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VOL. VIII.—No. 8.

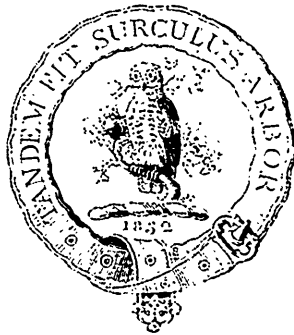
THE
CANADIAN NATURALIST

AND

Quarterly Journal of Science.

WITH THE

PROCEEDINGS OF THE NATURAL HISTORY SOCIETY
OF MONTREAL:



E. J. HARRINGTON, B. A., Ph. D.
Editor.

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Published December 20th, 1878.

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1878.

 The Editor of this Journal is responsible only for such communications as bear his name or initials.

Entered, according to the Act of the Parliament of Canada, in the year One thousand eight hundred and seventy-nine, by DAWSON BROTHERS, in the Office of the Minister of Agriculture.

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THE
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NATURAL HISTORY SOCIETY.

PROCEEDINGS FOR THE SESSION 1877-78.

MONTHLY MEETINGS.

1st Monthly Meeting, held October 29th, 1877.

Principal Dawson read a communication "On some Fossil Remains of *Phoca Greenlandica*," forwarded by Dr. Grant of Ottawa.

Mr. A. R. C. Selwyn exhibited and described a large calcareous sheath of an extinct geyser, disinterred at Three Rivers, and sent to the Museum of the Geological Survey by M. Genest.

Dr. Graham Bell's Telephone was exhibited in operation by Mr. Murray of the Canadian District Telegraph Company, and placed in communication with Emmanuel Church. The instrument was explained and illustrated by Dr. Baker Edwards, and conversations, music, &c., successfully transmitted.

2nd Monthly Meeting, held November 24th, 1877.

A paper was read by Mr. G. L. Marler on the Society's excursion to Oka, also an account of the settlements of the Indians there.

Principal Dawson read a paper "On the recent Earthquake, with an historical sketch of celebrated Earthquakes in Canada."

A very fine display of Canadian fish and game was hung in the lecture room, being a portion of the Canadian food collection prepared for the Paris Exhibition by Dr. S. P. May, and chiefly collected from the markets in Montreal during his brief

visit here. Mr. Marler made some remarks on the birds, most of which had fallen to his own gun on various occasions. Mr. Whiteaves named and commented upon the fishes exhibited.

3rd Monthly Meeting, held January 28th, 1878.

Mr. F. B. Caulfield read a paper on "The Colorado Beetle," which has since been published in the *Canadian Spectator*.

Principal Dawson presented a communication from Mr. L. S. Parker on a "remarkable form of Dendrite," resembling a fossil leaf, but formed of Tourmaline crystals. Other forms of dendrite in sandstone and in slate were also exhibited.

4th Monthly Meeting, held February 25th, 1878.

This meeting was devoted to Microscopic illustrations by members of the Microscopic Club, and the subject introduced by a brief description of the different modes of microscopic illumination, by the Recording Secretary. Messrs. McEachren, Osler, and Edwards were a Committee to arrange for the illustrations, and the students of the Colleges interested in the subject were invited through their Professors. More than thirty valuable instruments were exhibited, and the Committee were especially indebted to Messrs. Ferrier, Baillie, J. F. Whiteaves, W. Muir, E. Murphy, Dr. Wilkins, Dr. Osler and Dr. McEachren for illustrating the various modes of illumination both under high and low powers.

The meeting was well attended, and much pleasure expressed by those present.

Fifth Monthly Meeting, held March 25th, 1878.

Dr. G. M. Dawson read a paper "On the Surface Geology of the Pacific Slope of the Rocky Mountains."

He also made an interesting communication on some skulls and Indian antiquities brought by him from British Columbia, and exhibited at the meeting.

Sixth Monthly Meeting, held April 29th, 1878.

Principal Dawson read a communication from Lt.-Col. Grant, of Hamilton, on "Recent Discoveries in the Niagara Limestone." Also a paper by himself on "New Facts relating to the Geology of the Maritime Provinces."

The consideration of holding a field day was referred to the Lecture Committee.

ANNUAL MEETING.

The Annual Meeting of this Society was held on the 18th of May, 1878, and after the reading of the minutes, the President delivered the following address :

ADDRESS BY PRINCIPAL DAWSON, LL.D., F.R.S.

It becomes us in our present meeting to commemorate the names and services of eminent Naturalists associated with this Society who have passed away in the course of the year.

Dr. Philip Pearsall Carpenter was a son of the late Dr. Lant Carpenter of Bristol, and a member of a family distinguished for brilliant gifts and philanthropic enterprise. His brother, Dr. William B. Carpenter of London, and his sister lately deceased, the well known philanthropist, Mary Carpenter, need only to be mentioned in illustration of this. Dr. Carpenter was born in Bristol in 1812, and was thus fifty-six years of age at the time of his lamented decease. In 1865 he selected our city as his place of residence, and soon became one of our best known and most beloved citizens, distinguished more particularly for his fervent devotion to temperance and sanitary reform; and though much remains to be done in both of these benevolent efforts, he lived to see great good accomplished, largely by his own personal exertions.

But it was as a man of science that he was most widely known. He had devoted himself more especially to the study of the Mollusca. His collection of shells was one of the finest private collections extant, and his extensive knowledge and critical discrimination with reference to species and generic types, were unsurpassed anywhere. He was ready at all times to give aid and guidance with respect to any difficulty of determination either in recent or fossil forms; and his familiar expositions of the structures and habits of his favourites, and the way in which he made clear and intelligible their functions and modes of life, must be fresh in the memories of many of our members. We all esteemed him highly as a naturalist and loved him as a man, and we should thank him for the noble legacy he has left to our University in his magnificent collection of shells. While engaged in the work of classification and arrangement of this collection, Dr. Carpenter was occupied in preparing notes for publication on special points, and in determining and naming collections which had been placed in his hands by societies, institutions and indi-

viduals, in all parts of America. His latest special work is an elaborate revision of the difficult group of the Chitons, illustrated with figures, executed by an eminent American artist, who was induced to visit Montreal for the purpose. This paper, left unfinished at his death, will probably be published by the Smithsonian Institution.

The second name which it becomes me to mention here, is that of a man less known to many of you, but intimately known to me, and whom we have the right to claim as a Canadian geologist, and one of the highest standing—Charles Frederick Hartt, late Professor of Geology in Cornell University, and Director of the Geological Survey of Brazil, who died at Rio de Janeiro on the 19th of March last, at the early age of thirty-eight years. He was a native of Nova Scotia; and at Horton in that Province, where he studied at Acadia College, and while still a student, he became known to me as a diligent and successful collector of fossils of the Lower Carboniferous rocks. He subsequently engaged in educational work in St. John, and with his friend Mr. Matthew had the honour of first rendering intelligible the complicated geology of that district, and of discovering and almost exhausting its rich Devonian Flora and Cambrian Fauna. The collection and determination of the Cambrian fossils of what is now known as the Acadian group, and the excavation of the numerous fossil plants of the Devonian of the same district, constitute in my judgment two of the most important advances ever made in the palæontology of Eastern America, and are even yet bearing fruit. It was my good fortune to be able to aid and encourage Mr. Hartt in these earlier efforts, to determine his Lower Carboniferous and Devonian plants, and to afford him in my 'Acadian Geology' a medium of publication for his Primordial fossils. Acting under my advice, Mr. Hartt, in order to perfect his knowledge of palæontology, entered the school at that time recently established by Agassiz at Cambridge. This led to his appointment to a chair of geology first at Vassar College and subsequently at Cornell, and also to his connection with Brazil, which began with his being attached in 1865 to the "Thayer Expedition" to that country under Prof. Agassiz. The magnificent opening for geological work in Brazil seems to have fascinated his mind, and I remember well the enthusiasm with which he wrote to me at a subsequent time of the almost identical fauna and flora of the Brazilian coal-measures with those he

had in earlier days explored in Nova Scotia. In 1870 he returned to that country with an expedition from Cornell, and in 1875 he was appointed to the direction of the Survey then instituted by the Brazilian government, having already had a semi-official connection with the government for about a year. In the three years in which he worked in connection with the Brazilian government, he had explored and mapped large districts of the country, had accumulated a valuable geological museum, and had prepared the MS. of voluminous reports which he was about to publish at the time of his death. It is to be hoped that some worthy successor may still give them to the world.

In his character Hartt was, like our friend Carpenter, an amiable, exemplary, benevolent and christian man, and I have known few of our younger men of science who gave greater promise of brilliant success.

His rapid advancement to high and important positions shows that science is not without its advantages as a profession, and may perhaps serve to encourage others to devote themselves to similar pursuits, however such ardour may be checked by the remembrance of his early death. But it is better to live well and to good purpose than merely to live long.

Another member of this Society removed by a too early death, Dr. John Bell, deserves more than a passing notice. Taken away at the early age of thirty-three years, he had already achieved no small professional reputation, and had done good scientific work. He took the degree of B.A. in Queen's College, Kingston, in 1862, and that of M.A. in 1865. He graduated in medicine in McGill University in 1866, and in the same year took his degree of M.D. at Queen's College. After graduating he spent about a year in the army hospitals of the United States, in the vicinity of Louisville, Kentucky, and obtained the highest testimonials for his ability, industry and efficiency. He commenced practice in Montreal in 1868, and from his union of professional ability with all the highest feelings of a christian gentleman, and with all the tenderness of a sympathising heart, earned for himself not only the confidence but the love of a large and increasing number of patients. Though well informed in geology, zoology, and physical science, his favourite scientific pursuit was botany, and in this he had made large collections, and had become a reliable authority. He collected in the country around Kingston, on the Ottawa, at Owen Sound, in the Manitoulin Islands,

in Gaspé and the west coast of Newfoundland, and lists of some of these collections were published in the Reports of the Geological Survey and the *Canadian Naturalist*. He contributed many rare and interesting plants to the collections of the University and of this Society. He entered with zeal into the project of collecting a subscription for the erection of a monument over the bones of the pioneer American botanist, Frederick Pursh, and at the time of his death had succeeded in securing nearly a sufficient sum for the purpose. It is a sad coincidence that this subscription was commenced several years ago by another of our young botanists, the late Dr. Barnston, who also was removed by an early death.

Dr. Bell was a man of excellent gifts for scientific pursuits, and one whom we could have wished to give a larger amount of time to original research, but his noble and self-denying devotion to his high calling as a medical man, and especially to the relief of the poor and unfortunate, constitutes a higher claim to our regard than that which even brilliant scientific discoveries would have merited. I may add that Dr. Bell was always ready to aid our Society, and to give his valuable time to work in connection with our botanical collections.

Turning from the memory of the dead to the work of the living, I find that in all seventeen papers or communications on scientific subjects were brought under our notice in the past Session. Besides the reading of these papers, one evening was devoted to an exposition and illustration of the Telephone by Dr. Edwards and Mr. Murray; another to the exhibition of the collection of Canadian game formed by Dr. May for the Paris exhibition, and its explanation by Mr. Whiteaves and Mr. Marler, and still another to an exhibition of Microscopes and objects, for which we were specially indebted to Dr. Osler, Dr. McEachren, Mr. Ferrier, Mr. Muir, Mr. Murphy, and other microscopists. The arrangements for these meetings were made by our indefatigable Secretary, Dr. Baker Edwards, and they were all pleasant and successful.

Of the papers read the greater part were on geological subjects. Two eminent exceptions were that on the Locust in the North-West in 1876, by Dr. G. M. Dawson, and that on the Colorado Beetle by Mr. Caulfield. The former is the sequel to a series of papers on the same subject published in the *Naturalist*, and commenced when Mr. Dawson was géologist on the Boundary

Commission. On this occasion, as a private enterprise of his own, he issued circulars and blank forms to a great number of persons in the North-West, inviting replies, numbers of which were sent in from year to year. The result was the publication in our Journal of a series of papers which it is scarcely too much to say reach to all that is certainly known as to the locust plague and its remedies, and may probably be found in the sequel as important as the expensively obtained statistics now being collected by the United States Commission. I may add that not only have these reports been published in our Journal, but a large number of extra copies have been circulated throughout the West, without any expense to the country.

Mr. Caulfield's paper was an elaborate investigation of a plague which has reached nearer to ourselves. This paper has been published in one of our city newspapers, but deserves a much wider circulation. The time was when this Society was the subject of *jeux d'esprit* in the city press on the subject of "bug-hunting," but the Colorado beetle has vindicated the claims of the bugs to some degree of respect.

Of the geological papers, the following deserve especial mention:—the communication of Mr. Selwyn on the calcareous pipe found at Three Rivers in Post-Pliocene clays, and referred to the action of a hot spring penetrating those clays in Post-Pliocene times. That of Prof. Hind, in which he sought to illustrate the effects of Arctic ice in producing ocean currents. That of Mr. Whiteaves on new Jurassic fossils from British Columbia, in which the evidence for the existence of Jurassic rocks in that country is for the first time fully discussed. That of Dr. G. M. Dawson on the Surface Geology of the Pacific slope of the Rocky Mountains. That of Dr. Harrington on the microscopic structure of igneous dykes traversing the Laurentian rocks, one of our first Canadian contributions to Microscopic Petrology. I pass over several minor contributions, and also papers of my own on fossils from different formations, and on the Earthquake of November 10th, 1877.

On the whole our Session may be said to have been a fruitful and agreeable one, and I feel confident that the members who have attended our meetings and have looked into our published proceedings, have derived both instruction and recreation from our work. I cannot however refrain from expressing regret that our meetings have not been more largely attended, and that so

few of our members have brought under our notice facts or specimens. Surely no more rational or pleasant way of spending an evening can be found than in listening to new facts on the natural history of our country, and in examining and discussing the interesting and often rare or new specimens by which they are illustrated; and it should be borne in mind that we do not expect long or elaborate papers, but are quite content to receive the simplest and shortest notes on any natural phenomena that may be observed, or on any natural facts, either of scientific interest or of practical utility. Our Sommerville Lectures are largely attended by the public, and it appears to me that many of our monthly meetings have been of quite as great interest even to those not deeply versed in science, and vastly more so to those who are. Scientific societies in a country like this are of slow growth, but surely after an existence of half a century, and after having held up the torch of science for that long time in this community, this Society should have acquired greater strength. In the present Session it has completed its fiftieth year, and I think that it is time its members should make greater efforts to revive and strengthen it, so that it may be able with some vigour and eclat to celebrate its jubilee.

The address of the President was followed by the Report of the Chairman of Council, Mr. G. L. Marler, as follows:

REPORT OF THE CHAIRMAN OF COUNCIL.

At the close of another Session your Council beg to submit the following *résumé* of proceedings during the past year.

There has been little of extraordinary moment to which to call the attention of the members, but it may be stated that the labours of the Society seem to have been better appreciated than in the past, and also that there has been a larger attendance at the Sommerville Lectures and more visitors to the Museum.

The usual field day was a success in point of numbers, about 109 persons having been present. The trip was a very enjoyable one, as the weather was bright and pleasant. The party went by rail to Lachine, thence by boat up the river St. Lawrence, past Ile Dorval to Ile Perrot, where the boat stopped for a couple of hours to enable the excursionists to gather botanical specimens. The steamer then proceeded up through the Lake of Two Mountains to Oka, at which place the stay was too short, there not being sufficient time left for the ascent of

Mount Calvary. As usual the receipts were scarcely sufficient to meet the expenses.

In order to carry out the recommendation of the Report of the Council of the previous year, concerning the appointment of a competent Scientific Curator to devote most of his time to the museum and library, Mr. F. B. Caulfield was engaged at a salary of \$200. Since his engagement he has been devoting himself to his work to the satisfaction of the Council.

Your Council have to report that thirty-two new members have been added to the Society, but they greatly regret the loss of Dr. Philip P. Carpenter and Dr. John Bell, to whose death the President has alluded in his address. In them the Society loses two of its most active members.

The papers read at the usual monthly meetings have received full attention in the President's address, and call for no further mention from your Council.

The Sommerville Lectures have been delivered as usual, and were highly appreciated by the members of your Society and the public, the attendance having been much larger than formerly. The subjects of the lectures were as follows :

1. Feb. 7. On Insects, their Habits and Habitats: By the Rev. T. W. Fyles, illustrated by Microscopic Photographs taken and projected by Mr. Charles Baillie.
2. Feb. 14. On the Eye and its Mechanism. By Dr. Buller.
3. Feb. 21. On Glaciers, past and present, and the work they perform. By Dr. C. A. Wood.
4. Feb. 28. On the Ear and its Mechanism. By Dr. Proudfoot.
5. Mar. 7. On a visit to River de la Plata; its scenery, resources and local constitution. By Dr. Blackader.
6. Mar. 14. On Health. By Professor Bovey.

On the evenings of the lectures the museum was thrown open to the public, and was visited by about two thousand persons, in addition to one thousand visitors at other times during the year; a much larger attendance than there has ever been before. The greater portion of these were admitted to the museum free of charge.

The rooms have been rented during the year to several kindred societies, &c., and realized as rent the sum of \$600.

The vestibule of your building has also been greatly improved by closing the space on the left going in and the stairway.

The Reports of the Scientific Curator, Mr. F. B. Caulfield, and of the Library Committee, were then read.

REPORT OF THE SCIENTIFIC CURATOR.

During the past year the donations to the museum have not been very numerous. A fine specimen of the Carolina Grey Squirrel, *Sciurus Carolinensis*, and six species of Canadian birds have been presented; also a specimen of the Snow Goose, *Anser hyperboreus*, and a fine pair of the common Gar Pike, *Lepidosteus ossesus*, has been purchased.

The entomological collection has been re-arranged and classified, and measures have been taken to prevent injury from the larvæ of *Dermestes*, &c. The number of species in the local collection of Coleoptera has been largely increased by collections made and presented by Mr. Whiteaves and Mr. Passmore, and by duplicates from my own cabinet. The valuable series of beetles collected in British Columbia by Mr. Selwyn and Prof. McCoun, and determined by Dr. LeConte of Philadelphia, have also been labelled and pinned into their proper place in the cabinet.

The Diurnal Lepidoptera, Sphingidæ, and part of the Noctuidæ, have been classified and labelled, but owing to want of space the whole of the remaining families of smaller nocturnal moths cannot be exhibited. The Orthoptera are also nearly all named, and along with a large series of Hymenoptera, Hemiptera, Neuroptera and Diptera, are ready for exhibition as soon as another cabinet can be provided.

In the last annual report of my predecessor, Mr. Whiteaves, it was stated that "although corrosive sublimate was mixed with the paste with which the plants are fastened to the papers, it has been recently noticed that a small beetle has been and is still making burrows through some of the fasciculi, and the matter requires immediate attention." On examining the herbarium, it was found that many of the plants had been attacked by the larva of a small beetle, *Anobium foveatum*. Every plant was separately examined and the grubs removed and destroyed. Camphor has been placed in the herbarium and strips of cotton velvet fastened on the edges of the doors, so as to make them fit as tightly as possible; and it is believed that as the plants were examined at the season when the insect was in the larval condition and easily detected, the herbarium has been thoroughly freed from them, and with a little care can be kept in good order.

Many of the plants, however, are old and worthless, and should be replaced by fresh specimens as soon as they can be obtained.

Some of the jars containing Fish and Reptiles have been re-filled with alcohol, but a larger supply is needed, especially for the collection of marine invertibrates.

The cases containing the Mammalia, Birds, Fish and Reptiles need re-papering, as they are badly stained and discolored. The glass fronts of the cases should also be washed, and the floors throughout the museum more frequently scrubbed, as the dust which accumulates is very injurious to the specimens.

All donations to the museum and library have been recorded, and the circulars for the monthly meetings have been regularly addressed and posted.

F. B. CAULFIELD.

REPORT OF THE LIBRARY COMMITTEE.

The Library Committee have to report that although few meetings have been held during the year, the condition of the library has been considerably improved.

About twenty-five volumes of various scientific journals have been bound and are now on the shelves, while twenty-seven more have been arranged and are now in the hands of the binder.

A good deal has also been done in the way of collecting together the scattered numbers of some of the more important journals, transactions, &c., and a list of them has been prepared by Mr. Caulfield to show what numbers are in the library and what missing. The proportion of the latter is unfortunately large, and there are very few journals of which complete volumes can be made up for any number of consecutive years.

There are now about 1333 bound volumes in the library, classified by Mr. Caulfield as follows:—

Botany	- - - - -	96 vols.
Chemistry	- - - - -	37 "
Geology and Mineralogy	- - - - -	64 "
Natural History in General	- - - - -	280 "
Philosophy and General Science	- - - - -	91 "
Voyages, Travels, &c.	- - - - -	50 "
Biography and History	- - - - -	44 "
Miscellaneous	- - - - -	115 "
Periodicals, Reports of Scientific Societies &c.	- - - - -	556 "

Total - - - - - 1333

The accompanying statement was then submitted by the Treasurer, Mr. E. E. Shelton:

Dr. THE NATURAL HISTORY SOCIETY OF MONTREAL, in account with E. E. SHELTON, Treasurer. *Cr.*

1877-78.		Recapitulation.	
To Cash paid Mr. Cauldfield's Salary	\$150.00	By Balance in Treasurer's hands.....	\$708.41
" " Mr. Passmore's "	400.00	" Cash received, Members' Yearly Subscriptions.....	245.00
" " " for attendance.....	8.00	" " Entrance Fees.....	18.50
" " Mr. Footc, commission on collections ..	11.50	" " Rent of Rooms.....	569.00
" " Coal and Wood.....	108.51		
" " Gas Bills.....	89.90		
" " Water.....	43.95		
" " City Taxes.....	116.40		
" " Insurance.....	36.05		
" " Repairs and Petty Expenses.....	103.03		
" " Printing and Advertising.....	113.10		
" " Interest Royal Institution.....	77.50		
To balance in Treasurer's hands.....	282.97		
	<u>\$1540.91</u>		<u>\$1540.91</u>

LIABILITIES.

Mortgage on Society's Buildings in favor of Royal Institution	\$1000.00
Balance, Dawson Brothers.....	175.00

MONTREAL, } Audited and found correct, after comparing
 17th May, 1878 } Vouchers, &c.
 G. L. MARLER,
 W. MUIR,
 J. H. BRISSETTE.

Mr. W. Muir moved, seconded by Mr. J. B. Goode, "that the reports now read be received, approved and printed in pamphlet form for distribution to members."

Moved by Mr. G. L. Marler, seconded by Mr. Shelton, "that the by-laws relating to the election of officers be suspended, and that Principal Dawson be re-elected President of the Society." Carried unanimously.

Moved by Mr. Marler, seconded by Dr. Harrington, "that Mr. E. E. Shelton be re-elected Treasurer." Carried unanimously.

Moved by Dr. Dawson, seconded by Mr. Joseph, "that Dr. Baker Edwards be re-elected Recording Secretary, and Mr. Frank W. Hicks Corresponding Secretary." Carried unanimously.

Moved by Dr. Edwards, seconded by Mr. Marler, "that Mr. F. B. Caulfield be re-elected Scientific Curator for the ensuing year." Carried unanimously.

Moved by Mr. Marler, seconded by Mr. J. H. Joseph, and carried, "that the Council be requested to make suitable arrangements for the Editorship of the *Naturalist* and report to the Society."

Messrs. J. B. Goode and Brissette having been appointed scrutineers, the following gentlemen were elected by ballot:

Vice-Presidents—Rev. A. DeSola, LL.D.; A. R. C. Selwyn F.R.S.; G. L. Marler, Esq.; Prof. P. J. Darey, M.A., B.C.L.; James Ferrier, Jr., Esq.; J. F. Whiteaves, Esq., F.G.S.; C. Robb, Esq.; Rev. Canon Baldwin; J. H. Joseph, Esq.

Council—W. Muir, Esq., J. H. Brissette, Esq., Dr. B. J. Harrington, J. B. Goode, Esq., Prof. R. Bell, Dr. Osler, R. W. McLachlan, Esq., Dr. D. McEachren, Dr. G. M. Dawson.

Library Committee—Dr. B. J. Harrington, Convener, Dr. McConnell, Mr. Joseph Bemrose, Mr. J. Fraser Torrance, Mr. Charles Baillie.

A vote of thanks to the retiring officers closed the proceedings.

The Recording Secretary announced that the Annual Excursion would take place on the 1st of June, to St. Jerome, and the usual prizes would be offered for the best field collections.

DONATIONS TO MUSEUM AND LIBRARY—SESSION 1877-78.

<i>From</i>	TO THE MUSEUM.
N. P. Leach, Esq.	Carolina Grey Squirrel, <i>Sciurus Carolinensis</i> . White-throated Sparrow, <i>Zonotrichia albicollis</i> . Red-winged Blackbird, <i>Agelaius Phœniceus</i> . Ptarmigan, <i>Lagopus albus</i> . White-bellied Swallow, <i>Hirundo bicolor</i> .
J. C. Stockwell, Esq.	Northern Phalarope, <i>Phalaropus hyperboreus</i> Caterpillar of Moth, <i>Samia Columbia</i> .
G. W. Stephens, Esq.	Three stuffed Ptarmigan, <i>Lagopus albus</i> .
J. F. Whiteaves, Esq.	A series of the Coleoptera of the Island of Montreal.
Mr. Passmore.	A series of Coleoptera & Lepidoptera of the Island of Montreal.
Master Arthur Weir, and Master Frank Mitchell.	A number of Indian bones, dug up in a field between Peel and Metcalfe Streets, Montreal.
By Purchase.	Snow Goose, <i>Anser hyperboreus</i> . Pair common Gar Pike, <i>Lepidosteus osseus</i> .

TO THE LIBRARY.

The High Commission of Brazilian National Exhibition.	Brazilian Biographical Annals, 3 vols.
The Trustees of the British Museum.	List of the Lepidoptera Heterocera in the British Museum. Part 1. Catalogue of British Hymenoptera Part 1. Catalogue of Birds, Part 3. Catalogue of Fossil Reptiles of South Africa. British Fossil Crustacea (list of). Gigantic Land Tortoises. Guide to the Departments of Natural History and Antiquities in the British Museum.
J. M. LeMoine, Esq.	Tableau synoptique des Oiseaux du Canada Catalogue of Birds, Fishes, Reptiles, Woods &c., in the Museum of the Literary and Historical Society of Quebec.
A. H. Foord, Esq.	D'Orbigny's Palæontology, 2 vols. Quarterly Journal of Geological Society of London 3 vols.
J. F. Whiteaves, Esq. Principal Dawson.	Owen's Palæontology, 2nd Edition. Acadian Geology, 3rd Edition.

GRAPTOLITES OF THE NIAGARA FORMATION.

BY J. W. SPENCER, B.A., B.A.Sc., PH.D., F.G.S.

For many years, forms of life, allied or belonging to the Graptolite family, have been known to occur in several places throughout portions of the Niagara formation of New York. In the second volume of the Palæontology of New York, Prof. Hall has described three species, and lately one has been described by Professors Hall and Whitfield in the Palæontology of Ohio, all of which have been also obtained at Hamilton. The ancient seas of Hamilton, Ontario, appear to have been very favourable to their growth, as they have been found more abundantly here than elsewhere. Among the large number of specimens obtained nearly twenty species occur. Of these the writer has recognized four mentioned below, and has ventured on the description of three new genera and nine new species, hoping to complete the work with descriptive plates at an early date.

Whilst the Graptolites of other formations generally occur in shales, those at Hamilton more frequently are found in the limestones. Yet those obtained in the shales have their structure better preserved. In most cases the polyparies are obscured, but some of the specimens show their cells on one side. The corneous structure is often well preserved, as also the corrugations and depressions on the stipe. Different forms appear to be characteristic of different beds of rock. As the various species show great varietal differences, much difficulty arises in the way of the student; and many fragments that appear at first sight to be unlike, are found on close examination to belong to others whose characters are recognized, or are too irregular in their forms to establish specific relations.

For six years I have been making a collection of Graptolites whilst geologizing with my friend Lieut.-Col. Grant, H. P. 16th Regt. But it is principally owing to the indefatigable researches of that gentleman that so many Graptolites have been obtained, and many that are in my collection of over 200 specimens were collected by him. The earlier collections made by Col. Grant were sent to the Geological Survey of Canada, and later to Principal Dawson, LL.D., F.R.S., of McGill University. To both of these collections access was afforded. The types are at present at the Canadian Geological Survey Office.

Without further mention of the interesting associations of the Graptolites at present, the writer respectfully submits the notice of a few species found at Hamilton.

Genus *Dictyonema*, Hall, Palæontology of N. Y., Vol. II.

D. retiformis, Hall, " " "

D. gracilis, Hall, " " "

D. tenella, n. s.

Genus *Calyptograpsus*, n. g.

C. cyathiformis, n. s.

C. subretiformis, n. s.

Genus *Rhizograpsus*, n. g.

Rh. bulbosus, n. s.

Genus *Inocaulis*, Hall, Palæontology of N. Y., Vol. II.

I. plumulosa, Hall, " " "

I. bella, Hall & Whitfield, Palæontology of Ohio.

I. (?) problematica, n. s.

Genus *Acanthograpsus*, n. g.

A. Granti, n. s.

Genus *Ptilograpsus*, Hall, Can. Organic Rem. Decade II.

Pt. foliaceus, n. s.

Genus *Callograpsus*, Hall, " " "

C. Niagarensis, n. s.

Genus *Thonnograpsus*, " " "

Th. Bartonensis, n. s.

Genus **DICTYONEMA**, Hall, Palæont. N. Y., Vol. II.

Dictyonema tenella, n. s.

Fronde cyathiform in growing state, but usually circular, although occasional specimens have a flabellate form in the rock. The branches are uniform, nearly parallel, and radiate from the centre with very few bifurcations; in width they vary from $\frac{1}{12}$ to $\frac{1}{8}$ of an inch, but uniform in the same specimen. The branches are connected at short intervals by transverse dissepiments; while the margin of the frond is remarkably constant. The surface is striated, and the texture has a corneous character like that of the other species of this group.

As the connecting filaments are very fine, owing to imperfect preservation, they are not always distinct over the whole surface

of the frond. This species is easily distinguished from *D. gracilis*—even in fragments—by the branches being exceedingly fine (about one-hundredth of an inch in width), with scarcely that distance between them, and with no approach to the dendritic form of that species. The frond maintains its character even in the young state. The largest frond is three and one-half inches in diameter.

It occurs in the Niagara limestone at Hamilton, Ontario. The specimen described was obtained by Lieut.-Col. Grant, and presented to the writer.

Genus CALYPTOGRAPSUS, n. g.

Gr. kaluptos, overlaid; *grapho*, I write.

Frond cyathiform, with numerous bifurcating branches, which are dichotomous at their terminations, but are not connected by lateral processes. The branches are marked with striæ resembling rhomboidal pits; the axis has a black corneous exterior, and the radicle is composed of a thickened mass of the same texture as the branches. In appearance and texture this genus resembles *Dictyonema*, but the branches are all independent, not being connected by transverse dissepiments as in that genus, and are only united in one mass at the root. When fallen some of the branches overlie others as in a semi-anastomose form; the general shape of the frond is circular.

Calyptograpsus cyathiformis, n. s.

Frond cyathiform, with numerous bifurcating branches, united only at the base, with no lateral processes; the axis consists of a black corneous substance, which is striated longitudinally. The fallen frond has some of the branches overlying each other, forming a coarse net-work. The radicle consists of a well marked, thick, corneous mass.

The branches are about three-hundredths of an inch in breadth. The specimen under consideration is most interesting. When obtained the frond had a general flabellate form with the radicle well marked, having branches radiating to nearly a semi-circle; but on trimming the specimen the portion of the stem with radicle was chipped off, and revealed the remainder of a beautiful frond which was now shown to be circular—thus proving the funnel-shaped character when living. This fossil is two and one-half

inches in diameter, and from the base of the root to the top of the branches it measures one inch and a half.

It occurs in the Niagara limestone at Hamilton, Ontario.

Calyptograpsus subretiformis, n. s.

Froud circular, but cyathiform in its growing state. There are numerous bifurcating branches, which in the fossil condition imperfectly unite or overlie each other, producing a kind of fine net-work with irregular sub-rhomboidal interstices. In texture it is corneous, having the branches marked with striations of a sub-rhomboidal form.

In this species the branches are much finer (but little more than one-eightieth of an inch in width) than in *C. cyathiformis*, with more numerous and irregular bifurcations, producing a netted appearance. The original matter is often replaced by pyrites. The fronds are not generally more than two inches in diameter. Only a few specimens have been found, and these show some varietal differences.

This species was found in the Niagara limestone, Hamilton, Ontario, by Col. Grant.

Genus RHIZOGRAPSUS, n. g.

Gr. *Rhiza*, a root; *grapho*, I write.

Froud flabellate, but cyathiform in growing state; bifurcating branches with dichotomous terminations; stem terminating in a well-marked bulb; branches (marked with striæ) more or less reticulated, and united, or overlaid by others.

This genus is established on account of its *bulbous root*, which as yet has been found in no other species of this family. The numerous branches closely overlie each other or are connected in the form of a net-work without transverse dissepiments, as in *Dictyonema*. Fragments of these somewhat resemble species of *Calyptograpsus*, but have a much more netted appearance and the branches are much more delicate.

Rhizograpsus bulbosus, n. s.

Froud cyathiform in growing state; numerous bifurcating branches overlie each other, or are united at point of contact to form a net-work, with fine, [more or less irregular, rhomboidal interstices. The branches unite at base into a slender axis which terminate in a bulbous root. The branches are usually

less than $\frac{1}{60}$ of an inch wide, and in some specimens short abrupt spine-like branchlets are given off. The texture is corneous. Only a few specimens have been obtained, except in fragments. Frond is about two inches high. It was first found by Col. Grant in the Niagara limestones at Hamilton, Ont.

Genus INOCAULIS, Hall, Palæont. N. Y., Vol. II.

Inocaulis (?) *problematica*, n. s.

Plant-like, with numerous slender bifurcating branches, radiating more or less from a common centre, and resembling the branches of rootlets; texture corneous with irregular corrugations.

This species is of common occurrence, and is not easily mistaken for any other. The texture is not well preserved, appearing often as mere stains of dark color on the surface of the stone. Its relations are somewhat doubtful, but it is easily distinguished from all the other species of the family by its root-like character and slender branches (one-fortieth of an inch), often overlapping each other in an irregular manner. It occurs abundantly in the Niagara limestones of Hamilton, Ontario.

Genus ACANTHOGRAPSUS, n. g.

Gr. *Akantha*, a thorn; *grapho*, I write.

Frond shrub-like, consisting of thick branches, principally rising from near the base, with little divergence and some bifurcations. One side of the branches is furnished with prominent spines or denticles, which appear to mark the cell-apertures. Texture corneous and indistinctly striated. This generic form resembles *Dendrograpsus*, but it is stronger and more bushy than species of that genus, and has conspicuous spines indicating a different cell structure.

Acanthograpsus Granti, n. s.

Frond shrub-like, with thick branches principally originating near the base. Some of the branches are bifurcated, and have the ends dichotomous; cell apertures on one side only, and indicated by prominent spines which appear to be placed below them. The branches are sometimes the sixteenth of an inch broad, with spines in some places projecting the twenty-fourth of an inch and ending abruptly.

The larger fronds do not exceed two inches in height, and sometimes have the same width.

This species was first obtained at Hamilton, Ont., by Col. Grant.

Genus *PTYLOGRAPSUS*, Hall, Can. Org. Rem. Dec. II.

Ptylograpsus foliaceus, n. s.

Frond bipinnately branching. The slender branches are plumose, with delicate pinnules rising alternately from the opposite sides of the branchlets. There are angular openings on one side of the pinnules, whilst on the other there are indistinct corrugations. When viewed from the face, the cellules appear as oval impressions.

The branches seldom exceed more than half an inch in length and all appear to originate from nearly the same place on the axis. From these numerous parallel pinnules occur on each side of the axis (sometimes as many as sixteen). The pinnules seldom exceed the fourth of an inch in length and rise at a very acute angle. Even if separate branches be found they are easily recognized. They appear to have been attached, but from the specimens before me the radicle seems to have been broken off.

Like the other members of this group the texture is corneous, but sometimes replaced by pyrites. This species closely resembles the *P. plumulosa* of the Quebec Group, but is smaller (three-fourths of an inch) and finer in structure, with the relatively longer pinnules.

It occurs in the Niagara Limestone at Hamilton, Ontario.

Genus *THAMNOGRAPSUS*, Can. Org. Rem. Dec. II.

Thamnograpsus Bartonensis, n. s.

Stipes single and broad with lineal undulating branches alternately arranged on opposite sides and having half the thickness of the stipe, which is as much as one-sixteenth of an inch broad. The branches which are given off, are usually at right angles with the stipe, and are generally half an inch apart; there being an undulation of considerable length, opposite to their place of attachment.

Texture corneous and black, the surface being nearly smooth with longitudinal depressions. The branches are usually short and abrupt.

They occur in the Niagara Limestone at Hamilton, Ontario, and the writer has seen them in the rock several inches long.

Genus CALLOGRAPTUS, Can. Org. Rem. Dec. II.

Callograpsus Niagarensis, n. s.

Fronde flabellate; the slender bifurcating branches more or less parallel with occasional transverse filaments. The form is nearly semicircular with the branches radiating from a common axis. In texture it is corneous and the surface of the numerous flattened branches is marked with striations, appearing like oval impressions, while on the under side there are minute pits indicating the apertures of the cells, as many as twenty pits being visible in one-fourth of an inch. The fronds are usually less than two inches in breadth, and resemble the outline of a bush, where the branches principally originate from the root.

This species is easily distinguished from *Dictyonema* by the bush-like form and more slender branches, together with an almost entire absence of dissepiments and cell markings. In the better preserved specimens, the cells readily distinguish it from *Dendrograpsus*, as also the more numerous and more parallel branches. The branches are broader, more drooping and further separated than in the species of this genus found in the Quebec Group.

Besides the species described above the writer has observed several species of *Dendrograpsus* and others, which he hopes to publish at an early period with plates, and more particulars of their modes of occurrence and general structure.

ON SOME MARINE INVERTEBRATA FROM THE
WEST COAST OF NORTH AMERICA.

BY J. F. WHITEAVES.

During Mr. Richardson's explorations on Vancouver Island and the coast of British Columbia, on behalf of the Geological Survey of Canada, in the summer seasons of 1874 and 1875, no opportunity was neglected for obtaining specimens of interest to the zoologist or botanist. In the first of these years, an examination of the coast was made, from Victoria, V. I., to the mouth of the Stickeen River in Alaska, as described in the "Report of Progress for 1874-75," and some dredging was done in Burrard's inlet, also in McLaughlin's bay on Campbell Island. The following year, in addition to shore collecting near Victoria, successful dredging operations were carried on in the Gulf of Georgia, between Victoria Harbour and Race Island Lighthouse, also in Deep Bay opposite Denman Island, and near the north-west end of Texada Island. A small but interesting series of littoral Algæ, Hydroids, Polyzoa and Crustaceans, from the immediate vicinity of Victoria, was presented to the museum of the Survey, through Mr. Richardson, by Mr. R. Middleton, of that city, in 1875. The whole of the zoological specimens obtained during these two years were deposited temporarily in the Museum of the Natural History Society of Montreal, with the understanding that the writer, who was then Curator to the Society, would examine and report upon them.

The Crustacea, with the exception of the *Echidnocerus*, have been kindly determined by Prof. S. I. Smith, and the Hydrozoa by Prof. S. F. Clark, both of Yale College. The writer is also indebted to Professors Verrill and A. Agassiz, and to Mr. W. H. Dall for valuable assistance in the identification of some of the Alcyonaria, Echinodermata and Mollusca.

The following is a list of the species recognized so far.

HYDROZOA.

Littoral species, collected near Victoria by Mr. R. Middleton.

Aglaiofenia struthionides.

Plumularia setacea.

Sertularia anguina, Trask, var. *robusta.*

Sertularella Greenii.

“ *turgida*, Trask.

Obelia. (Sp. Undt.)

Tubularia. (Sp. Undt.)

ALCYONARIA.

Verrillia Blakei, Stearns. Five fine living specimens of this gigantic and remarkable Pennatulid were obtained by Mr. Richardson from Burrard's Inlet, in between 10 and 20 fathoms, in 1874. These have since been received in a beautifully perfect state of preservation, as alcoholic preparations, but Mr. Stearns' description of the species (on pages 147 to 149 of the fifth volume of the "Proceedings of the Californian Academy of Sciences") is so exhaustive and accurate, that they give very little additional information on the subject. The largest specimen collected by Mr. Richardson is seven feet and eight inches long; the length of the naked basal portion being just two feet. The polyps, which are sessile, are arranged in crowded, subimbricating, obliquely transverse rows, "in two unilateral longitudinal series." Mr. F. B. Caulfield has carefully counted the exact number of polyps in one of the longitudinal series in this specimen, and finds it to be 3802; the number of transverse rows in the same series, including the shortest ones, being 369. On the supposition that there is an equal number in both series, the total number of polyps in this individual would be 7604! In a specimen 66 inches long, described by Mr. Stearns, it has been estimated that there would be about 5000.

It would appear that this or a very similar species is found also off the coast of Alaska, for in a letter by the anonymous author of the quaint narrative of the voyages of the King George and Queen Charlotte, published under the

name and authority of Captain Dixon,* dated Montague Island (Prince William Sound) May 13, 1787, the following passage occurs: "I should not omit that one of our people, in fishing with hook and line, caught a very remarkable object, which I suppose to be a species of polypus: it seemed to be both of an animal and vegetable nature, and adhered to a small switch about three feet long."

Paragorgia. (Nov. Sp.?) A living example of a large and multitudinously branched, spreading species of *Paragorgia* was purchased by Mr. Richardson in 1875 from some fishermen, who informed him that it was brought up on one of their lines from a depth of about ten fathoms in Jervis Inlet. A portion of one of the branches and a photograph of the specimen have been sent to Prof. Verrill, who thinks that the species is closely allied to the *Paragorgia arborea* of the Northern Atlantic Coast, but that it is probably new to science.

ECHINODERMATA.

Ophioglypha Lutkeni? Lyman. Two brittle stars which seem referable to this species, were dredged by Mr. Richardson in two different localities in the Strait of Georgia in 1875.

Cribrella læviuscula. Stimpson. Strait of Georgia, two living specimens: J. Richardson, 1874.

Pycnopia helianthoidea, Brandt. (Sp.) Creeping on stones near low water mark at the entrance to Deep Bay, V. I.; J. Richardson, 1875.

Asterias epichlora? Brandt. Low water near Victoria, V. I.; J. R., 1874. Rays five, very long and slender, disk small. Greatest diameter, from the extreme points of two opposite rays, sixteen inches: breadth of disk, scarcely two inches. Dorsal spines short, cylindrical or subclavate, truncated at their summits, rather sparse, and forming distinct but irregular reticulations. Ventral spines much longer and more crowded.

* A Voyage round the World, but more particularly to the North West Coast of North America, performed in 1785, 1786, 1787 and 1788 in the King George and Queen Charlotte, Captains Portlock and Dixon. By Captain George Dixon. London, 1789. Page 148.

Asterias ochracea? Brandt. Gulf of Georgia, in from twenty to seventy fathoms. One living specimen: J. Richardson, 1875. Rays five, rather long and tapering gradually, disk somewhat small. Maximum diameter, three inches and a quarter: breadth of disk, three-quarters of an inch. Dorsal spines cylindrical below, bluntly pointed and longitudinally grooved above, thinly scattered and not forming very distinct reticulations. Ventral spines similar to the dorsal, but much more crowded. As the writer has not access to Brandt's original description of this and the preceding species, their identification, which is based upon Stimpson's short summary of their characters in volume six of the Journal of the Boston Natural History Society, is uncertain.

Asterias hexactis? Stimpson. One specimen, from the same locality and station as the preceding: J. R., 1874. Rays six, short and tapering rapidly: disk large. Greatest diameter, twenty-one lines: breadth of disk, eight lines. Dorsal spines small, short, numerous, arranged in five or six longitudinal rows, equal in height, cylindrical, minutely fluted, and subtruncated above. Ventral spines much longer, dilated at their summits, and apparently smooth or nearly so.

Dendraster excentricus, Esch. (♂.) Abundant in shallow water near Deep Bay, V. I.: J. R., 1875.

Loxechinus purpuratus, Stimps. Sooke, in the Strait of Juan de Fuca, in one or two fathoms: J. R., 1874.

Toxopneustes Franciscana, A. Ag. Same locality and collector as for the preceding species.

Pentacta. Sp. undt. Gulf of Georgia in from 20 to 70 fathoms. J. Richardson, 1875.

POLYZOA.

The marine Polyzoa collected by Messrs. Richardson and Middleton have yet to be studied. Most of the species appear to be new, and of those which have been previously described only the three following have been recognized at present.

Tubulipora phalangea, Couch. In dead shells at low water mark near Victoria: J. R., 1874.

Membranipora lineata, Linn. var. With the preceding.

Flustra membranacea, Johnston, as of Linnæus. Not *Membranipora membranacea* of Johnston or Busk. Near Victoria; R. Middleton, 1875.

BRACHIOPODA.

The Brachiopoda named below were dredged by Mr. Richardson between Race Island Lighthouse and Victoria Harbour in from 30 to 70 fathoms, and off the N. W. end of Texada Island, in 40 to 70 fathoms mud, with the exception of the *Megerlia* which was taken only at the first mentioned locality.

Hemithyris psittacea, Linn. (Sp.) Several. Alive.

Terebratulina unguicula, Cpr. Rather abundant. Loop complete.

Laqueus Californicus, Dall ex Koch. Four living specimens.

Identified by W. H. Dall.

Terebratella transversa, Sby. (= *T. caurina*, Gld.) Seven living examples.

Megerlia Jeffreysi, Dall. One dead but perfect shell. Also identified by Mr. Dall. The species was originally described from Alaska.

MOLLUSCA.

Name of Species.	Number of Live Specimens.	Number of Dead Shells.	Remarks.
(<i>Lamellibranchiata</i> .)			
<i>Nexera pectinata</i> , Cpr.	1		
<i>Kennerlya grandis</i> , Dall.....		3	Recently described from Unalaska.
<i>Lyonsia Californica</i> , Con., variety <i>bracteata</i>		1	A single valve.
<i>Psephis Lordii</i> , Baird.....	Many		Found abundantly also at Klio Bay, in 12 fathoms by J. Richardson in 1874.
<i>Venus Kennerlyi</i> , Reeve	1		
<i>Cardium Nuttalli</i> , Con.....	Many		
<i>Cardium Richardsons</i> , (N. Sp.)*	1		For description of this species see the foot note below.

* *Cardium Richardsons*, N. Sp. Shell inflated, but not quite as thick as high, inequilateral; outline transversely and ovately subcircular. Length slightly exceeding the height; posterior side rather longer, and more narrowly rounded than the anterior: beaks large, elevated, incurved and approximating; placed a little in advance of the middle. Surface of the anterior and central portions of the shell marked by flattened and comparatively broad, radiating ribs, separated by narrower, deeply impressed lines, both of which are crossed by faint, concentric striæ or lines growth. On the posterior area, the radiating ribs are thin, prominent, and much narrower than the flattened interspaces, and the concentric striations are developed into elevated, thin and crenulated laminar ridges. Hinge with two small cardinal and two remote lateral teeth in each valve, one of which is sublunular. Pallial line entire; inferior margin of the valves denticulated all round within. Valves touching at all points when closed; not open at either extremity.

Length of the only specimen yet obtained, eight lines and a quarter: height seven lines and a half; thickness through the closed valves, not quite six lines.

Strait of Georgia, between Race Island Lighthouse and Victoria Harbour, in 30 to 50 fathoms.

Name of Species.	Number of Live Specimens.	Number of Dead Shells.	Remarks.
<i>Serripes Laperousianus</i> , Desh.	1		
<i>Rhectocyma mirabilis</i> , Dall....	8		Perhaps = <i>Astarte Esquimalti</i> , Baird.
<i>Lucina tenuisculpta</i> , Cpr.....	Many		
<i>Modiolaria lævigata</i> , Gray.....	2		
“ <i>nigra</i> , Gray.....	1		New to the W. Coast of N. America.
<i>Axinea septentrionalis</i> , Midd.	1		
<i>Nucula tenuis</i> , Mont.....	1		
<i>Acila Lyalli</i> , Baird.....	5		
<i>Leda minuta</i> , O. Fab.....	1		
<i>Yoldia lanceolata</i> , J. Sby.....	3		
<i>Yoldia amygdala</i> , Val.....	2		
<i>Pecten hastatus</i> , Sby.			
variety <i>Hindsii</i> , Cpr.....	1		} Mr. Dall thinks that both of these are varieties of <i>Pecten Islandicus</i> .
<i>Pecten hastatus</i> , Sby,			
variety <i>rubidus</i> , Hinds.....	1		
<i>Amusium carvinum</i> , Gld.....	4		18 to 20 fathoms, Deep Bay, about 130 miles N. of Victoria: not found at the other two localities.
(Gasteropoda.)			
<i>Tornatina eximia</i> , Baird.....	3		
<i>Dentalium rectius</i> , Cpr.....	1		A fine, adult specimen.
<i>Lepeta cœcoides</i> , Cpr.....	2		
<i>Glyphis aspera</i> , Esch.....	4		
<i>Puncturella galeata</i> , Gld.....	1		
<i>Calliostoma annulatum</i> , Mart.	4		
<i>Margarita pupilla</i> , Gld,			
variety <i>inflata</i> , Cpr.	2		Umbilicus closed.
“ <i>Vahlîi</i> , Moll.....	1		
“ <i>lirulata</i> , Cpr.....	1		
<i>Crepidula navicelloides</i> , Nutt..	2		
<i>Galerus fastigiatus</i> , Gld.....	4		
<i>Mesalia reticulata</i> , Migh.....	1		= <i>M. lacteola</i> , Cpr.
<i>Drillia cancellata</i> , Cpr.....	1		
<i>Bela fidicula</i> , Gld.....	1		
<i>Surcula perversa</i> , Gabb.....	2		Very fine.
<i>Eulima micans</i> , Cpr.....	Many		
<i>Trichotropis cancellatus</i> , Hinds	3		
<i>Natica clausa</i> , Brod. & Sby....	1		
<i>Lunatia pallida</i> , Brod. & Sby.	3		Probably = <i>L. Groenlandica</i> , Moll.
<i>Priene Oregonensis</i> , Redf.....	2		
<i>Olivella bætica</i> , Cpr.....	Many		
<i>Nassa mendica</i> , Gld... ..	4		
<i>Amphissa corrugata</i> , Reeve....	3		
<i>Trophon Orpheus</i> , Gld.....	1		
“ <i>tenuisculptus</i> , Cpr... ..	2	3	
“ <i>muriciformis</i> , Dall... ..	2		“Icy Cape; Smith. Bering Sea; Dall.”
<i>Chrysodomus dirus</i> , Reeve.....	1		
“ <i>tabulatus</i> , Baird,.....	2	2	
“ <i>rectirostris</i> , Cpr.....	2		

Littoral species collected near Victoria, V. I., by J. Richardson in 1875.

Name of Species.	Number of Live Specimens.	Number of Dead Shells.	Remarks.
<i>(Lamellibranchiata.)</i>			
<i>Pholadidea penita</i> , Con.....	4		Siphonal tube wrinkled but not tuberculated.
<i>Pholadidea ovoidea</i> , Gld.....	4		Siphonal tube tuberculated externally, especially near the middle.
<i>Saxicava pholadis</i> , Linn.....		3	
<i>Cryptomya Californica</i> , Con...	1		
<i>Schizothærus Nuttalli</i> , Con....		Valves.	
<i>Solen sicarius</i> , Gld.....		1	
<i>Mæra salmonea</i> , Cpr.....	Several		
<i>Tapes staminea</i> , Con.....	do.		
<i>Saxidomus squalidus</i> , Desh. ..	1		
<i>Petricola carditoides</i> , Con.....	4		According to Tryon this is <i>P. nivea</i> , Chemn.
<i>Mytilus edulis</i> , Linn.....	2		Young.
<i>Modiola modiolus</i> , Linn.		1	
<i>Hinnites giganteus</i> , Gray.....	2		
<i>Placunanomia macroschisma</i> , Desh.....	6		
<i>(Gasteropoda.)</i>			
<i>Cryptochiton Stelleri</i> , Midd. ..	1		
<i>Kathorina tunicata</i> , Sby.....	2		
<i>Tonicella insignis</i> , Reeve.....	1		= <i>Tonicella submarmorata</i> , Midd.
“ <i>lineata</i> , Wood.....	2		
<i>Mopalia ciliata</i> , Sby.....	1		= <i>Chiton muscosus</i> , Gld.
“ <i>Merkii</i> , Midd.....	1		= <i>Chiton lignosus</i> , Gld.
“ “ “			
“ variety <i>vespertina</i>		1	
“ <i>Hindsii</i> , Gray.....	2		
<i>Acmaea patina</i> , Esch.....	Several		
“ <i>pelta</i> , Esch.	do.		
<i>Littorina scutulata</i> , Gld.			
“ variety <i>plena</i>	1		
<i>Natica russa</i> , Gld.....		1	Apparently a large variety of <i>N. Clausa</i> .
<i>Amycla gausapata</i> , Gld.....	3		
<i>Purpura crispata</i> , Chemn.....	Many		
“ <i>saxicola</i> , Val.,			
“ variety <i>lurida</i>	1		
<i>Buccinum polare</i> , Gray,			
“ variety <i>compactum</i> , Dall....		2	Teste Dall.
<i>Cerostoma foliatum</i> , Gmel.....		3	

CRUSTACEA.

Dredged at McLaughlin's Bay, Campbell Island, in from ten to thirty fathoms, by J. Richardson, in 1874.

Chorilia longipes, Dana. One.

Dermaturus hispidus, Stimpson. One.

Paracrangon echinatus, Dana. Three.

Crangon salebrosus, Owen. One.

Hippolyte Ochtoensis? Brandt. One, broken.

("This last species is quite uncertain, as the specimen is imperfect and does not fully agree with Brandt's figures and descriptions. All the species are new to me, being from further north than any collection I had seen from the west coast. The *Dermaturus* is very interesting, having been described from a single specimen from off Monterey, California, and as far as I know, not since noticed."—Prof. S. J. Smith, 1875.)

Littoral species from near Victoria, V. I., collected by Mr. R. Middleton, in 1875.

Heterograpsus nudus, Stimpson. Five.

" *Oregonensis*, Stimpson. One, very small.

Cancer magister, Dana. Two.

Trichocera Oregonensis, Dana. Four.

Phyllolithodes papillosus, Brandt. One.

Scyra. (Sp. undt.)

("The last species is apparently new; the others are well known and common California and Oregon species, except the *Phyllolithodes*, which is rare in collections at least."—Prof. S. J. Smith, 1875.)

Dredged in the Gulf of Georgia in 15 to 70 fathoms, by Mr. J. Richardson in 1875.

Cancer productus, Randall.

Trichocera Oregonensis? Dana.

Oregonia hirta, Dana.

Eupagurus armatus, (Dana) Stimps.

Clibinarius turgidus, Stimps.

From various localities.

Echidnocerus cibarius, White. The edible crab of Victoria.

Idotea media, Dana. Among seaweed on the beach near Victoria.

Pollicipes polymera, Sowerby. Stones near low water mark at Sooke in the Strait of St. Juan de Fuca.

MISCELLANEOUS.

SUPPLEMENT TO THE SECOND EDITION OF ACADIAN GEOLOGY, BY J. W. DAWSON, LL.D., F.R.S. Pp. 102.—This publication contains the new matter added to the 3rd edition of "Acadian Geology" just issued; and which is published separately for the benefit of those who already possess the second edition. It reviews the new facts which have been discovered in the Maritime Provinces of British America since the issue of the second edition in 1868. Beginning with the more recent deposits, the author endeavours to vindicate by new facts his conclusion that the cold of the glacial period in Canada was not connected with a continental glacier, but merely with local glaciers on the mountains and ice-drifted by Arctic currents over the submerged plains. He subdivides the Post-pliocene deposits as follows in ascending order:—

- (a.) Peaty terrestrial surface anterior to boulder clay.
- (b.) Lower stratified gravels (Syrtensian deposits of Matthew).
- (c.) Boulder clay and unstratified sands with boulders. Fauna, when present, extremely Arctic.
- (d.) Lower Leda clay, with a limited number of highly Arctic shells, such as are now found only in permanently ice-laden seas.
- (e.) Upper Leda clay and sand, or Uddevalla beds, holding many sub-Arctic or boreal shells similar to those of the Labrador coast at present.
- (f.) Saxicava sand and gravel, either non-fossiliferous or with a few littoral shells, of boreal or Acadian types.

Passing over the Trias, extensively developed in Prince Edward Island, while it affords the remains of some land-plants and one Dinosaurian reptile, and which in Western Nova Scotia is

remarkable for its great development of trappean rocks, a large space is devoted to the Carboniferous, and more especially to the recognition of a Permo-Carboniferous or perhaps truly Permian development of Red Sandstones in its upper part, containing a peculiar flora in many respects resembling that of the European Lower Permian. Details and figures are also given as to new species of Batrachians, Fishes, Insects and Crustaceans recently discovered, and a detailed analysis of the remarkable development of the Lower Carboniferous or "Sub-Carboniferous" of American Geologists, in comparison with that of other countries.

After a short notice of the Devonian, which in the regions referred to is chiefly remarkable for its rich flora, in the main distinct from that of the Lower Carboniferous, and now numbering 125 described species, the author proceeds to discuss the difficulties attending on the study of the Silurian and Cambrian formations, in a region where they are much disturbed and altered, and associated with igneous beds of very varied character. On this subject he remarks:—

"In the Acadian Provinces, as in some other parts of Eastern America, the great igneous outbursts, evidenced by the masses and dykes of granite which cut the Lower Devonian rocks, make a strong line of distinction between the later and older Palæozoic. While the Carboniferous series is unaltered, except very locally, and comparatively little disturbed, and confined to the lower levels, the Upper Silurian, and all older series, have been folded and disturbed and profoundly altered, and constitute the hilly and broken parts of the country. Further, in the Upper Silurian and the older periods, there seems to have been a constant mixture with the aqueous sediments in process of deposition of both acidic and basic volcanic matter, in the form of ashes and fragments, as well as probably outflows of trachyte and dioritic rock, so that all these older formations are characterized by the presence of felsite and porphyry and petrosiliceous breccia, and of diorite. Further, since these volcanic and tufaceous rocks, owing to their composition, are much more liable to be rendered crystalline by metamorphism than the ordinary aqueous sediments from which the bases have been leached out by water, and since they are usually not fossiliferous, the appearance is presented of crystalline non-fossiliferous rocks alternating with others holding abundant organic remains, and comparatively unaltered.

The volcanic members of these series are also often very irregular in distribution, and there is little to distinguish them from each other, even when their ages may be very different. These circumstances oppose many difficulties to the classification of all the pre-Devonian rocks of Nova Scotia and New Brunswick, difficulties as yet very imperfectly overcome."

In New Brunswick and in Eastern Maine it appears that the Upper Silurian rocks of the "Mascarene" series are capped by felsites, chloritic schists, and agglomerates of great thickness, and having the aspect of Huronian rocks, while in Eastern Nova Scotia similar rocks appear in the lower part of the Upper Silurian. All that part of the Lower Silurian period intervening between the Quebec group and the Utica shale of the interior continental areas seems to have been characterised by the deposition of similar volcanic beds, constituting with a group of overlying metalliferous slates, the "Cobequid series" of the author, and resembling much more the Skiddaw and Borrowdale formations of England than the familiar rocks of the New York system.

Below these however are fossiliferous beds of true Cambrian age. In Cape Breton there have recently been recognised by Mr. Fletcher, fossils indicating an Upper Cambrian group, probably of the horizon of the *Lingula* flags. Below this is the Acadian series so rich in *Conocoryphe*, *Paradoxides* and other forms characterising the Middle or Lower Cambrian; and the author now regards the auriferous quartzites and slates of the Atlantic coast of Nova Scotia as equivalent to the lowest Cambrian or Longmynd rocks of England. Some portions of this Atlantic coast series, which are associated with intrusive masses and dykes of granite, and which appear as gneisses and mica schists, have been described as Huronian or Laurentian; but the author regards this as an error and considers that they are merely metamorphosed portions of the slates and quartzites.

Distinguishable from all these in New Brunswick, and also in Cape Breton and probably in Western Nova Scotia, are the Huronian and Laurentian systems. In the close of the work an attempt is made to present in a tabular form the equivalency of the older rocks in Acadia and in Great Britain. This is of course somewhat provisional, but may serve to aid comparisons.

ENGLAND, ETC.

NOVA SCOTIA AND NEW BRUNSWICK.

Upper Silurian.

Ludlow, Wenlock, and Llandovery or Mayhill.

Upper Arisaig Series, Mascarene Series; Lower Arisaig, New Canaan, Wentworth, and Restigouche Series.

Lower Silurian.

Caradoc and Bala, with Snowdon Felsites and Ash Beds, Coniston and Knock Series.

Upper Cobequid Series, Slates, Felsites, Quartzites and Greenstones.

Great Felsite and Trap Ash Series of Borrowdale (Ward).

Lower Cobequid Series, Felsites, Porphyrites, Agglomerates and Massive Syenite of Cobequids, Pictou, and Cape Breton

Llandeilo Flags and Shales, Arenig Series, Skiddaw Slates, etc.

Graptolitic or Levis Series of Quebec and North New Brunswick, part of Cape Breton Series.

Cambrian.

Tremadoc Slates and Lingula Flags.

Miré Series and St. Andrew's Channel Series in Cape Breton, Acadian Series of St. John.

Menevian.

Atlantic Coast Series.

Longmynd.

Huronian.

Pebidian and Dimetian Series (Hicks), containing Felsite, Chlorite Schist, and Serpentine.

Huronian Felsites, Chloritic and Epidotic Rocks of St. John, Yarmouth, and of Cape Breton in part.

Laurentian.

Older Gneisses of Scotland and of Scandinavia.

Gneiss, Quartzite, and Limestone of St. John, Portland Group, Gneiss of St. Anne's Mountain?

It is evident from this table that the Lower Palæozoic and Eozoic formations in the Maritime provinces much more closely resemble those of Great Britain than those of the inland parts of Canada and the United States; though they also resemble the rocks of New England and the Eastern Appalachian region generally, as well as those of some parts of Eastern Quebec. The succession deduced from the study of the inland continental plateau is thus incapable of being applied successfully to that in the sea-coast where great igneous actions were going on upon the Atlantic margin of both continents, contemporaneously with tranquil deposition of ordinary aqueous beds on the interior submerged plateau.

DESCRIPTION OF A NEW SPECIES OF PARAGORGIA FROM JERVIS INLET, B.C. By Prof. A. E. VERRILL.

Paragorgia Pacifica Verrill. Corallum large, very much branched, irregularly dichotomous, the branches trending somewhat in a plane. In the single specimen obtained, several large branches arise from close to the base and diverge at wide angles, so that the coral is broader than high; these subdivide very soon into numerous branches, which, like their branchlets, start out nearly at right angles and then bend upward, thus producing broad rounded axils. The branchlets are nearly round, slender for this genus, slightly irregular, variable in length, and mostly swollen at the tip. The polyp-cells are irregularly scattered, moderately large, eight-rayed and mostly sunken in contraction. Between the polyp cells there are numerous openings, like pin-punctures, apparently corresponding to rudimentary zooids, analogous to those found in *Sarcophyton* and the Pennatulaceæ. Similar small openings exist in *Paragorgia arborea*. Cœnenchyma moderately thick, axis porous, brittle, composed mostly of elongated, rough spicula. Color bright red-lead or orange-red, axis pale yellow. Diameter of the branchlets .25 to .35 of an inch; distance between their divisions 1 to 2.5 inches. Total height of the specimen about 16 inches. The spicula composing the outer layer of the cœnenchyma are very small, short and rough, varying from forms that are but little longer than broad to those that are nearly twice as long as broad, mostly with a whorl of about four rudely subdivided warts close to each end, the end itself consisting of a small, rough rounded tubercle; between the whorls of warts there is a narrow naked middle space. Beneath the outer layer the cœnenchyma is filled with many much larger stout fusiform light red spicula, varying in size and form, which bear rudely conical, divergent spicules, arranged irregularly in two to four or more remote whorls, one of which is often central; the ends of these spicula are prominent and more or less spinulose; they are often three times as long as broad, but smaller and shorter ones are mingled with them. The axis contains much larger and longer whitish fusiform spicula, often six to eight or more times longer than thick, with a wide median naked space, and with about three distant irregular whorls of rough, conical, spinulose prominences, those next the ends often much the largest and subdivided or rudely branched. The specimen was obtained at Jervis Inlet by Mr. Richardson. This form is closely allied to *Paragorgia arborea*, found on both sides of the North Atlantic, and abundant in deep water off Nova Scotia, in 200 to 300 fathoms, hard bottom. The latter, although very variable as to the size and style of its branches, is a much coarser and stouter form, with thicker and more irregular branchlets.

(This is the coral referred to on page 466 of Mr. Whiteave's paper in the in the present number.)

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NOTE.—Volume VIII, containing eight numbers, covers a period of three years instead of two.

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