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* Ottawa Field-Naturalists' Club *

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NOTES ON, AND THE PRECISE GEOLOGICAL HORIZON
OF SIPHONOTRETA SCOTICA, DAVIDSON.

BY HENRY M. AMI.

(Read March 3rd, 1887.)

At the Montreal Meeting of the American Association for the Advancement of Science in 1883, Mr. J. F. Whiteaves, Palæontologist, &c., to the Geological Survey of Canada, read a communication or paper before the Geological Section, in which there was recorded for the first time on this continent the occurrence of a beautifully fringed, or spinose brachiopod, which, from specimens sent him, Dr. Thos. Davidson, the eminent authority on the Brachiopoda, had recognized to be referable to a form which he himself had described as *Siphonotreta Scotica*. The specimens thus referred to de Verneuil's genus *Siphonotreta* had been collected by Mr. J. W. H. Watts, of the Ottawa Field-Naturalists' Club, and that gentleman had handed them to Mr. Whiteaves and subsequently presented them to the National Museum at Ottawa where they are now exhibited in the cases. The specimens in question had been obtained from blocks of impure limestone lying near Mr. Watts' residence at Cummings' Bridge, near Ottawa, and were said to have come out of a well sunk by the same gentleman on his property. There was but little doubt, both from the lithological aspect of the rock containing the specimens of *Siphonotreta* and other fossils found on this property, and from the *facies* of the included fauna, that the measures whence they came were referable to the Utica Formation. For some time, however, a certain amount of doubt was entertained by a number of palæontologists as to the precise geological position of the interesting form under consideration; but, from recent investigations made with the special object in view of clearing this point, the writer, in conjunction with Messrs. McConnell, Hayter and other members of the Ottawa Field-Naturalists' Club has made a number of excursions during which specimens of this beautiful shell were collected.

In order to ascertain definitely the true horizon of the *Siphonotreta* in question, it was necessary to find it in situ, and further to obtain from the same bed or beds in which it occurs as many species of fossils as possible, in other words, determine what were its contemporaries. It had been previously pointed out that the lowest measures of the Utica formation about Ottawa consisted in a series of impure bands of limestone at times, slightly dolomitic and interstratified with black brittle bituminous shales all abounding in fossils. (See Geological Report, Transactions Ottawa Field-Naturalists' Club, Vol. I. No. 4, p. 66; also Vol. II, p. 347). The close resemblance in lithological character between the specimens sent to Dr. Davidson by Mr. Whiteaves and the rocks constituting the lower portion of the Utica formation where it crops out along the right bank of the Rideau River, opposite the Rifle Range, near the rapids, was such as to warrant a careful search for *Siphonotreta* in that locality. After a somewhat careful search on the part of those members of the Club above mentioned, a goodly number of specimens of this interesting species were found at the rapids along with other forms to be mentioned later on.

The precise bed in which *Siphonotreta Scotica* occurs, is that band of impure bituminous limestone, black or dark brown in colour, which crosses the Rideau River at this locality and forms the rapids or slight fall, giving the peculiar orographic aspect to that portion of the river which it possesses and dividing the smooth flowing water above this point stretching on to near Hurdman's Bridge from the rapid running waters below.

The following is a section of the measures of the Utica formation exposed at the head of the rapids opposite the Rifle Range, and includes the zone of *Siphonotreta Scotica*. The middle and upper measures of the Utica have been denuded away, especially during glacial times, and the uppermost beds of the section are capped with Post-Tertiary deposits made up for the most part of debris of the 'till' and Saxicava sand and associated gravel formations with 'erratics' in abundance, the 'Leda clay' having been washed away in latter times. The section is given in descending order:—

CHARACTER OF BEDS, THE THICKNESS, &C.

These upper measures consist of very soft, brittle and friable bituminous shales holding <i>Triarthrus Becki</i> , Green and other fossils.	(Shales.) Thirty inches.
Band of hard compact impure limestone teeming with the remains of <i>Conularia Trentonensis</i> , Hall, and holding also <i>Zygospira Headi</i> , Bill, <i>Leptæna sericea</i> , Sow. <i>Orthis testudinaria</i> Dal. <i>Calymene senaria</i> , Con., &c., &c.	(Limestone) One inch.
Zone of <i>Siphonotreta Scotica</i> . Band of black impure bituminous limestones gradually passing into a series of calcareo-argillaceous shales, at other times compact and breaking with a conchoidal fracture, holding abundance of fossils. (See lists.)	(Limestone.) Zone of <i>Siphonotreta</i> . Varies from eight to twelve inches.
Black and brittle impure (calcareo-argillaceous) shales, bituminous and holding the remains of <i>Asaphus Canadensis</i> , Chapman.	(Shales.)
Band of impure limestone.	(Limestone.)
Shales, very bituminous and brittle.	(Shales.)
Band of impure limestone.	(Limestone.)
Brownish-black beds of shales, very brittle and bituminous.	(Shales.)
Two bands of an irregular and unevenly bedded limestone containing <i>Orthoceras</i> and other fossils but poorly preserved; limestone dark and somewhat bituminous.	(Limestone.)

From the band of impure limestone holding *Siphonotreta* the following species of fossils have also been found intimately associated therewith:—

- | | |
|---|---|
| 1. <i>Batostoma erraticum</i> Ulrich. | 10. <i>Zygospira</i> (probably a new form). |
| 2. <i>Lingula curta</i> , Hall. | 11. <i>Conularia Trentonensis</i> , Hall. |
| 3. " <i>elongata</i> , Hall. | 12. <i>Asaphus Canadensis</i> , Chapman. |
| 4. " <i>quadrata</i> , Eichwald. | 13. " <i>platycephalus</i> , Stokes. |
| 5. <i>Leptæna sericea</i> , Sowerby. | <i>vel megistos</i> , Locke. |
| 6. <i>Strophomena alternata</i> , Courad. | 14. <i>Calymene senaria</i> , Courad. |
| 7. <i>Orthis testudinaria</i> , Dalman. | 15. <i>Beyrichia oculifera</i> , Hall. |
| 8. <i>Zygospira Headi</i> , Billings. | 16. <i>Leperditia cylindrica</i> , Hall. |
| 9. " <i>modesta</i> , Say. | |

A mere glance at the fauna which thus characterizes the zone of *Siphonotreta Scotica* in America is sufficient to indicate that the measures whence they came belong to the Utica Formation, in the upper portion of the Cambro-Silurian or Ordovician System. A single hand specimen showed the following interesting association of species:—

- | | |
|---------------------------------------|--------------------------------------|
| 1. <i>Siphonotreta Scotica</i> , Dav. | 3. <i>Zygospira Headi</i> , Bill. |
| 2. <i>Leptæna sericea</i> , Sow. | 4. <i>Asaphus Canadensis</i> , Chap. |

From specimens obtained at the head of the Rifle Range Rapids along the Rideau River by the writer and from those of the National Museum collection kindly placed at the disposition of the writer by Mr. Whiteaves, the following notes have been gathered:—

Specimen No. 1.—Collected at the rapids along the Rideau River, opposite the Rifle Range, in Gloucester. Collector H. M. A., 1886.

This specimen agrees well with the beautiful and clear description given by Dr. Davidson in his "Supplement to the British Silurian Brachiopoda, 1882-1884, p. 217," and only slight variations such as might be merely local can be observed. The dimensions of the shell are as follows:—*Length, twelve and a half millimetres; breadth, eleven millimetres; height, measured at about one third the distance from the beak to the anterior extremity, two millimetres.* Length of the longest spines, seen along the anterior margin, *three millimetres.*

Specimen No. 2.—Collected by Mr. J. W. H. Watts on his property, Cummings' Bridge P. O., Ont., near Ottawa City, 1883.

This specimen exhibits the spines all around the outer margin of the valve from near the beak on one side round the front margin and near the beak on the other side. These spines, the longest measured as yet, gave *three and a half millimetres, or one and a half lines in length.* In the centre of the umbonal region where the valve rises abruptly from the beak near the latter there is a clearly defined sinus or groove extending only a short distance anteriorly and dying out on the gently convex or arched valve. This feature is also present in the next.

Specimen No. 3.—Collected by Mr. J. W. H. Watts at the same locality as No. 2.

A very typical example of the species indeed, whose length is twelve and a half millimetres (6 lines) and breadth ten and a half millimetres (5 lines). The height of the valve is two millimetres but the spines being partially or wholly imbedded in the matrix their length has not been ascertained exactly.

The three specimens above referred to, as mentioned before, agree well with Dr. Davidson's Scottish form *Siphonotreta Scotica*; nevertheless as it may possibly happen that the Canadian form exhibits the few points of variation constantly the varietal designation of *Si-*

phonotreta Scotica var. *Canadensis* now proposed, may perhaps not be entirely deemed inappropriate. The spines in the Canadian specimens examined so far are exceedingly minute and numerous, narrowly cylindrical, pointed and smooth for the most part, and somewhat broad and thickened at the base. Even under a high power of a microscope the spines appear to be smooth, no annulations being visible, whilst irregularly distributed punctures at times appear to be present—these are perhaps due to the mode of fossilization. The number of spines round the outer margin of specimen No. 2. (*supra*) has been roughly estimated at over three hundred, forming only one of the many rows of “adpressed spines” ranging from the beak to beak round the anterior front of the shell.

It may not be deemed out of place in this connection to give a list of the species of fossils associated with *S. Scotica*, Dav., and collected at Craighead, in Ayrshire, Scotland, chiefly by Mrs. R. Gray, a lady whose researches in and contributions to paleontology are well known. They are all referred to the Llandeilo formation, a series of measures underlying the Caradoc-Bala group, all members of the Cambro-Silurian or Ordovician System. The list of Brachiopoda has been compiled from S. Davidson's “Supplement” (*loc. cit.*) and the Crustacea are taken from the admirable “Monograph of the Silurian fossils of the Girvan district,” by Dr. H. A. Nicholson and Mr. Robt. Etheridge, jr., F.G.S.

The following is the list of species from Craighead in the Llandeilo formation from which *Siphonotreta Scotica* was obtained, those common to Canada all italicised.

BRACHIOPODA.

- | | |
|--|--|
| 1. <i>Lingula quadrata</i> , Eichwald. | 12. <i>Orthis testudinaria</i> , Dalman. |
| 2. “ <i>Ramsayi</i> , Salter. | 13. “ <i>confinis</i> , Salter. |
| 3. <i>Discinia perrugata</i> , McCoy. | 14. “ <i>biforata</i> , Schlothein. |
| 4. <i>Acrotreta Nicholsoni</i> , Dav. | 15. “ <i>turgida</i> , McCoy. |
| 5. <i>Leptaena sericea</i> , Sow. | 16. <i>Sstrophomena rhomboidalis</i> , Wilckens. |
| 6. “ <i>tenuicincta</i> , McCoy. | 17. “ <i>Imbrex</i> , Pander, var. |
| 7. “ <i>Youngiana</i> , Dav. | 18. “ <i>expansa</i> , Sowerby. |
| 8. “ <i>Grayiæ</i> , Dav. | 19. “ <i>retroflexa</i> , Salter. |
| 9. <i>Leptaena Etheridgei</i> , Dav. | 20. <i>Rhynchonella Balcluthiensis</i> , Dav. |
| 10. (?) <i>Orthis unguis</i> , Sow. | 21. “ <i>Peachii</i> , Dav. |
| 11. <i>Orthis Sowerbyiana</i> , Dav. | 22. “ <i>Scotica</i> , Dav. |

CRUSTACEA.

- | | |
|--|---------------------------------|
| 1. Calymene Blumenbachii Brong. | 6. Illenus Bowmani, Salter. |
| 2. Bronteus sp. (large form). | 7. " Rosenbergi, Eichwald. |
| 3. Cheirurus gelasinus, Portlock. | 8. Lichas Hibernicus, Portlock. |
| 4. Encrinurus punctatus, Brönnich. | |
| 5. Encrinurus punctatus var. arenaceus,
Salter. | |

The association of *Siphonotreta Scotica*, Dav., has thus been given both as regards its Canadian and European contemporaries. There are a number of other forms occurring throughout the section at the Rapids, in Gloucester, not mentioned which would swell the list considerably, but subsequent researches will help in ascertaining their precise affinities and lead to other forms being found.

There remains much work, however, to be done in ascertaining the internal characters of this pretty little spinose brachiopod which in Scotland and Canada used to flourish in the old Cambro-Silurian Seas.

Should any member of the Club find any specimen or specimens of *Siphonotreta Scotica* or of its Canadian variety which would throw additional light and show the muscular and other impressions of the interior of this shell belonging to the division of the Tretenterata, he or she would be conferring a favour to Science by contributing the same in the Club's 'Transactions or elsewhere.

THE COUGAR OR PANTHER.

WILLIAM PITTMAN LETT.

(Read 10th March, 1887.)

This interesting animal (*Felis concolor*, L.) has been variously called Cougar and Panther in North America, Puma in South America, "Mountain Lion" in some of the Western States, and "California Lion" in California. Amongst the old trappers and hunters, it was known as the "Panther;" and many startling and wonderful stories have been told regarding its size and ferocity by those hardy pioneers of the wilderness, who followed their adventurous occupation, with their eyes always on the watch for the tomahawk and the scalping knife, and their ears ever open for the sound of the war-whoop. They dealt largely in the marvellous, in those far back times—those early days, before the woodman's exterminating axe and the resistless march of the battalions of civilization, had driven out from their forest fastnesses the great ruminants and the larger and fiercer carnivora which formerly abounded in localities where they are now unknown. The habitat of the Cougar is confined to the American Continent, ranging from Canada to the equatorial forests, and as far south as Terra del Fuego. It is found in the range of the Andes at an altitude of 9,000 feet, and is quite common in South America, as well as in the forests around the Rocky Mountains. It abounded, at one time, in the Valley of the Ottawa, in considerable numbers. The Cougar belongs to the *Felidae*, or cat family; and, except the Jaguar, is the largest animal of its kind in America.

A full grown cougar of the largest size of which we have any authentic account, measures eight feet in length from the point of the nose to the extremity of the tail, and weighs about one hundred and fifty pounds. In some rare instances, specimens have been found reaching the uncommon weight of two hundred pounds. In a recent interesting work on Wild Animals, written by Major Nutt, of Montreal, an account is given of a cougar which was killed in Texas, in 1883, which measured nine feet four inches, and weighed two hundred and forty pounds. "*The American Field*," an excellent

portsman's paper, tells of the recent killing of one of these animals at Georgetown, El Dorado County, California, which measured nine feet from tip to tip and weighed two hundred pounds. This variation in size may be quite possible, for every hunter of any experience knows that the average weight of a large Virginian deer is about two hundred pounds, although, occasionally, extra large bucks have been met with, weighing two hundred and fifty, and even three hundred pounds.

The colour of the cougar is a deep fawn, inclining to white on the belly. The body is long and somewhat slender, and the height about two feet six inches at the shoulder. The tail is two feet long with a small tuft of stiff hair at the end. The legs are thick and extremely muscular, and the teeth are sharp, strong and dangerous looking. Like all animals of the cat tribe, the claws are keen, formidable and retractile, thus aiding in the seizure and retention of its living prey, as well as enabling it to climb trees with facility.

After a gestatory period of about ninety-two days, the female brings forth two kittens at a birth; sometimes, however, one, three or even four constitute her infant family. The young are produced late in the winter, or early in the spring. A reliable authority, William A. Conkling, Ph. D., Director of the Central Park, New York, speaking of panthers, remarks:—

“The cubs are born with their eyelids closed, they open after eight or nine days. The incisors and canine teeth cut through the gums in eighteen days. The body is at first spotted; the spots disappear in about six months. They are weaned when three months old. The mother carries the young about in her mouth in the same manner that a cat does.” (Merriam.)

As I intend to adhere as closely as possible to scientific facts, I shall make no apology for presenting you with a few admirable extracts* from a work, entitled, “The Mammalia of the Adirondacks,” by Dr. Clinton Hart Merriam, of Locust Grove, in the State of New York—a volume which those who have had an opportunity of reading will readily acknowledge to be an able and valuable contribution to the Natural History of America. * * * *

*These extracts giving a very full account of the habits of this animal are, for want of space, omitted, and the reader is referred to Dr. Merriam's splendid work.

The cougar which you may see, very inartistically and unnaturally, set up in the glass-case before you must have been, when living, a remarkably fine specimen. As nearly as possible, he must have measured seven and a half feet from nose to end of tail. He was shot by a boy named Bentley, upward of forty years ago, on Croil's Island, on the south side of the St. Lawrence River, opposite Farran's Point, about ten miles east of Morrisburgh, with an iron spike or nail. The youth killed the animal with a single shot, a sporting exploit sometimes found difficult of accomplishment by experienced hunters.

About one hundred years ago, the panther was found in every part of Ontario and Quebec. I have been assured by reliable authority, that about forty years ago, two large specimens were frequently seen near the Village of Lachute, in the Province of Quebec. Since the days of the adventurous Kentuckian, Daniel Boone, many thrilling stories have been told about the size, ferocity and destructiveness of the cougar. It is well known that it has strong proclivities for the flesh of deer and smaller animals, and that, also, when pressed by hunger it has been known to destroy sheep and horned cattle; but we have yet to learn from any authentic record that one of its characteristics is to attack man, except when wounded and brought to bay. In the latter case, it will defend itself to the last with great fury. Under such circumstances, valuable hounds have frequently been killed in the attempt to close with it.

On the contrary many strange stories have been told from time to time, illustrative of the apparently unaccountable, friendly and even affectionate feeling entertained by it for the human race. I have read an account recently which is strikingly illustrative of the gentleness of this interesting animal towards man. A farmer was travelling upon a lonely road in Washington Territory to a place called Olympia. The road led through a thick bush for a mile or more. In the darkness, he became sensible of something rubbing against his leg, and at the same time heard a loud purring sound. On looking down he was terrified at the sight of a large panther walking along beside him. Every few yards the animal would bound off into the bush, only to return and repeat the cat-like action, and continue the purring. At

last, when getting near the clearance, he heard the sound of waggon wheels; and fancying that the attentions of the panther were becoming aggressive, he uttered a loud scream, and the animal bounded away into the darkness. When the waggon arrived at the spot, the driver found the terrified farmer scarcely able to speak.

I have not quoted the foregoing interesting incidents as positive facts in natural history; but I imagine that there must be some reasonable foundation for narratives of the kind, or they would be unlikely to appear so frequently as they do. You are all acquainted with the beautiful story of the Roman Slave Androcles, and the Lion, and a most affecting tale it is, and perhaps, strictly true. If true, it speaks volumes for the almost rational gratitude of the king of the beasts. I have read, also, of a certain class of Asiatic priests who kept tame tigers which followed around like dogs, and were perfectly docile and harmless. The Cheetar (*Felis jubata*), the hunting leopard of India, forms a strong link in the chain of evidence, which goes to prove that many savage animals are susceptible of an educational transformation, which, in a great measure, neutralizes their supposed natural propensities. The Ounce, the American Leopard, and Panther, the Bengal Tiger and the South American Jaguar are untamable. Even the beautiful little Ocelot is not quite as tractable as a domestic cat.

From its length of body, strength of limbs, and liness of form, the cougar is naturally possessed of immense muscular power and agility. These qualities are peculiarly requisite to enable it make the sudden and swift rushes with which it surprises and captures its prey. Although a rapid and expert climber, it would appear, according to Merriam, that the cougar is not generally given to ascending trees. It was, however, supposed, and commonly believed, at one time, that its attack was usually made from some elevation, or from the overhanging branch of a tree. James Fennimore Cooper, in his famous and inimitable "Leather-Stocking Tales," which, as graphic pictures of Indian and hunter's life, and savage warfare are, *sui generis*, the most intensely interesting narratives ever written—gives many strange and attractive accounts, which would lead, more or less, to the belief that the panther, or "painter," is a much stronger, and a much more formidable animal than he really is.

Perhaps there is no carnivorous animal of the same size and genus, with the exception of the cheetah, that can leap so far for a number of consecutive bounds as can the cougar. A full grown one can leap twenty feet and upwards at each bound, for a distance of one hundred yards or more. I can readily credit this, when I know from personal observation, that the large wiry-haired Scotch staghound can cover twenty feet at each stride, and keep up the pace for a couple of miles. A large Virginian deer can leap from seventeen to twenty feet and keep up the gait for a considerable distance, when freshly started, with the matchless chorus of the hounds behind him. About six years ago, I had the curiosity to measure a single bound of a fine spike horned buck, after it had rushed down the steep side of one of our own Laurentian hills before the hounds; and I found that, from the spot from whence it had started to the point where its fore feet struck the earth again, the distance was one hundred and eleven feet, or thirty-seven yards. The descent or grade was, of course, exceedingly steep.

I have heard many an exciting story, and read many a thrilling account, of the blood-curdling scream of the panther, or, as this animal has been frequently called, the "catamount," but I have never seen one in the act of screaming, or under any other circumstances except in a menagerie. On two or three occasions, many years ago, I heard, in the thick forest near the Village of Richmond, and afterwards in the Township of Huntley, some strangely startling and frightful screams, which I then attributed to the cougar. Be this as it may, I have heard no screams of the same kind for the last thirty years.

Being always fond of music, I soon learned, not, however, without some trouble, to imitate the terror-striking screams of the catamount; and having been given to harmless practical joking, I have frequently accelerated the gait of nocturnal travellers, and had the pleasure afterwards to listen to their exaggerated accounts of narrow escapes. It never required more than two good yells to put the boldest to flight. * * * * *

I think I have now told you all I know concerning the cougar. If I have entertained any of my hearers, or, better still have instructed any in the smallest degree, I shall consider myself amply rewarded for

the hours which I have spent in accomplishing the little of which I am capable, as a member of the Field Naturalists' Club, of the City of Ottawa, an organization which, I am happy to say, numbers within its circle of membership, many able and scientific men. It seems to me that we have been placed upon this earth for the purpose of doing all the good we can to our fellow-beings in our day and generation. The public benefactor, whoever he may be, and whatever may be his talents, his powers or his influence for good, will always find his most gratifying reward in the contemplation of the progress, prosperity, enlightenment or happiness, which he has been directly or indirectly, instrumental in promoting. He may be gifted with genius—he may be endowed with talent, yet he is deserving of no personal credit for the possession of either. But, if he has cherished, guarded and nurtured the celestial spark committed to his charge, until it has grown and expanded into a living flame, which has developed and brightened his own intelligence, and proved a beacon to guide the earnest searcher after truth, he is entitled to every honour and commendation for having at least endeavoured to accomplish the manifest behests of his own destiny.

That we have had in the past, and that we now have, amongst the throbbing millions of this vast world, great and gifted men in every branch of human industry, and in every avenue of human thought and human action, is due alone to the wonder-working power of that Omnipotent Hand that planted the firmament with the sun, the moon, the stars and the planets—that studded the arched equator of the blue ocean of the heavens with the glittering islands of the Milky Way; that clothed the earth with verdure and beauty; that laid the foundations of the mountains and fashioned “the Everlasting Hills;” that intersected terrestrial space with rivers and streams, and capped the towering climax of immeasurable might by infusing the resistless spirit of limitless aspiration into that mysteriously sublime something called the human soul. Here the finite is lost in the magnitude of the infinite! The most gifted, the most learned one of human kind, when he seeks to unravel the mystery of his own nature, pauses when he is confronted by God, and shrinks abashed before the majesty of the Incomprehensible!

NOTE ON FLOUR AND GRAIN BEETLES.

W. HAGUE HARRINGTON.

(Read 10th February, 1887.)

Among the insects which prove unwelcome visitors or dwellers in our houses are species of beetles which are almost universally distributed over the world, and which cause, sometimes, immense loss through their attacks on stored grain, or on its products. It is not my intention this evening to give any extended history of these obnoxious insects, but merely to mention the principal ones which occur here, and to call attention to the longevity of one species. The grub which is so frequently found in flour and meal is the larva of *Tenebrio molitor*, a beetle belonging to the Tenebrionidae, several members of which occur in, or about, houses, and are known as "black beetles." The insect, in its several stages, is more abundant about bakeries, mills and flour-ware-houses, than in ordinary dwellings, and is also destructive on shipboard. The grub is cylindrical in shape and about an inch long, burrowing and living in the flour. The beetle is of a blackish-brown colour, of moderate size, flying abundantly at night, and coming in at open windows. The grain beetles are very much smaller and belong to the Calandridae, a family of the Rhynchophora or "snout-beetles." They especially frequent granaries and flour mills, and in the former sometimes work great damage. Two species occur here, viz.: *Calandra oryzae* and *C. granaria*, but not so far as I am aware in sufficient abundance to be very destructive, as they are in more southerly portions of the continent. The life history of these weevils is briefly as follows: The females bore with her long beak a minute hole in a grain of wheat, barley or rice, &c., in which she deposits an egg, from which hatches a little stout footless grub, or maggot, which burrows into the grain, feeding until fully grown on its substance, and then undergoing its transformations in the empty shell, which is all that remains when it comes forth as the perfect beetle. The mature insects, or beetles, also feed upon the grain, but do not so rapidly consume it. As you are aware, the duration of the life of the majority of insects is very brief, especially after they have reached the imago, or perfect state. Larvæ may live for several months, or even years, but their final transformations undergone they enter a brief existence, measured by weeks, days, or even hours.

Certain species, however, such as some bees and wasps live for almost a year, while some ants are said to live for several years. The specimens of *Calandra granaria* which I exhibit this evening are, when the average longevity of insects is considered, genuine patriarchs; their days have been long in the land. They were given to me on 4th July, 1885, by Mr. Latchford, who found a great number of them in a flour

barrel. Their age at that time was not known, but they have since lived quite happily in their limited quarters (a small pill box) and have nearly devoured the small quantity of grain then allotted to them. They must be nearly twenty months old.

NOTE.—Of ten of the above mentioned specimens four survived on 24th October, 1887, and one still remains alive on 30th November, 1887, or nine months and twenty days later.—W. H. H.

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SUB-EXCURSIONS.

TWENTIETH.—On the 5th November the clear, cool weather was favourable to a Geological Outing, and accordingly a small party paid a visit to an interesting exposure on the line of the Canada Atlantic Railway, of a formation not elsewhere observed in the vicinity. It was reached by a five mile tramp and found to consist of drab and brownish grey calcareous shales, holding in abundance the remains of petrified shells. These were very well preserved, the internal as well as external characters of a number of species being especially well shown, thus enabling the geologist to determine the structure of these extinct forms, which flourished and swam in the sea which in remote geologic periods covered this region. A large number of these fossils were collected and carried home for the purpose of further study.

On the same afternoon the Leaders of the Entomological Branch visited the Beaver Meadow, Hull, and notwithstanding that the ground was covered with snow (about three inches) their explorations were well repaid. The objects especially sought for were galls, and a large number were obtained on roses, golden-rods, willows, etc. Several cocoons and pupæ of moths, such as *Sania Cecropia* and *Callosamia Promethea*, were also found. This shows that even at such a late date, and under apparently most unfavorable conditions, collecting could still be carried on with fair success, and that even in midwinter it would be still possible.

TWENTY-FIRST.—A trip was made on 7th November by the Leaders of the Entomological Branch to Dow's Swamp, with the special object of collecting moss. This was not obtained, as might be supposed, for botanical purposes, but for the insects and shells which abound in it, and which find in it their winter residence. The ground was very wet, and the surface more or less frozen and snow-covered, but a sufficient quantity was easily obtained to fill two large sacks, and to yield many specimens, a list of which may hereafter be presented to the Club. Numbers of the cocoons of *Nematius Erichsonii*, the Larch Sawfly, were found, showing that these insects had been abundant during the summer.

NEW MEMBERS.—31. Dr. Felix Cornu, Angers, Que. 32. R. H. Campbell. 33. A. O. Wheeler. 34. W. W. Hilbourn. 35. F. B. Anderson, Winnipeg, Man.

SOIREEES.

1887.
Dec. 8. President's Inaugural Address. Mr. R. B. Whyte.
1888.
Jan. 5. Clays, Sands and Gravels in the
vicinity of Ottawa, and their con-
tinuations..... Mr. Amos Bowman.
Report of the Geological Branch.
- “ 19. Our Forest Trees..... Prof. Macoun.
Report of the Botanical Branch.
- Feb. 2. Vegetable Parasites..... Mr. James Fletcher.
Notes on Gall-forming Insects..... Mr. W. H. Harrington
Report of the Entomological Branch.
- “ 16. Autumn on the Ottawa River..... Mr. A. O. Wheeler.
Report of the Conchological Branch.
- March 1. Our Squirrels..... Mr. J. Ballantyne.
Report of the Ornithological Branch.

Members are requested to prepare short notes on any subject which may have been brought to their notice during the year, for presentation at any of the above meetings. Additions to or changes in the Programme will be announced in future issues of the OTTAWA NATURALIST.

The Soirées will be held in the Museum of the Ottawa Literary and Scientific Society, 25 Sparks Street, and the chair will on all occasions be taken punctually at eight o'clock.

ADMISSION FREE TO MEMBERS OF THE CLUB; TO NON-MEMBERS
TEN CENTS.

MONDAY AFTERNOON LECTURES.

1888.

January	9.	Ornithology.	Prof. John Macoun.
"	16.	Geology.	Mr. Henry M. Ami.
"	23.	Mineralogy.	D. Geo. Buptie.
"	30.	Conchology.	Mr. F. R. Latchford.
February	6.	Zoology—(General.	Dr. H. Beaumont Small.
"	13.	Entomology.	Mr. James Fletcher.
"	20.	Entomology.	Mr. W. Hague Harrington.
"	27.	Botany.	Mr. R. B. Whyte.
March	5.	Mosses.	Prof. John Macoun.
"	12.	Classification of Plants.	Prof. John Macoun.

Any change in the above list will be duly announced in the
OTTAWA NATURALIST.

It is aimed to make these lectures intelligible to those entirely ignorant of Natural History, and at the same time instructive to those who have made some progress in the study of the subjects to be discussed. They will be brief, in order that ample time may be afforded for subsequent discussion, and replies to questions.

They will commence promptly at 4.15 o'clock, so as to be concluded by 5.30.

ADMISSION FREE.

Members of the Ottawa Literary and Scientific Society, and teachers in the various Educational Institutions of the city are especially invited to be present.

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