their management will only show a deep interest in the matter and will commend it to the friends of the several institutions, I apprehend there will be no difficulty in procuring two or three hundred dollars with which to erect a simple monument over Mr. Somerville's grave.

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### NOTES ON CANADIAN EARTHQUAKES.

By PROF. C. G. ROCKWOOD, JR., Ph., D., Princeton, N. J.

The following notices of earthquake shocks felt in Canada since 1876, are gathered here, from the authors "Notes on American Earthquakes," published at various times in the "American Journal of Science and Arts."

1877.

May 2.—A shock, "lasting eight or ten seconds," occurred at 10.20 p.m., at Oshawa, Ontario.

May 15.—From Port Stanley, Ontario, it was reported that a wave five feet high, apparently due to some earthquake shock, swept along the northern shore of Lake Erie, and was followed for an hour by smaller ones.

July 17.—At 3 a.m., a sharp shock, lasting about thirty seconds, occurred at Rivière du Loup, Quebec.

Nov. 4.—About 2 a.m. a rather severe earthquake was felt throughout a large part of Canada, New York and New England.



It was reported from Ottawa, Perth and many other places in Ontario, east of a line joining Kingston and Pembroke; from Cornwall, Montreal and other places in the St. Lawrence Valley, as far east as Three Rivers; from Hanover, N. H., Springfield, Mass., Hartford, Conn., and other places along the Connecticut River; from Burlington and Bennington, Vt.; from Plattsburg, Whitehall, Saratoga, and the valley of Lake Champlain and the Hudson, as far south as Albany, N. Y.; and finally from Utica, Rome, Auburn and the Mohawk Valley. It would thus seem to have been felt over an irregular trapezium, whose angles are marked by Pembroke, Ont., Three Rivers, Que., Hartford, Conn., and Auburn, N. Y.; and which is therefore some 200 miles on its northern and southern sides, about 300 on the east and 175 on the west. Comparing the reports of time from thirty-six localities, we find them cluster closely about 2 a.m., none earlier than 1.45, none later than 2.10—most being between 1.50 and 2, local time. The most accurate appear to be Montreal, 1.50 a.m., Hartford, 1.56=1.52, Montreal<sup>1</sup> time, and Dudley Observatory, Albany, 1.53=1.54, Montreal time. The duration in Montreal was about twenty seconds, and in other places about the same. It seems to have been most severe in the valley of the St. Lawrence and about Lake Champlain, where the vibration was sufficient to overturn crockery, crack ceilings, and, in a few cases, throw down chimneys. The reports were nearly unanimous that the vibration advanced from west to east. In some places a rumbling noise, and in others two or several shocks were reported.

Nov. 14.—At 9.40 a.m. a slight shock occurred at Cornwall, Ont.

Dec. 18.—At Beachburg, Ont., two shocks occurred, the first between 1 and 2 a.m., the second between 5 and 6 a.m., and quite severe.

1879.

June 11, 12.—A light shock at 10 p.m. was felt at Montreal and east and southeast from there, as far as Waterloo and Freighsburg. At Montreal it was described as "loud rumbling, slight shock and continuation of rumbling." The direction was said to be N. to S. Some persons reported a second light shock and rumbling at 2 a.m. on the 12th.

Aug. 21.—The country between Lakes Erie and Ontario was severely shaken about 3 a.m. The earthquake was reported from

Buffalo, Lockport, and Niagara on the New York side, and from various places as far west as Beamsville and Welland on the Canada side. At most places an explosion was heard and at St. Catherines the shock was strong enough to cause the church bell to make two taps.

## 1880.

Feb. 8.—Between 8 and 9 p.m. a slight shock was felt near Ottawa.

April 3.—At 10 p.m. a slight shock was felt at Quebec and Ottawa.

July 22.—At 2 a.m. a shock was felt at Ottawa, from west to east, with rumbling noise.

Sept. 6.—A slight shock occurred a little after midnight at Montreal, Huntingdon and Cornwall. The time given at Huntingdon was 0.30 a.m.; at Cornwall, 2 a.m.

Nov. 6.—Under this date the Princeton (N. J.) Press reported, "A shock of earthquake has been felt at Newcastle, Ont." No other account of it has come to hand, and it is regarded as doubtful.

Nov. 24.—At 11.45 p.m. a shock occurred at Quebec.

Nov. 28.—At 8.30 a.m. a shock occurred at St. Paul's Bay.

## 1881.

April 7.—At midnight, on the morning of the 7th, a shock was felt at St. Paul's Bay.

May 31.—At 3.20 a.m. a heavy shock occurred at Murray Bay and vicinity.

June 19.—In the morning a slight shock was felt at Ottawa.

Oct. 1.—At 1.40 a.m. a strong shock occurred at Kamouraska, Quebec. It may be remarked that twice before during the year (April 7 and May 31), this same vicinity had been shaken.

Dec. 4.—At 6.30 p.m. a slight shock occurred at Huntingdon; direction, west-east.

## 1882.

Feb. 26.—At 6.25 p.m. a shock lasting three or four seconds occurred at Murray Bay.

Aug. 1.—At 6 p.m. a light earthquake was felt at Point des Monts, Quebec.

Aug. 15.—At 10.30 a.m. a strong earthquake was felt at Point des Monts.

Sept. 20.—At noon another light shock occurred at Point des Mouts.

Oct. 10.—At 4.15 a.m. a slight shock occurred at Montreal, felt also at Lachine, St. Hilaire, Huntingdon (5 a.m.), and other places in that vicinity.

Nov. 27.—At 6.30 p.m. a severe shock occurred at Welland, Allauburg, Port Colborne and other places along the Welland Canal.

Dec. 31.—About 10.05 p.m. a decided shock with rumbling noise, was felt in Halifax, N. S., and other places along the railroad to Truro. It was felt generally in New Brunswick and was also reported from Eastport (9.55), Rockland (10 p.m.), and Bangor (9.30 p.m.) in Maine.

Princeton, N. J., March 13, 1883.

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## ON SOME RECENT ANALYSES OF SOILS.

BY J. BAKER EDWARDS, Ph.D., F.C.S., Public Analyst.

(Read before the Natural History Society, February, 1883.)

Having lately been called upon professionally to examine and give an opinion on several samples of soil very different in origin, in locality, and in composition, I thought it might be well to lay my results before the Society. The first was from a delta of the small river St. Pierre, running alongside of the ship canal between Lachine and the Tanneries. This soil is also evidently a former bed of the River St. Lawrence, and is rendered comparatively valueless by the large boulders left by the old ice current in the valley which the Lachine railway now traverses. It is now swampy land, having been banked out by the ship canal; but by the removal of these stones would become valuable market garden land, draining into the River St. Pierre. It is full of fresh water shells and of vegetable deposit, of a light and arable character, with enough sand to make good drainage, and with proper drainage into the river would prove a most fertile soil.

This soil yielded upon analysis as follows:—

### *Class 1.*

Three samples soil of between Lachine Canal and River St. Pierre, gave:

## 1. Surface bog soil.

Water.....	30·0
Organic matter.....	10·0
Clay.....	6·0
Sand, gravel and shells.....	54·0
	<hr/>
	100·0
Soluble in acid.....	8·5
“ in water.....	5·0

No. 2. Detritus from the River St. Pierre—dried—consists chiefly of carbonate of lime, silicate of alumina, and about 5% organic matter.

No. 3. Three do. in banks—pure shell marl—containing fresh water shells and potash ashes.

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*Class 2.*

## SAMPLE OF SOIL FROM FERTILE ORANGE BELT OF FLORIDA.

This is a nearly pure chalk of marine origin, composed almost entirely of carbonate and silicate of lime, yielding

Carbonate of lime.....	90·0
Silicates of lime and potash.....	4·8
Silica.....	4·0
Organic matter containing traces of phosphates, alumina, iron and soluble salts (sodic) .....	1·2
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	100·00

This chalk is evidently of marine origin and requires admixture with other materials to be generally fertile and cultivatable.

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*Class 3.*

Analysis of three samples of soil from North-West Territory, Section 27, Township 11, Range 27 West of 1st Meridian, Manitoba. Taken 31st Oct., 1882, by McPherson Le Moyne, Esq.

No. 1. Taken from surface of highest knoll, contains:—

Moisture .....	4·6
Organic matter (containing nitrogen)...	11·8
Carbonate of lime .....	30·0
Phosphate of lime .....	1·4
Salts soluble in water, largely potassic...	8·6
Silica, silicates and gravel.....	43·6
	<hr/>
	100·0

No. 2. Soil taken at 15 inches below the surface of the same knoll, contains :

Moisture.....	3·2
Organic matter.....	6·0
Lime as carbonate.....	51·4
“ as phosphate.....	3·0
Salts soluble in water.....	4·6
Silica, silicates and gravel.....	31·8
	<hr/>
	100·0

Sample No. 3. Soil taken from 24 inches below surface of same knoll, contains:—

Moisture.....	2·0
Organic matter.....	4·2
Carbonate of lime.....	24·0
Phosphate of lime.....	4·6
Salts, soluble.....	10·4
Silicates and gravel.....	54·8
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	100·0

This shows a favorable condition of the subsoil in regard to phosphates, and the substratum being chiefly gravelly, is excellent for drainage.

These results must not be taken as of extreme accuracy—the ultimate and exact analysis of the elements of a soil being one of the most elaborate and tedious operations in chemistry, and Dr. Hunt has done good service to science in the publication of careful results of analysis of the soil and subsoils of the Champlain wheat-exhausted districts, once called the “Granary of New France.” I have in the general outline followed his methods of analysis, but not to minutiae, and perhaps he has not seen much reason to modify the opinion he expressed twenty years ago, in the Report of Geol. Survey of Canada for 1863, “that extremely “delicate chemical details would not afford reliable data for agricultural guidance.” The general nature of a soil and its subsoil, however, affords a glimpse of its possibilities which may be of great practical value to the cultivator.

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NOTICE OF GRAPTOLITES OF THE QUEBEC  
GROUP COLLECTED BY MR. JAMES RICHARDSON  
FOR THE PETER REDPATH MUSEUM.

By J. W. Dawson, LL.D., F.R.S.

As it seemed appropriate that a portion of the Logan Memorial Collection should consist of the fossils of Sir William's "Quebec Group," of which, after the removal of the Geological Survey, no adequate collections existed in Montreal, Mr. Richardson, late of the Geological Survey, kindly undertook to procure specimens for the Museum. Mr. Richardson visited for this purpose the rich graptolitic localities at Levis, and also a locality recently discovered by himself near Matane. The result has been the accumulation of a large collection, part of which is already arranged in the Museum.

In addition to the collection of specimens, Mr. Richardson's labors have given us some new facts respecting the graptolitic fauna of Canada, which may be noticed here in advance of more detailed study of the collections.

The original locality in the river cliffs at Levis, which afforded the greater part of the species described by Prof. Hall, in the decades of the Geological Survey of Canada, constitutes a distinct graptolitic zone extending for a considerable distance along the river front of Levis, and affording species of a number of genera, among which are present, though comparatively rare, *Phyllograptus*, *Didymograptus* and *Tetragraptus*.

Farther inland, near Fort No. 2, in beds of dolomitic shale, associated with limestone conglomerate, but whose precise stratigraphical relation to the shore beds has not yet been determined, Mr. Richardson has found a second zone crowded with *Phyllograptus typus*, mostly of the narrower variety, and abounding in specimens of *Tetragraptus bryonoides* and more rarely *T. Bigsbyi*. These beds also hold a *Dictyonema* of the type of *D. Sociale*, but distinct.\* There seems good reasons to believe that these

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\* This species has been named *D. delicatulum*, and may be thus described:—General form funnel-shaped in small specimens, apparently flabellate in old specimens. Length of a large specimen ten centimetres, breadth at top about the same. Texture very delicate, the

fossils indicate a second graptolitic zone, possibly older than that which afforded the species described by Hall.

At Mataue Mr. Richardson has found a bed of highly laminated black shale similar to that explored by Mr. Weston a few years ago at Little White River, holding similar fossils in great abundance. Prominent among them is a beautiful *Dictyonema*, distinct from any of these found at Levis, and which on comparison with specimens presented to the Museum by Prof. H. Alleyne Nicholson, appears so close in all its characters to *D. sociale* Salter, of the English Tremadoc, that it may fairly be assumed to represent that species in our fauna. It is well known that some good palæontologists regard *D. sociale* as only varieties distinct from *D. flabelliforme* of Eichwald from Russia; and the Norwegian species known as *D. Norvegicum* and *D. graptolithinum* are also regarded as varieties of the same species, which in all these countries seems characteristic of the upper Cambrian beds.\* We might infer from this that the *Dictyonema* beds at Mataue may indicate a horizon somewhat lower than any of those at Levis. Associated with the *Dictyonema* are many specimens of *Didymograptus flexilis* and *D. Loganii*, or an allied form, and there are also fragments of an undetermined *Tetragraptus*. In a neighbouring bed there is a vast quantity of debris of Trilobites, and though these are all in a very fragmentary state, yet such specimens as give any indications of the genera to which they belong, would seem to agree with the graptolites in indicating an Upper Cambrian age. They are apparently more nearly related to the trilobitic fauna of the Potsdam of Newfoundland, as described by Billings, than to that of Levis.

It is no doubt true that organisms like graptolites, which have a great range both in time and space, are not so much to be relied on as some other fossils in determining subdivisions of formations. Yet there seems reason to believe from Mr. Richardson's recent observations that graptolitic zones reaching from the Lower Tremadoc to the Upper Llandeilo may be discriminated in the great mass of sediments known as the "Quebec Group," which

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vertical stems being slender and as many as 18 in a centimetre. Cells in one series, round in cross section; aperture pointed, but apparently not mucronate; transverse bars very slender, more distant than the vertical stems but constituting a distinct network.

\* Dr. Schmidt in Journal of Geological Society of London, Nov., 1882.

the writer has long believed, on the evidence of the fossils he has himself observed, to represent a lapse of geological time extending from the base of the Potsdam to the Chazy limestone.†

Specimens of Mr. Richardson's graptolites have been sent to the Geological Survey Museum, and will also be sent to the State Museum at Albany, and it may be hoped that they will be studied in more detail by the palaeontologists of the Canadian and New York Surveys.

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## THE PROBOSCIS AND BLOOD-SUCKING APPARATUS OF THE MOSQUITO, GENUS *CULEX*.

BY EDWARD MURPHY, Esq.

(Read before the Natural History Society, 30th April, 1883.)

It is an interesting question how a creature as small as the mosquito, and so very light that the slightest breeze will blow it away, can hold on to its prey with sufficient tenacity to force through a hard epidermis, and into the solid flesh, the very delicate and perfect instruments with which nature has furnished it for feeding.

The object of this paper is to lay before the members of the Natural History Society the result of repeated observations made on the mosquito while feeding, and a careful examination of its organs under the microscope. Having dissected a number of these little creatures I can with some confidence submit the following results of my observations, taken from notes made on these insects, and shall illustrate the subject by mounted specimens prepared by myself, now under the microscopes for examination.

Entomology teaches that in the "blood-sucking" insects there is a wonderful modification of the mandibulate mouth.

In the mosquito a prolongation of the *labium* forms a fleshy proboscis, covered with minute scales, having a muscular contraction a short distance from the point or end, which not only holds the sucking tube, the saws and other feeding organs in a compact body for insertion when required, but probably also forms a cleaning organ, through which they can be drawn.

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† See also Dr. Selwyn's remarks on this subject in the Report of the Geological Survey, 1877-78, pp. 4-5.



When the instruments are inserted into the flesh, the proboscis is pushed back at an angle more or less acute, and having somewhat the appearance of a leg with a bent joint.

The mandibles have been modified into a pair of extremely small and beautiful, saws, whose sharp teeth, generally *ten* or *twelve* in number, occupy about one-twelfth to one-fifteenth of the length of the proboscis, the teeth are small at the point of the instrument but they increase in size to about the middle of the saw, and being *set backwards*, they not only act as cutting tools, but from their barbed shape, give the creature the "purchase" necessary to hold it to its prey.

A careful observation of the insect, while feeding, shows it *pulling* the saw on one side, as it *pushes in* the saw on the opposite side. *The saw that it pulls is the saw that cuts*; thus the action that increases the depth and size of the wound also gives the creature the necessary "purchase" to enable it to push in the opposite saw.

Between these saws and the tube or sucker, the *maxillae* are modified into a pair of irritators (these are horny and stiff like bristles) supposed to be used to excite and increase the flow of blood, and possibly used also to prevent any solid matter entering the tube in drawing or sucking up the blood.

The sucking tube is a modification of the tongue, is horny in structure, sharp pointed and *solid at the end*, so that it may be pressed firmly against the bottom of the wound without the risk of being stopped up, as it might be if the orifice was at the end, the blood flowing through a hole like the eye of a needle, which opens into the tube at a distance from the point equal to about the diameter of the tube.

In conclusion, I have only to add that in the feeding apparatus of the mosquito, we have a beautiful illustration of a perfect and wonderful adaptation of means to ends.

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## THE HEAD AND SUCKING APPARATUS OF THE MOSQUITO.

By Wm. Muir Esq

(Read before the Natural History Society, April 30th, 1853)

*The Labrum*, or upper lip or sting, composed of chitine or transparent horny substance, nearly cylindrical, slightly tapering and needle-pointed, is  $\frac{1}{3}$  in. long and at  $\frac{1}{100}$  in. from the tip is  $\frac{1}{350}$  in. dia. at  $\frac{1}{100}$  in. from the root is  $\frac{1}{200}$  in. dia.

*The Labium*, under lip or sheath, composed of muscular substance united together in short sections, by which means it can be doubled up under the head when the piercing apparatus (which it encloses) enters the wound and plunges into the flesh, is provided with a strong muscular joint near the tip, which clasps the piercing apparatus and holds them in position while doing their work. The tip is composed of two parts which apparently open out and lie on the skin, while the creature is feeding.

*The mandibles*, of which there are two, are similar in form to a scythe blade, of the same length as the labrum, and at the back or thickest edge  $\frac{1}{40}$  in. dia. Attached to this structure, and running to near the point is an exceedingly thin striated membrane, the striae being  $\frac{1}{50}$  in. apart, and curved at the ends—the tip is sharp pointed and has six teeth turned inwards like a ripping saw—the upper tooth having a projection of  $\frac{1}{50}$  in., the others tapering to the end. The six teeth are in a space of  $\frac{1}{4}$  in.; above these are seven bent hooks in a space of  $\frac{1}{2}$  in.; in some specimens these latter are like the teeth of a reaping machine.

*The maxillæ*, of which there are two, are exceedingly thin transparent flat ribbon-like membranes, uniform width, slightly pointed—the edges at the point serrated—the length same as labrum,  $\frac{1}{20}$  in. broad and  $\frac{1}{20}$  in. thick.

*The analogue of the tongue*, a small hollow tube  $\frac{1}{30}$  in. dia., pointed at the end, having a thin membrane on each side.

These five—the two mandibles, the two maxillæ and the analogue of the tongue—lie in the hollow of the cylinder composing the labrum, under it and next the labium.

*The palpi* are club-like, having a small knot at the ends, three jointed, covered with hairs. They are  $\frac{1}{4}$  in. long,  $\frac{1}{100}$  in. thick.

*Antennæ*, spring from a bulbous root, and are composed of 13 cylindrical joints, having each a whorl of five long hairs—the last joint tipped with a short point or finger; they are  $\frac{1}{3}$  in. long,  $\frac{1}{30}$  in. dia., slightly tapering.

*Eye*, compound flattened, hemispherical  $\frac{1}{800}$  in. dia.

*Head*,  $\frac{1}{25}$  in. dia., having an internal pear-shaped sack near posterior part and connected with the labrum.

*Wings*,  $\frac{1}{7}$  in. long,  $\frac{1}{16}$  in. broad—the membrane covered with short hairs  $\frac{1}{1650}$  in. apart. The veins or ribs thinly covered with scales; the posterior edge and tip fringed with scales—shaped like a canoe paddle  $\frac{1}{40}$  in. long, the neck  $\frac{1}{400}$  in. dia., the broadest part  $\frac{1}{300}$  in., and  $\frac{1}{250}$  in. apart—the neck cylindrical, the blade beautifully striated and in some cases pointed at the ends. Between these there is another row of the same description and form, only half the size.

The total length of the creature from the tip of the labrum to the end of the abdomen is  $\frac{1}{3}$  inch.

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## NATURAL HISTORY SOCIETY PROCEEDINGS.

The fourth meeting of the session 1882-83, was held on the evening of February 26th—the President, Dr. Dawson, occupied the chair.

Messrs. Thomas Robin and Joseph Fortier were elected ordinary members.

Dr. Alloway exhibited samples of marble, mica and granite from the vicinity of Papineauville, County of Grenville.

Mr. Walter F. Ferrier then read his

### “NOTES ON A FOSSIL TRACK FROM THE POTSDAM SANDSTONE OF NORTHERN NEW YORK STATE.”

And exhibited the slabs upon which the impressions occur.

He said the specimen was found 60 feet from the east edge of the precipice, at Rainbow Falls, Ausable Chasm, Essex County, N. Y., in the cellar of the Ausable Chasm Horse Nail Works. It was quarried out of the rock about five feet below the surface bed. The beds in which it occurs are generally thin and dip to the S.E. at an angle of about  $3^{\circ} 30'$ . Ripple marks, very well preserved, are abundant in these beds and in some layers, an *Ophileta* (probably *O. compacta*, Salter) has been noticed, but

no *Lingulæ* or *Scolithus linearis* have been met with at that spot although they both occur in the vicinity. The sandstone is of a light brownish color and very hard and compact. The tracks were first noticed by James Ferrier, Jr., of Montreal.

Dr. Dawson said one of the tracks is a cast of two narrow furrows about a quarter of an inch apart, with a row of punctiform impressions about an inch distant at either side. This impression is repeated in two places on a ripple-marked slab. It may be the track of a Trilobite with two prominent spines on the pygidium, possibly of some species of *Dikellocephalus*. Another is a trail about an inch in width, marked with transverse furrows and ridges, perfectly simple, and without any median ridge. In this last respect they differ from the trails known as *Rusichnites*, *Cruziana*, *Arthrichnites* (*Arthropycus*), and *Fraena*. They resemble, though on a larger scale, impressions from the Erian sandstone of Gaspé, (of which a slab from the McGill College collection was exhibited for comparison). Such impressions, destitute of a central ridge, may have been made by gasteropods or by worms without any abdominal furrow. These impressions belong to the genus *Gyrichnites* already proposed by Mr. J. F. Whiteaves, for the similar impressions from the Erian of Gaspé.

Mr. J. U. Baudry described a visit to the wonderful gorge and cave at Covey Hill, about twenty miles from Beauharnois.

Dr. J. Baker Edwards then read a paper on "Recent Analyses of Soils, which may be found at page 458.

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The fifth meeting was held on March 26th—the President occupied the chair.

Messrs. R. C. Adams, P. J. N. Beaudry, of Beauharnois, and Arch. Wurtle, were elected members, and Messrs. W. H. Rintoul, and W. A. J. Bond, proposed for membership.

A letter from Mr. Geo. Whitfield, of Rougemont, was read inviting the Society to hold its field-day at his grounds.

Prof. Lockwood, of Princeton, N. J., presented a paper on "Canadian Earthquakes since 1876," which was read by Dr. T. Sterry Hunt. This paper is printed in full at pages 455-458.

Dr. Dawson then read the following biographical sketch of the late Mr. Barnston, a former president of the society, and a member of the Royal Society of Canada:—Mr. Barnston was of English parentage, but was born and educated in Edinburgh. It was apparently intended at one time that he should enter the

army, and he studied for that purpose, but he eventually joined the service of the Old North-West Company, leaving Scotland in 1820 for Canada. Shortly after this time a union of the Old North-West and Hudson's Bay Companies was formed, and Mr. Barnston continued with the new company, in which he remained for forty-one years. He was stationed in the course of that time at various points from the Gulf of St. Lawrence to British Columbia. He crossed the Rocky Mountains into British Columbia as early as 1825 or 1826, making the return journey in winter on snow-shoes. When in British Columbia he established the first factory on the Fraser River. When at York Factory in 1824 he assisted in fitting out Franklin's party, and at Norway House, thirty years later, he aided the expeditions under Rae and Anderson and Stewart. He married in 1830 Miss Matthews, daughter of Mr. W. Matthews, one of the pioneers with Jacob Astor. In 1867 he retired from the service of the Hudson's Bay Company and took up his residence in Montreal, where he died on the 14th March, 1883, in the 83rd year of his age. Mr. Barnston throughout his residence in the Hudson's Bay Territory was a diligent collector in botany and zoology, and contributed collections of insects, plants, &c., to the British Museum, the Natural History Society of Montreal, the McGill University and other institutions. In 1872-73 he was President of the Natural History Society. At Montreal he occupied himself with the determination and arrangement of the specimens he had collected, and prepared notices of them for publication, more especially in the *Canadian Naturalist*. The most important of his papers are the following:—On the geographical distribution of the *Ranunculaceæ* in British America, 1857; on the geographical distribution of plants in the British possessions in North America, 1858; on the geographical distribution of *Cruciferae* and of the genus *Allium*, 1859; sketch of the life of Douglas, the botanist, 1860; on the swans and geese of the Hudson's Bay Territories, 1861; on the genus *Lutra*, 1863; on plants collected by Mr. J. Richardson in British Columbia, 1878. In 1860 a report was prepared and published by Mr. W. S. D'Urban on the *Coleoptera* in Mr. Barnston's collection. Mr. Barnston published other papers in journals in Great Britain of which we have as yet no detailed information.

On motion of Mr. W. Muir, seconded by Dr. T. Sterry Hunt, the following resolution was passed:—

“On the occasion of the decease of George Barnston, Esq., a member of this Society and a contributor of valuable papers to its proceedings and specimens to the museum, and a former President, the Society desires to express its high estimate of his character and services, and its sympathy with the members of his family.”

Mr. F. B. Caulfield presented to the museum a specimen of the male Grosbeak, and the President a series of graptolites.

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The last ordinary meeting for the session was held on the 30th of April—the President occupied the chair.

The first business was the announcement by Mr. E. Murphy, of a very fine donation of stuffed birds from Mr. A. A. Jowett of Sheffield, England. The collection, which includes all the game birds of Britain, was prepared by Webster, the London taxidermist, and exhibited at the London Fisheries Exhibit, where Mr. Jowett purchased it, and has forwarded it per S. S. Grecian to Montreal, where it will form a very valuable addition to the Museum of the Society.

On motion of Rev. Dean Baldwin, the heartiest thanks of the Society were tendered to Mr. Jowett for his very handsome donation, and he was proposed as a corresponding member.

Mr. E. Murphy, then presented a paper on the microscopic appearances of the mosquito.

Mr. Muir followed, giving the exact microscopical measurements of the organs of the tiny creatures under consideration, and after viewing specimens prepared, the meeting adjourned.

(The papers of Messrs. Murphy and Muir may be found on pages 463 to 466.)

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## THE ANNUAL MEETING

was held on the evening of May 18th; the President in the chair.

### THE PRESIDENT'S ADDRESS.

In closing the Session of this Society, perhaps the first thing in our thoughts will be the position of this old and useful body in relation to the place which Montreal has taken as an entertainer of those great popular scientific associations which have done so much for the extension and diffusion of knowledge in the Mother Country and in the United States. The first meeting of the Am-

erican Association for the Advancement of Science in Montreal in 1857 was largely the work of this society. The conception of the idea belongs, I think, to the late Sir William Logan and myself, and it was carried out through the medium of the organization afforded by this Society. The invitation came from us. A delegation from our Society presented it to the American Association at Springfield, and the nucleus of the committee consisted of our members. We were, it is true, nobly seconded by the great body of the citizens, and the local committee, as ultimately constituted, included all the leading men of Montreal. That meeting was one of the most successful in numbers and scientific interest held by the Association up to that time, and in looking back upon its results I cannot but feel that it formed an epoch in the scientific and educational life of this city. We had hoped that the benefits experienced here would have induced some of the other cities of Canada to follow our example. But it was left to Montreal again, after the lapse of 25 years, to invite the Association, grown greatly in the meantime in numbers and importance, to hold its annual meeting in Canada. The lapse of a quarter of a century had removed most of the men who were leaders in 1857, but others had filled their places. Our society had greatly improved its building and its collections, and marvelous development had taken place in our educational institutions, and especially in the University. Again the Natural History Society took the lead in the invitation, and aided materially in securing the success of the meeting; and we had the pleasure of knowing that again our Montreal meeting was second to none that had preceded it. More especially it was successful in attracting men from abroad in greater numbers than is usual in meetings of the American Association.

These meetings must not be regarded as representing the actual work of science. They are rather its efflorescence and display, bearing the same relation to its regular labor that the public examination of a school at the end of its session bears to the daily *fag* and *grind* of the teachers and pupils throughout the year. Still such meetings do much good. They bring scientific workers together, enable the younger and less known to find access to those who occupy higher places, permit the friendly comparison and conflict of opinions, and enable the unscientific public to know something of what is occupying the attention of scientific students. They bring out, also, into prominence the march of

science from year to year, and do much to show its value as a means of education and as a pioneer to wealth, industry and prosperity.

Our good city has now taken a more ambitious flight in proffering its hospitality to the British Association for its meeting of 1884. I say more ambitious, not so much in reference to the standing and character of the Association itself as in reference to the difficulties to be overcome. I do not assert that the leading members of the British Association individually stand higher than those of the American, and perhaps there is as large an amount of good scientific work represented in the one society as in the other. But the American Association is at our door, the British is far away. Though living under a different Government, American men of science scarcely at all regard this in their intercourse with Canadians. In so far as science and literature are concerned, we are practically one, and there are many things in common in our circumstances and surroundings which bring more closely together those who have alike been colonists in a new country, than either can to the more conservative and established ideas of a Mother Country. Hence it is more difficult to induce the Englishman to see any propriety in transferring one of his great institutions to a colony than for the American to cross over an imaginary political line. Besides, the Atlantic with its waves and its sea-sickness is much more than an imaginary line, and the transportation of a large society across it, involves pecuniary outlay as well as personal risk and inconvenience. We need not wonder, therefore, that there should have been much hesitation in accepting an invitation so novel and involving so many untried contingencies. The fact that four hundred members of the Association, including many of its ablest men, have already signified their wish to attend the meeting in Montreal, should be taken by us as a testimony that the old spirit of adventure is not dead in the Mother Country and that scientific men at least appreciate what we can do in the Colonies. Let us hope that the intended meeting may be in the highest degree successful, and may be of the greatest service to the still infant cause of science in this country.

Death has removed several of our members in the past year. Of two only do I need to say a few words. Mr. Barnston was one of our true and earnest cultivators of natural science, one of those men who, banished into remote and uncultivated districts,



are attracted by the aspects of nature, and instead of allowing their minds to rust away in inaction turn themselves to the investigation and study of natural facts. Mr. Barnston was a typical man of this class, and has left in the pages of our journal and in our museum the evidence of his zeal as a naturalist. We have already recorded some features of his life and our estimation of his character. The aged are passing away; let us hope that younger men are rising up to take the places which they leave vacant. Another former president and long-trying and valuable friend of the society whom death has removed, is the late Rev. Dr. De-Sola.

In connection with this I would remind the Society of the appeal made to us by the Rev. Mr. Campbell, to aid in erecting a monument to the memory of our benefactor the Rev. Mr. Sommerville. Such men are few and deserve commemoration, and it may be well to think also of the fact that, in bearing them in remembrance, we stimulate others to like noble deeds. Among the many ways open to those who desire beneficially to connect their names with the real progress of this country, none is more fruitful than to follow in the footsteps of Mr. Sommerville, and to aid societies like this in educating the people by free popular lectures. Our treasurer, Mr. Marler, was authorized to receive contributions to the monument to Mr. Sommerville.

Of the scientific work of the session a more than usual portion has related to zoological science. Taking the last first, a very interesting subject was opened up, but by no means exhausted, by the contributions of Mr. Muir and Mr. Murphy towards the anatomy of the suctorial organs of the mosquito. Structures of this kind, imperfectly examined at a time when microscopes were less serviceable than at present, are described in the same terms by one naturalist after another till the imperfections of their descriptions attract attention, and new investigations are made, often leading to unexpected results.

The remarkable modifications by which the mandibles and maxillæ of the typical mandibulate insects become specialized into lancets and tubes for suctorial purposes merit more attention than they have hitherto received, and appear to present a vast variety of contrivances of the most perfect and complex character. It is perhaps, some compensation for the annoyance which these organs cause to us, that we find them to present so elaborate indications of thought and skill when we make them the objects of careful investigation. I may add here that there is scarcely

anything in the structures of animals and plants that when made the subject of microscopic study is not capable of furnishing the material of thought and improvement, and I trust that the Microscopical Club will frequently send in to this society such evidences of its life and vigor as were presented in this paper.

We were indebted to Mr. Fowler for the exhibition of a very interesting series of drawings of fishes, prepared by him for the international exhibition in London. No method of illustration of our fishes is better than such faithful drawings as those of Mr. Fowler, and I have no doubt they will be as much appreciated and admired by the visitors to the exhibition as by the members of our society. In preparing these drawings Mr. Fowler has had his attention called to many varietal forms and other peculiarities of our fishes, an account of which he will, I hope, one day present to us.

Our attention was directed to the analyses of soils by Dr. Edwards. This is a subject which has received far too little attention in Canada, and since the now somewhat distant time when Dr. Sterry Hunt was commissioned by the Geological Survey to analyse the exhausted and virgin soils of some typical districts of this country it has been much neglected. It is time, in the interests of agriculture, that the Government should appoint a chemical commission to collect the facts as to the exhaustion of soils and present them to the public.

Geology, as usual, occupied a prominent place in our proceedings. The discovery of the bones of a whale at Smith's Falls in the post-pliocene gravel, and at an elevation of more than 400 feet above the sea, bears remarkable testimony to that submergence of the continent in the glacial age of which we have so many indications. Dr. T. Sterry Hunt occupied one of our evenings with an elaborate account of the state of the controversy relating to the age and relations of the Taconic rocks. The battle about the ages and subdivisions of the older crystalline rocks still rages fiercely and the most extreme views are expressed. Only a few days ago I found in *Nature* a report of a paper by Mr. Geikie the director of the Geological Survey of Great Britain, in which he utterly set at nought the divisions of Dimictian, Arvonian and Pebidean applied by Hicks to successive series of pre-cambrian rocks. How it will end is not possible to divine. In the mean time we are much indebted to Dr. Hunt for his masterly statement of the points at issue in one department closely connected with the main subject.

I must not forget thus publicly to thank Prof. Lockwood, of Princeton, for his kindness in making up our record of earthquakes for our proceedings. It shows, like former reports, some remarkable connections of earthquakes with certain seasons of the year, and also their connection locally with the junction of the Laurentian with the newer formations.

An interesting communication by one of our younger members was that of Mr. Walter Ferrier on new forms of animal impressions from the Potsdam sandstone. In connection with this I should say here that the similar impressions from Gaspé, referred to at the meeting, had been named in a paper read last spring by Mr. Whiteaves, but not yet published, *Gyrichnites*, a name which would also apply to Mr. Ferrier's specimens.

The small number of original contributions made to this society is a matter for much regret. We need to cultivate scientific writers, whether from among our own young men or from abroad. There is no doubt that in the comparative absence of men of combined culture and leisure, and in the heavy pressure of business on all our younger men, scientific research cannot greatly flourish, but there is the more need for its cultivation and encouragement by such societies as this.

We have to thank the newly constituted Royal Society of Canada for inviting us to send a delegate to its annual meeting. One of our younger scientific men has been chosen to this office, and he will present to the Royal Society a short notice of our scientific work during the session.

In conclusion allow me to say that while I regret that it is probable I cannot be present at any of the meetings of this society next winter, and while on this account I deem it right to decline being a candidate for re-election as president of the society, I hope that I shall be able when absent, occasionally to contribute notes and specimens to the meetings, and that on my return I may be able to advance the interests of the society with renewed vigor, and perhaps with more leisure for scientific pursuits.

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Mr. G. L. Marler then read the

REPORT OF THE CHAIRMAN OF COUNCIL:

The year now closing has been one of exceptional character in the history of the Society, the invitation to the American Association for the Advancement of Science having been accepted, and the meeting of that body for 1882 held in this city. This meeting brought together a large concourse of the scientists of America, and a number also from Europe. The American Forestry Congress also met in this city and received the assistance of our Natural History Society.

As the result of the meeting of the Forestry Congress we have to chronicle the formation of a Canadian Association under the name of "Forestry Association of the Province of Quebec, Canada," and of the proclamation by the Provincial Government that a day in the month of May be devoted to tree planting and called "Arbor Day." As the result of our invitation together with that of other bodies we hope to take part in entertaining the members of the British Association in August, 1884.

Fourteen new ordinary members were elected during the year, and one corresponding member. We have to regret that the Society's ranks have been depleted by the death of several old members—Sir Hugh Allan, George Barnston, Dr. De Sola, James Court, M. H. Sanborn and David Greenshields.

The usual course of Somerville lectures was given to the number of six, as follows:—

1883.

- Febry. 1st. "A Sketch of the Life and Bequests of the Rev. James Somerville, founder of these lectures." By Rev. Robert Campbell, M.A.
- Febry. 5th. "Life Forces in Health and Disease." By Dr. John Wanless, L.F.P.S., &c.
- Febry. 15th. "Notes on a Tour in the White Mountains." By Prof. P. J. Darey, M.A., B.C.L.
- Febry. 22nd. "How Rocks are formed." By J. T. Donald, M.A., F.C.S.
- March 1st. On "The Athabaska McKenzie Basin." By Robert Bell, M.D., LL.D., F.G.S.
- March 5th "The Geology of the Old and New World compared." By T. Sterry Hunt, LL.D., F.R.S., &c.

These lectures attracted large and appreciative audiences and afforded to those present much pleasure and profit.

Your Council would recommend that hereafter ten lectures be given in this course on some popular subjects of natural history.

The thanks of your Society are hereby tendered to the gentlemen who so kindly delivered the lectures for this year and also to those who contributed to the Museum during the year, and especially to Mr. A. A. Jowett, of Sheffield, England, for his handsome donation—a case of British game birds. Over two thousand persons visited the Museum during the year and nearly all free.

Your Council has also to thank Mr. Charles Gibb for the kind invitation extended during the past year to visit his country residence at Abbotsford, and to regret that the weather was so unpropitious that they could not avail themselves of his proffered hospitality.

Your Council has to regret the continued illness of Professor F. W. Hicks, the recording secretary, and to thank Dr. Edwards for having kindly acted in that capacity during the absence of Mr. Hicks.

Your Council would recommend to their successors that a revised list of members be printed in the *Naturalist*, and that the Society's exchange list be revised for the forthcoming edition of the Society's transactions, which will be published by Messrs. John Lovell & Son, for the Society.

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Mr. Marler also presented

#### THE TREASURER'S REPORT AND FINANCIAL STATEMENT.

During the past year numerous improvements have been made in the building. The ceiling of the library has been decorated, additional shelves have been put up and a new carpet placed on the floor. A new furnace has been placed in the building, the amount due Dawson Bros. and the arrears of taxes have been paid and there remains on hand a balance of \$192.18, with the Government grant for 1883 yet intact.

## FINANCIAL STATEMENT.

G. L. MARLER, Treasurer, in account with THE NATURAL HISTORY SOCIETY OF MONTREAL,  
from May 19th, 1882, to May 18th, 1883.

Dr.

Cr.

1882. May 18.	1882 and 1883.
To Balance on hand.....	By Printing and Advertising.....
" Government grant.....	" Gas account for year.....
" Rent of Rooms.....	" Additions to Museum.....
" Entrance fees to Museum.....	" Editing <i>Naturalist</i> .....
" Members' Fees.....	" Bookbinding.....
" Donations.....	" General repairs.....
	" Stationery, Books, Postage, &c.....
	" Salary to J. Potts.....
	" City Water Works account.....
	" New Furnace.....
	" Wood and Coal.....
	" Insurance.....
	" Dawson Bros. account.....
	" Thomas Mussen (carpet).....
	" City Taxes (two years).....
	" Petty disbursements.....
	" Tinting, decorating, &c.....
	" Balance.....
	<u>\$1959.57</u>
To balance brought down.....	<u>\$192.18</u>

Mr. Wm. Muir then presented the

REPORT OF THE CABINET KEEPER AND OF THE  
LIBRARY COMMITTEE.

1st. Work on the Building.—The museum and library room have been cleaned, the ceilings and walls tinted and the library floor carpeted. In the lecture room and halls the ceilings have been tinted and the walls blocked in imitation of stone.

The old furnace has been replaced by a very superior one capable of heating the whole building.

2nd. Work in the Museum.—W. F. Ferrier, Esq., has devoted much time to arranging the mineralogical specimens, cleaning the cases and improving the appearance of the specimens by placing them in suitable boxes. The Society is indebted to Mr. Ferrier for his valuable services. Mr. F. B. Caulfield has also devoted much time to the care and improvement of the insect collection, he reports as follows:

“The specimens of Canadian Lepidoptera purchased by the Society from me are one hundred in number, viz.:

Butterflies 2, *Sphingidae* 1, *Bombycidae* 11, *Noctuidae* 52, *Geometridae* 34.

During the session the specimens have been taken out and cleaned, the drawers repaired and the specimens replaced, leaving room in the drawers containing Canadian insects, for the reception of species wanting in the collection.

The cabinet contains a fair series of Canadian insects, arranged in the following order:

Canadian Coleoptera (beetles)	4 cases.
British Columbian Coleoptera (beetles)	1 “
Canadian Lepidoptera (butterflies & moths)	8 “
British Lepidoptera (butterflies & moths)	3 “
British Coleoptera (beetles)	1 “

The remaining cases contain exotic insects, principally Coleoptera, from South America, Africa, India, &c.

The orders *Orthoptera*, *Hemiptera*, *Diptera* and *Neuroptera*, being almost entirely wanting in the cabinet, I have reserved two drawers for such specimens as may be procured from time to time.

With the exception of the exotic species, on which I am working at present, the work is finished, and the collections are clean and free from insects pests.”

The following is a list of donations to the museum during the year with the names of donors :

- Pine Grosbeak *Pinicola Canadensis*, Car. By F. B. Caulfield, Esq.  
 Western Meadow Lark, (Manitoba) *Sturnella Magna*. By A. D. Ross, Esq.  
 Pigeon Hawk (Manitoba), *Falco Columbarius* Var. By A. D. Ross, Esq.  
 Canadian Sponge. By Prof. Fowler.  
 Two bottles of insects, Scorpions, &c. By R. Holwell, Esq, Kingston, Jamaica, W. I.  
 Case British Game Birds, by A. A. Jowett, Esq., Sheffield, England, contains the following :
- |   |                  |
|---|------------------|
| Common Partridge, <i>Perdix cinereus</i> ,  | male and female. |
| Red-legged Partridge, <i>Caccabis rufa</i>  | “ “ “            |
| Migratory Quail, <i>Coturnix communis</i> , | “ “ “            |
| Capercaillie, <i>Tetrao urogallus</i> ,     | “ “ “            |
| Black Grouse, <i>Tetrao tetriz</i> ,        | “ “ “            |
| Red Grouse <i>Lagopus scoticus</i> ,        | “ “ “            |
| Common Ptarmigan <i>Lagopus vulgaris</i> ,  | “ “ “            |
- Specimens Pyroxene from near Calumet. By John Thornton.  
 18 Specimens Graptolites. By Principal Dawson.  
 37 Specimens, various Minerals. By a lady friend.

3. Report of the Library Committee.—During the year one hundred and ninety-three volumes of periodicals and pamphlets have been bound and placed in the Library.

A large number of works have been received during the year, list of which will be published in a future issue of the Society's journal.

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Mr. J. T. Donald submitted the

REPORT OF EDITOR OF "CANADIAN NATURALIST."

During the year now closing four parts of the *Naturalist* have been published and a fifth will be issued as soon as the proceedings of the annual meeting are available for publication. The Editor has attended to the mailing of the Journal to exchanges and delivery of same to members with satisfactory results as there are now no complaints that the *Naturalist* is not received by those entitled to it.

In view of the publication of a Journal to take the place of the *Naturalist* which will not appear after the issue of the part now in press, it is respectfully suggested that a Committee be appointed to revise the exchange list, and that the Editor be empowered to take the oversight of mailing and delivery of the



Society's Journal, and to acknowledge receipt of exchanges, and that a book and printed forms for that purpose be placed at his disposal.

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Mr. A. A. Jowett of Sheffield, England, was elected a corresponding member.

#### THE ELECTION OF OFFICERS.

The election of officers was then proceeded with and resulted as follows :

*President*—Dr. T. Sterry Hunt.

*Vice-Presidents*—Mr. J. H. Joseph, Prof. P. J. Darey, Major H. Latour, Rev. Dean Baldwin, Dr. Hingston, Prof. B. J. Harrington, Mr. D. A. P. Watt, Rev. R. Campbell and Dr. Dawson.

*Recording Secretary*—Mr. G. Summer.

*Corresponding Secretary*—Dr. J. Baker Edwards.

*Treasurer*—Mr. G. L. Marler.

*Cabinet-Keeper and Librarian*—Mr. Wm. Muir.

*Council*—Messrs. J. T. Donald, J. Bemrose, Dr. Osler, M. H. Brissette, John S. Shearer, J. H. R. Molson, W. F. Ferrier and E. Murphy.

*Library Committee*—Messrs. W. Muir, J. Bemrose, E. T. Chambers and Dr. McLaren.

*Editor of Canadian Naturalist*—Mr. J. T. Donald.

Mr. E. MURPHY moved a vote of thanks to the retiring officers, and to Dr. Dawson especially, which was carried unanimously.

Dr. DAWSON thanked the Society for the cordial vote of thanks, and the meeting was adjourned.

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## MISCELLANEOUS.

## METEOROLOGICAL RESULTS FOR THE YEAR 1882.

McGill College Observatory Montreal, Canada. C. H. McLeod,  
Superintendent. Height above sea level, 187 feet.

MONTH.	THERMOMETER.				* BAROMETER.				Mean Pressure of Vapour.	Mean relative humidity
	Mean	Max.	Min.	M'n d'y Range.	Mean.	Max.	Min.	M'n d'y Range.		
January.....	12.20	42.4	-26.0	17.68	30.1047	30.881	29.144	.4142	.0711	79.8
February.....	21.04	46.2	- 8.5	15.37	30.0903	30.999	29.582	.3529	.094	74.0
March.....	25.05	47.0	1.4	15.23	30.0474	30.743	29.230	.3322	.1046	69.7
April.....	33.37	57.2	13.1	14.07	29.9719	30.645	29.190	.2449	.1450	68.7
May.....	49.68	67.5	27.1	18.02	29.9322	30.482	29.526	.1865	.2019	56.6
June.....	62.72	86.7	45.9	17.21	29.7999	30.246	29.339	.1514	.3766	65.5
July.....	67.61	84.9	50.8	15.21	29.9006	30.280	29.500	.1180	.5054	75.7
August.....	68.34	91.0	48.0	17.72	29.9597	30.311	29.500	.1318	.5037	72.7
September.....	58.21	79.1	40.6	14.79	30.0616	30.413	29.2.5	.1621	.3799	75.2
October.....	49.43	74.7	30.5	15.09	30.0587	30.380	29.611	.1635	.2653	71.5
November.....	31.33	60.6	14.3	11.24	30.1124	30.582	29.524	.1708	.1390	77.0
December.....	17.67	37.1	- 5.3	12.54	30.0328	30.561	29.396	.2200	.0323	86.4
Means for 1882...	41.576	.....	.....	15.35	30.0111	.....	.....	.....	.23985	72.73
Means for 8 years ending with '82.	42.591	.....	.....	.....	29.9694	.....	.....	.....	.25477	73.97

MONTH.	WIND.		Sky clouded per cent.	Percent- age of Possible Sunshine
	Mean velocity in miles & hour	Mean direction.		
January.....	14.15	W. by S.	58.7	44.1
February.....	13.17	N. W.	47.3	49.7
March.....	12.35	N. W. by W.	50.1	53.0
April.....	11.88	N. W. by N.	63.9	46.6
May.....	11.40	E. N. E.	57.0	50.0
June.....	10.55	W. S. W.	51.3	60.1
July.....	10.15	W. by S.	53.2	62.8
August.....	7.62	N. W. by W.	46.8	68.4
September.....	8.31	N.	58.0	53.1
October.....	10.02	W. S. W.	49.9	57.5
November.....	9.30	N. W.	64.7	40.1
December.....	11.04	W. S. W.	73.7	25.0(?)
Means for 1882.....	10.83	W. N. W.	56.63	50.87
Means for 8 years ending with December 31st. 1881.....	11.054	W. by S.	61.41	.....

\* Barometer reduced to 32° Fah. and to sea level.

† Inches of mercury. ‡ Observed.

‡ Relative saturation being 100.

The monthly means are derived from observations taken every fourth hour beginning with 3.13 a.m. (The mean sunshine given for December is not from a record, but was estimated from the mean of clear sky observed.)

The greatest heat was 91.0 on August 6th; the greatest cold was 26.0 below zero on January 24th; extreme range of temperature for the year 117°; greatest range of thermometer in one day was 37.° on February 17th; least range of thermometer in one day was 4.4 on November 20th; the warmest day

was August 6th, the mean temperature (from max. and min.) being 82.°7; the coldest day was January 24th, the mean temperature being 18°.1 below zero; highest barometer reading was 30.099 on February 18th; lowest barometer reading was 29.190 on April 28th, giving range of 1.809 inches; the lowest relative humidity was 18 on May 17th. The greatest mileage of wind recorded in one hour was 49 on January 22nd; greatest velocity was at the rate of 64 miles per hour, on January 22nd. (This is the greatest velocity recorded here during eight years—the greatest previous velocity, during this period was 60 miles per hour on February 2nd, 1876.)

*Notes.*—The sleighing of the winter closed on March 27th. The first snow of the autumn fell on November 14th, but was inappreciable; the first appreciable snow fell on November 25th. The first river craft arrival in port was on April 11th. Ferries began running on April 13th. Navigation open on April 27th. Auroras were observed on 52 nights. Lunar coronas were observed on 8 nights; solar halos on 18 nights; solar halos on 5 days, accompanied by parhelia on 2 days; hoar frost on 21 days; fogs on 20 days; thunder storms on 21 days, and lightning, without thunder, on 9 days. Earthquake tremor on October 10th, at 4.50 a.m. The zodiacal light was observed once.

#### RAIN AND SNOW FALL DURING 1882.

MONTH.	Inches of rain.	No. of days on which rain fell.	Inches of snow.	No. of days on which snow fell.	Inches of rain and snow melted.	No. of days on which rain and snow fell.	No. of days on which rain or snow fell.
January.....	1.18	4	23.2	20	3.90	3	21
February.....	0.58	4	23.2	13	2.87	0	17
March.....	2.46	8	15.3	15	4.41	3	20
April.....	1.58	11	3.2	5	1.85	1	14
May.....	1.50	15	0.5	1	1.55	0	16
June.....	4.74	26	0.0	0	4.74	0	20
July.....	6.04	17	0.0	0	6.04	0	17
August.....	2.52	11	0.0	0	2.52	0	11
September.....	3.63	12	0.0	0	3.63	0	12
October.....	1.34	14	0.0	0	1.34	0	14
November.....	1.39	14	1.0	5	1.46	1	14
December.....	0.04	3	39.8	24	3.95	1	26
Totals.....	27.60	133	111.2	83	38.26	9	202
Means for eight years ending with 1882...	27.04	137.0	113.7	85.3	38.48	16.1	205.5

Hail fell one day in June, one day in October and two days in November.

## PUBLISHERS' NOTICE.

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With the present number the publication of *The Canadian Naturalist and Geologist* will be discontinued.

A few complete sets of the First Series in eight volumes still remain. These volumes contain many important original papers contributed by the first editor, the late Mr. E. BILLINGS. Price for the set \$16.00.

Of the Second Series several of the volumes are out of print. Those which remain will be sold at \$3.00 per volume.

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The Transactions of the Natural History Society will be published in form similar to *The Canadian Naturalist* by Messrs. John Lovell & Son, for the Society, as announced on page 476.



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