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THE OTTAWA NATURALIST.

Vol. XIII.

OTTAWA, JANUARY, 1900.

No. 10

ARCHÆOLOGY OF LAKE DESCHÊNES.

BY T. W. EDWIN SOWTER.

To those who are unacquainted with local topography it may be said that Lake Deschênes is an expansion of the Ottawa River, extending from the Chats Falls, in a south-easterly direction, as far as Deschênes Rapids, a distance of about thirty miles, and averaging from less than one to upwards of three miles in width. This beautiful expanse of water was known to the old "voyageurs" as "Lac Chaudière," and was so designated at a time as comparatively recent as that in which the late John Egan was mayor of Aylmer, as there is an old by-law, bearing his signature, in the municipal archives, in which the westerly limit of the Aylmer Road is described as Chaudière Lake.

A similar confusion of place-names, in this connection, is a source of annoyance to the student of natural or ethnic history in dealing with matters of local reference. For instance: Chats Island is now known to many as Moore's Island; Pointe à la Bataille has become Lapottie's Point, and Pointe aux Pins, the site of the Queen's Park, is known to summer visitors as One-tree Point.

It seems a pity that names given to these places by the pioneers of civilization should be thus lightly set aside for the prosaic nomenclature of modern times.

As already noted in THE NATURALIST, the evidences of Indian occupation of the shores of Lake Deschênes are of frequent occurrence and of extreme interest to the archæologist. These consist, for the most part, of what may be termed beach workshops, or certain portions of the lake shore where the primitive workman

chipped out his flint arrowheads ; or labouriously ground an edge to his rude stone tomahawk, many years before the coming of the pale-faces.

At these places the beach is thickly strewn with flint chippings and, frequently, the sand or gravel contains large quantities of them to a considerable depth. This flint, which is very dark, is identical both in colour and character with that contained in the Trenton formation at Hull, from whence it was doubtless procured, as it is there found in large quantities and may be removed from the limestone beds with little difficulty. The fact that flint is not found in the Chazy or Calciferous rocks, outcropping on the lake front, would seem to justify the presumption that the Algonkin warriors of Lake Deschênes procured their supply of raw material from the nearest and most convenient source, which would be the place already indicated.

While these work places contain such traces of palæolithic art in great abundance, they also reveal evidences of later contact with the white man in the shape of light colored gun and musket flints which are said to be characteristic of the Cretaceous flint of western Europe.

At Bell's Bay, just below Aylmer, I removed several fragments of worked flint from beneath a large oak stump and about one foot below its base. These were taken from a bed of river gravel that was being washed away, at high water, by successive spring floods. Similar fragments were also obtained from the surface of the same gravel bed, having been laid bare by the washing away of the overlying deposit of vegetable mould. As, in the former instance, the flints must have become embedded in the gravel long before the time required for the oak to grow from a seedling to a large forest tree, it is not difficult to form an approximate estimate of the long period of time which must have intervened between the days in which the first and the last of these fragments were cast aside by the lithal artificer.

At Raymond's Point, on the side next the big bay, some recent quarrying operations have exposed a fine section of stratified rock, with an overlying bed of coarse gravel about 18 inches in thickness. I secured a piece of flint from the bottom of this gravel, where it came in contact with the bed of rock beneath. It

was evident that the gravel had not been disturbed by natural or artificial agencies since the clearing away of the forest, and, as the bed is beyond the reach of the high water in the spring, there is some ground for the supposition that it must have been washed into its present position at a time when the volume of water in Lake Deschênes was much greater than it has been in recent years.

From a personal examination of the foregoing and similar data, I am convinced that for many generations these work places were centres of aboriginal occupation, either as village sites or permanent camping grounds, for the red men of this part of the Ottawa valley.

These places, which have so far been examined, are situated at Raymond's Point, just opposite the innermost extremity of Chartrand's Island, and at Snake Island Point and Noël's Point, all on the Ontario shore. Also, from the eastern boundary of the Queen's Park at Pointe aux Pins, on the Quebec side of the lake, the shore is strewn with flints as far down as the rocky point which forms the eastern limit of Newman's Bay. At Bell's Bay, between the town of Aylmer and Deschênes village, at the mouth of a small creek, flints are also found in great abundance, and above and below it at frequent intervals.

A peculiar feature of these beach workshops is that the greatest accumulations of flint chippings are to be found about large boulders or detached masses of rock, which appear to have been utilized as work-tables upon which the chipping, pecking or grinding processes in the fabrication of implements of war or of the chase were accomplished by the ancient workmen.

Fragments of rude pottery, at Raymond's Point, composed of a mixture of clay and gravel, and imperfectly burnt, are indications that in fictile work the primitive dwellers on the shores of Lake Deschênes had mastered the initial stages in the manufacture of domestic utensils. These fragments are quite smooth and ornamented on the outside; while they are either smooth or bear the unmistakable impressions of grass blades on the inside; from which it would seem that two different methods were employed in the manufacture of the originals to which they belonged. In one process, the primitive potter seems to have daubed the matrix

about a core of grass, which was doubtless worked into the shape of the desired utensil. Then, by placing the whole mass in the fire the grass core would be burnt to ashes and a rude earthen vessel would remain as a triumph of aboriginal art. By the other method, some advance appears to have been made, as in this instance the matrix has evidently been manipulated both on the inside as well as the outside, which is evidence that the grassy core had been discarded by the adoption of a simpler process of manufacture.

Specimens of celts or palæolithic tomahawks, picked up at Bell's Bay and Raymond's Point, as well as others from neighboring localities, are very crude products of lithal workmanship. A fragment of stone appears to have been selected about the size and as near as possible the shape of the desired weapon. One end of this was then ground down to a cutting edge, and a celt from Raymond's Point has had one side reduced to proper shape by pecking. A peculiarity of many specimens from this district is, that the sharpened end of the blade has been ground flat on one side and broadly rounded on the other, something like the edge of a carpenter's axe.

The arrowheads, from these beach workshops, vary in shape, as they were doubtless designed for different purposes. They are usually made of flint and some of them of white quartz. The Squaw's Knife, Fig. 1, and the arrowheads, Figs. 3, 4, 5, 6 and 7 in Plate II., were collected by Mr. Jacob Smith of the Interior Department at Ottawa. They are now in the collection of Rev. A. W. Mackenzie of Lakefield, Ont., who kindly loaned them to illustrate this paper. Mr. Jacob Smith, of the Interior Department, picked up a small and very perfect one, at Snake Island Point, which was probably designed for the killing of birds or small animals. It was only about one half the usual size and was made of light grey agate. A single arrowhead, made of bone, was taken from an Indian grave on the Lighthouse Island, and is probably the only specimen of the kind from this district. It should be remembered, however, that weapons made of this material and exposed for many years to the action of the weather, as well as in many cases to the attrition of the shifting gravel of the lake beach, would soon be destroyed; so that the absence of

all but a single specimen should by no means be taken as negative evidence that bone arrow-tips were not in common use among the Indians of the lake.

As already stated, gun and musket flints have been found mingled with the flint chippings of these workshops. This is obviously an indication of the advent of the European trader. Of course these flints may have been lost or discarded by either white man or Indian; but their presence may also bear witness to these village sites having been used as temporary camping grounds by the "coureurs des bois," or, later on, by the agents of the Hudson's Bay Company. A silver bangle was also found, at Snake Island Point, which is said to resemble those which are still used in the ornamentation of hunting shirts and supplied to customers of the above named company in the North West Territories.

My attention was first directed to these workshops by Mr. Jacob Smith, of the Interior Department at Ottawa, to whom is due the sole credit of their discovery. Mr. Smith has thus rendered an important contribution to the advancement of science that will be duly appreciated by every student of Canadian archæology.

In a former paper in *THE NATURALIST* on the "Antiquities of Lake Deschênes," I called attention to the finding of a cache of bullets, some years ago, by Joseph Leclair of Aylmer, at Pointe à la Bataille, otherwise known as Lapottie's Point, at the junction of the lake shore with the eastern limit of Constance Bay. The bullets are said to have been large and suited for a 12-bore gun. Mr. Leclair took away several hundreds of them, but left many more washing about in the sand.

On the 24th of May, 1897, Aldos and David Pariseau discovered a cache of bullets at Flat Rock, near Wilson's Bluff, and just above the summer residence of Mr. A. H. Taylor, in the township of South March, Ontario. They were found in the sand, in a few inches of water quite close to the shore, and 800 were taken from the cache, together with an Indian pipe with the head of some animal moulded or carved on the bowl. Some of these bullets are now in my collection, and I am told that they are what are known as the "trade bullets" supplied to Indians of the Northwest by the Hudson's Bay Company. They are about the size used for a 16-bore gun.

Some time ago while Mr. Charles Breckenridge was plowing on his farm at the mouth of Breckenridge's Creek, on the Quebec shore of the lake, about eight miles above Aylmer, he unearthed a large cache of gun-flints. He also found in the vicinity a couple of stone celts and the copper handle of a kettle. The handle was of rolled sheet copper and belonged to a large sized kettle.

A very fine specimen of pipe-tomahawk was picked up by Mr. Samuel Edey on his farm on the N. $\frac{1}{2}$ of lot 19, 2nd concession of the township of South Hull. The axe weighs 1 lb. $1\frac{1}{4}$ ozs., and is one of the kind said to have been designed for presentation to Indian chiefs. The flint lock of a musket was also found at the same place, by Mr. Edey, but it was so badly rusted as to crumble to pieces on being touched. The point at which this find was made is about two miles from the lake shore to the north-east of Aylmer.

Some years ago, while a path was being cut through a gravel bank in front of the summer residence of the late Col. J. S. Dennis, at Kingsmere, Que., the workmen unearthed an iron tomahawk of French manufacture. An old squaw, who was living in the neighborhood at the time, informed Col. Dennis that according to a tradition of her people an Indian trail at one time led across the mountains, by way of Kingsmere, from the waters of the Gatineau River to those of Deschênes Lake.

This is by no means an unlikely story, for on the earliest recorded map of the township of Hull, several creeks of considerable size are shown as taking their rise at or near these mountains and flowing southward into the lake. Many of these tributary streams have shrunk in volume owing to the clearing away of the forest and subsequent drainage of the land for farming purposes; and some of the smaller ones have disappeared altogether. Traces along these watercourses of the dams of the much prized beaver, as well as the testimony of the early settlers that this district was at one time teeming with game, are sufficient reasons for supposing that these local tributaries of the Ottawa River were frequented by Indian hunters and trappers; and as one of the largest of these streams flows from the mountains, within a short distance of Kingsmere, this may have been the direction taken by the trail above mentioned.

Apart from the foregoing, it is not unlikely that when the primeval forest stretched in unbroken continuity between the waters of the Ottawa and the Gatineau, many a red inhabitant of the river front, in times of trouble, found an asylum on some of these streams and saved his hair from the covetous hands of unwelcome visitors, by availing himself of the strategic advantages of these intricate waterways in a practical application of the old Indian proverb that "water leaves no trail.

Although much important work has been accomplished in connection with the beach workshops already alluded to, there still remains a large amount of useful information to be derived from a careful examination of Indian burial places, at various points along the lake. One of these is said to be situated near Blueberry Point, a short distance above Bell's Bay; another may be found on what are known as the Sand Hills, between Bucham's and Constance Bays, on the Ontario side of the lake, near the mouth of Constance Creek; while a third is situated near the foot of the old Indian portage on Conroy's Island at the Chat's Falls.

A most important burial place, however, and the only one I have so far examined, is that of the Lighthouse Island above Aylmer and opposite the Queen's Park at Pointe aux Pins. At this place I have assisted at the exhumation of several skeletons, which has given me a fairly accurate insight into the mode of sepulture which obtained among the aboriginal people of Lake Deschênes.

This island, which is about an acre in extent, and rises at its highest point to some fifteen feet above the summer level of the lake, is composed of sand, gravel and boulders. It is of glacial origin and was obviously left in its present position by the recession of the vast glacier which at one time occupied this part of the Ottawa valley. Its area was at one time much greater than it is at present, but the upper side is being worn away by the ice shoves every spring and the subsequent high water.

There is abundant evidence to show that the island has been used as a burial place from very early times down to a period so comparatively recent as to come within the memory of those of the generation that is now passing away.

It is clearly evident that the interments are all intrusive, a

fact which would do away with the suggestion of a tumulus to account for the dome-shaped crown of the island where most of them are to be found. This is sufficiently shown, on the upper side of the island, where the cut bank in falling away has exposed sections of graves so clearly as to leave no room to doubt that they were excavated.

The usual mode of sepulture seems to have been to swathe the remains of the dead warrior in birch bark and place them, with or without his personal effects, in a shallow grave from two to three feet below the surface of the ground, in a recumbent rather than a prostrate posture. With one exception the burials are single, but in excavating the foundations of the lighthouse, recently erected by the Marine Department, at the highest point of the island, the workmen laid bare a great accumulation of bones, which would seem to indicate the presence of an ossuary, the approximate extent of which may be judged from the fact that a cartload of bones was removed from the holes for the base supports of the superstructure.

If, therefore, we may rely upon the testimony of the workmen who excavated the foundations of the lighthouse, and there is no reason why we should not do so, then, we have on this island two distinct modes of sepulture, the single and communal. This would lead to the conclusion that two different races, practising variant mortuary rites, were contemporaneous occupants of the lake shores, according to each other the privileges of a common burial place. The presence of the communal grave is accounted for, as a matter of course, by shadowy Indian traditions of a bloody native battle fought in the vicinity. A. F. Hunter, in dealing with a kindred subject, "The Rice Lake and Innisfil Mounds," says that "the same is true of every bone-pit or communal grave of any kind from Montreal to Detroit, none of which could be understood by the modern Algonkins as burials made in times of peace."

Now, in the first place, the bones on the Lighthouse Island have been thrown into the pit promiscuously, as they are not grouped in the relative positions which would naturally follow if they had been buried in the flesh. In the second place, if an invading force had been met and "wiped out" by the warriors of

the lake, it is altogether likely that, after the scalping-knife had done its work, the victors, instead of giving their slain enemies a decent burial, such as the above grave would indicate, would have left them, in conformity with Indian usage, to the wild beasts of the forest, while their own dead would have been interred at leisure in accordance with tribal custom.

As a suggestion, in explanation of the presence of this ossuary, may it not have been likely after the great Huron-Iroquois family quarrel that one of the remnants of the fugitive Huron nation may have found an asylum in this vicinity, have lived in friendly intercourse with the native population and held the "Feast of the Dead" on this island burial place. Iron tomahawks, scalping-knives, gun and musket flints, porcelain beads, &c., have been found on this island at different times. A stone slab bearing the letters J P O T was found by Mr. Boucher in what was probably the grave of a white man.

The most unique isolated burial, however, that has yet been discovered on the island, was that recently laid bare by the lighthouse keeper, Mr. Frank Boucher.

After the destruction of the old lighthouse, in the early part of last summer, and before the erection of the new structure by the Marine Department, while Mr. Boucher was sinking holes for the reception of a tripod to support a temporary light, he unearthed a skeleton together with a large array of implements. The skeleton was in a reclining position with the implements placed beneath the shoulders. Mr. Boucher very generously presented me with the skull, the bones of the pelvis and the implements. These latter consisted of an iron tomahawk, three knives, five gouge-like iron tools, some beaver teeth, a bone gouge, a bone skin-dresser, a bone harpoon and a bone netting needle, a copper kettle with an iron handle, a bar of wrought iron perforated near the middle, some pieces of sheet lead, a number of shell beads or disks, a flint for making fire, and a quantity of human hair made into fringe and wrapped in birch bark.

Sketches of this tomahawk and of the one found by Mr. Edey were sent for identification to Mr. David Boyle, curator of the Archæological Museum at Toronto. As Mr. Boyle is one of our most distinguished archæologists, and one who has had large

experience in the study of Indian relics, his own description of the weapon will be far clearer than any that might be substituted by me. He says :—

“The tomahawks of which you send drawings are undoubtedly French. We have many bearing a similar mark. The British ones usually have a round eye and are not nearly so well made as the French tools. They are also smaller and handier, according to Indian notions, for we have several examples of attempts, successful and otherwise, to make the French ones lighter by laboriously sawing off longitudinal sections with flints, just as if the tools had been made of stone.”

“The French stamps vary somewhat, and tools of British make have seldom any stamp at all. There is quite a little field for investigation respecting the makers and the stamps. I fancy that each trading company had its own mark, those from, say Rochelle being distinguishable thus, from those made in or coming from Havre or St. Malo. This, however, is only a surmise.”

The iron tomahawk from the Lighthouse Island is made with a slide eye, and is 2 lbs. and $1\frac{1}{4}$ ozs. in weight.

The three knives are all of the same pattern but of different sizes. As they are so badly rusted, it is impossible to find any marks on them by which they might be identified. One of them has a wooden handle, inlaid with a vine-like design in copper. One of them is strongly made, with a 6-inch blade, and was doubtless the one used in removing the emblems of victory from the heads of slain enemies, in other words, the scalping-knife.

The five gouge-like tools are of iron, and therefore of European make. It is difficult to say, however, for what purpose they were used, Mr. Boyle inclines to the belief that from the small bulb or knob, at the end of the handles, they may have been used by means of pushing directly in the hand, perhaps as skin-dressers or flesh-scrapers. The blades are all more or less curved, and vary in width at the ends. A tool somewhat similar to these was received at the Toronto museum, not long since, but it had a straight blade and was minus the knob at the end of the handle. It is just possible they may have been the crooked knives used by wood-workers; but they are so badly rusted that this must be merely a conjecture.

The bone harpoon is six inches in length and a little more than half an inch in width. It has four barbs and an eye at the shank end, by which it was doubtless attached to the shaft.

The bone netting needle is about three and a-half inches in length by less than half an inch in width, with an eye in the middle.

The copper kettle, which is of European manufacture, is in a good state of preservation and still bears the marks of fire upon the bottom. The bottom has not been knocked in by the stroke of a tomahawk, so as to render it useless, as is the case with many specimens from western Ontario. It is about six inches across the top, and four inches in depth. The handle, however, is badly rusted and might be broken by careless handling.

The bone gouge and the skin dresser are made, the former from a human thigh bone and the latter from a human jawbone, from which we are constrained to form a very low estimate of the moral status of their owner, who thus appropriated portions of a fellow-creature's anatomy from which to fabricate his domestic implements.

The hair fringe is a specimen of intricate and beautiful workmanship, and a tangible example of the delicate manipulation of the aboriginal hair-dresser. In his archæological report, 1897-98, to the Minister of Education for Ontario, Mr. David Boyle, in reference to native textile work, has written: "Before very long we shall be unable to become possessed of such specimens, and an effort should be made at once to collect every available type-sample of woven work from the hands of our Indians." As this is a timely and valuable suggestion, I have been particularly careful in ascertaining the exact texture of this piece of hair work. The warp, into which the hair is woven, consists of three threads about the thickness of and somewhat resembling ordinary stout sewing cotton. Examined through a common magnifying glass, these threads appear to have been spun from the inner fur of some animal, such as the beaver, the otter, or the muskrat, or from fine human hair from the head of a child. As the loom in which the fringe was fabricated was not buried with him, and a description of it, therefor, being out of the question, let us suppose that the ancient weaver adopted for the purpose some contrivance of

the simplest and most primitive character. His hunting bow may have suggested the use of a piece of bent wood, which, being strung with the warp threads one above the other, the thin strands of hair which constituted the weft were manipulated in something like the following manner: One of these strands was taken and one end of it passed outward between the middle and upper warp threads, around the upper thread, forward and downward across it and the middle one, outward between the middle and lower threads, around the lower one, forward and upward across this and the middle one, again passed outward between the middle and upper threads, then around the upper one and outward again between it and the middle one, around behind the middle thread and forward between it and the lower one. The free ends of the strand, one on each side of the centre warp thread, were then united and drawn forward with one hand, while with the thumb and finger of the other both warp and weft were brought firmly together. Succeeding strands having been treated in a similar manner and connected with each other by a lateral or side-long pressure, the result was a section of hair fringe with a selvage of about $\frac{1}{8}$ of an inch in width. Figure 10a in Plate II, represents a 3-ply strand of twine woven loosely through a warp of three threads, to illustrate the weaving of the hair fringe in Fig. 10.

The shell beads or discs are a little over $\frac{3}{8}$ of an inch in diameter, and appear to have been made from the shells of the *Unio*.

In looking over the bones belonging to the same skeleton, which Mr. Boucher had collected for the purpose of re-interring them, Dr. R. W. Neill, of Aylmer, now of Balmoral, Manitoba, picked out a segment of the lumbar vertebrae of an Indian that was transfixed by a bone arrowhead. Dr. Neill very generously presented this interesting relic to me, thereby furnishing us with a striking example of the deadly nature of this aboriginal weapon, and a graphic illustration of the manner in which the deceased warrior met his death. This bone belonged to the Indian unearthed by Mr. Frank Boucher on the Lighthouse Island. The shank of the arrowhead, which had pierced the spinal cord from behind, is broken off, doubtless by the falling of the body, the

lower portion of which would become immediately paralyzed as a matter of course ; so that this victim of inter-tribal warfare in all probability passed to his happy hunting grounds with the war-whoop still ringing in his ears and his scalping tuft in the hands of a triumphant enemy.

It is indeed a gruesome relic and carries the mind back to a time in the history of New France when the line of communication, by the way of St. Lawrence, between the Indians of the great lakes and the lower French settlements had been severed by the blood-stained tomahawk of the Iroquois, and the northern and western tribes were beset at the carrying places and vulnerable points on the "River of the Ottawas" by the implacable hostility of their southern neighbours.

I might say in conclusion, that as we have in the membership of the Field Naturalists' Club some of the most eminent scientific men in America, it would be well if some of these would devote some of their leisure time to the study of Canadian archæology. We have in the vicinity of Ottawa a splendid field of investigation and I trust that the study of ethnic history, in this domain, will reflect honour upon the members of the Field Naturalists' Club.

ILLUSTRATIONS.

PLATE I.

Figure 1.—Pipe-tomahawk, $\frac{1}{3}$ diameter, from Mr. S. H. Edey's farm, N. $\frac{1}{2}$ of lot 19, 2nd concession of the township of South Hull.

Figure 2.—Tomahawk, $\frac{1}{3}$ diameter, from Indian grave on Lighthouse Island, near Aylmer.

Figure 2a.—French stamp, natural size on Fig. 2.

Figure 3.—Stone celt, $\frac{1}{3}$ diameter, from Bell's Bay, Lake Deschênes.

Figure 4.—Segment of lumbar vertebrae of Indian, natural size, pierced by bone arrowhead, from Lighthouse Island, near Aylmer.

Figure 4a.—Flat side of bone arrowhead in Fig. 4.

Figure 5.—Bone netting needle, $\frac{1}{2}$ diameter, from Indian grave on Lighthouse Island.

Figure 6.—Shell bead, from Indian grave on Lighthouse Island.

Figure 7.—Silver bangle, Snake Island Point, Lake Deschênes.

Figure 8.—Bone harpoon, $\frac{1}{2}$ diameter, from Indian grave on Lighthouse Island.

PLATE II.

- Figure 1.*—Squaw's knife of dark flint, $\frac{1}{2}$ diameter, from Lake Deschênes.
Figures 3-7.—Flint arrowheads, $\frac{1}{2}$ diameter, from Lake Deschênes.
Figure 8.—Skin scraper, made from human jawbone, $\frac{1}{3}$ diameter, from Indian grave, Lighthouse Island.
Figure 9.—Gouge made from human thigh bone, $\frac{1}{3}$ diameter, from Indian grave on Lighthouse Island.
Figure 10.—Hair fringe, natural size, but hair $\frac{1}{2}$ the natural length, from Indian grave, on Lighthouse Island.
Figure 10a.—Twine woven loosely to show method of weaving hair fringe in figure 10.
Figure 11.—Copper Kettle, $\frac{1}{3}$ diameter, from Indian grave on Lighthouse Island.
Figures 12-14.—Knives of European make, $\frac{1}{3}$ diameter, from Indian grave on Lighthouse Island.

PLATE III.

- Figures 1-5.*—Front view of gouge-like implements or crooked knives, $\frac{1}{2}$ diameter, from Indian grave on Lighthouse Island.
Figures 1a-5a.—Side view of figures 1 to 5.
Figures 6-7.—Gun flints, natural size, from Lighthouse Island, Lake Deschênes.
Figure 8.—Stone slab, $\frac{1}{10}$ diameter, lettered J.P.O.T., from grave on Lighthouse Island.

ON SOME TRENTON (ORDOVICIAN) FOSSILS FROM
 THE LIGHT GRAY LIMESTONES OF CUMBERLAND,
 COUNTY OF RUSSELL, ONTARIO, CANADA.

BY H. M. AMI, M. A., F. G. S.

Some weeks ago I received from my friend, Dr. F. Slater Jackson, of the Biological Laboratories, McGill University, a small but interesting collection of fossil organic remains made by him in 1890, at Cumberland, some 24 miles below Ottawa City.

They proved on examination to be eminently characteristic forms of the Trenton formation in the Ordovician System. This collection enables the writer to complete more perfectly the succession of life-zones in the Ordovician of that locality.

On the occasion of the Ottawa Field-Naturalists' Club excursion to Cumberland on the 15th of July, 1899, the Calciferous, Chazy, Black River and Trenton formations—the latter only very

imperfectly—were examined and recognised as forming a regular succession of well-nigh horizontal strata which appear along the Ottawa River front and form a more or less conspicuous series of cliffs and planes in ascending order until the summit of the highland is reached south of Cumberland, where the Trenton formation and the overlying Pleistocene deposits make their appearance. This locality is evidently a most interesting one inasmuch as it gives the geologist and collector an uninterrupted succession of fossiliferous sedimentary strata from the Calciferous to the Trenton at least, without the presence of the faults and folds or dislocations so prevalent in the immediate vicinity of Ottawa, which tend to obscure and puzzle the student of geology.

The following list of species of organic remains collected by Dr. F. S. Jackson in the light-gray, semi-crystalline limestone of Cumberland in 1890, as determined by the writer, are presented in the hope that they may serve to stimulate some of the local collectors to visit that interesting locality where our Ordovician formations are so well seen and developed.

ZOOPHYTA.

1. *Streptelasma corniculum*, Hall or allied form.

ECHINODERMATA.

2. Crinoidal fragments, not determinable.

BRYOZOA.

3. Branching form, requires a micro-section before it can be identified with certainty.

BRACHIOPODA.

4. *Plectambonites sericea*, Sowerby, typical form.
5. *Strophomena fluctuosa*, Billings.
6. *Rafinesquina alternata*, Conrad (Emmons).
7. *Strophomena*, cf. *S. tenuistriata*, Sowerby.
8. *Platystrophia biforata*, var. *lynx*, Eichwald.
9. *Rhyncheoma inæquivalvis*, Castelnau.
10. *Zygospira recurvirostra*, Hall.

GASTROPODA.

11. *Liospira Progne*, Billings.
12. *Trochonema umbilicatum*, Hall.
13. *Hormotoma gracilis*, Hall.
14. (?) *Omospira Alexandra*, Billings.

TRILOBITA.

15. *Asaphus*, sp. fragments of what appear to represent *Asaphus platycephalus*, Stokes.

16. *Calymene senaria*, Conrad; a fine pygidium.

17. (?) *Lichas*, sp. cf. *L. Trentonensis*, H.

Of the above, *Strophomena fluctuosa*, Billings, and the form referred to (?) *Omospira Alexandra*, Billings, are of special interest, the former species having been founded on specimens occurring in the Trenton limestones of Ottawa City, and the latter from the limestones of Paquette's Rapids, Ottawa River, below Pembroke. With the generous consent of Dr. Jackson, this collection of Trenton fossils will be presented to the local collection at the Normal School, where it is now deposited.

Ottawa, Nov. 24th, 1899.

 PALÆONTOLOGICAL NOTES.

In Doctor G. F. Matthew's "Studies on Cambrian faunas," Nos. 3 and 1 and "The Etcheminian fauna of Smith Sound, Newfoundland," just issued by the Royal Society of Canada, Trans. vol. v, section 4, series 2, 1899-1900. (1899), the following new genera and species of Canadian fossil organic remains are described :

I.—*Upper Cambrian fossils from Mount Stephen, Field, B.C.*
(From the cabinets of Mr. Byron E. Walker, F.G.S., Toronto, Ont.)

ANNELIDA (= Pteropoda of other writers.)

UROTHECA, (n. gen.) Matthew, 1899.

U. flagellum, Matthew.

U. parva, Matthew.

BYRONIA, (n. gen.) Matthew, 1899.

B. annulata, Matthew.

Orthotheca corrugata, Matthew.

Hyalolithes carinatus, Matthew.

TRILOBITA.

Agnostus montis, (emend.) Matthew.

Corynexochus Rœmingeri, Matthew.

Dolichometopus occidentalis, Matthew.

Bathyriscus pupa, Matthew.

NEOLENUS, (n. gen.) Matthew, 1899.

N. granulatus, Matthew.

Oryctocephalus Walkeri, Matthew.

Besides the above, Dr. Matthew also records the occurrence at Mt. Stephen, of the following forms from the Walker collection :

ANNELIDA.

Hyalithes, sp.

TRILOBITA.

Ptychoparia cordillerae, Rominger.

Bathyriscus Howelli, Walcott.

Neolenus serratus, Rominger, sp.

Doropyge Darwini, Walcott, sp.

Zacanthoides spinosus, Walcott.

Ogygia (Ogygopsis) Klotzi, Rominger.

Dr. Matthew then gives a very careful analysis of the genera obtained from the Mt. Stephen horizon, and the percentage of their occurrence, with the use of comparative tables. He concludes by making the following statement : "*The Mount Stephen Fauna is essentially Upper Cambrian.*" This places the horizon of the Mount Stephen trilobite bed (at an altitude of between eight and nine thousand feet above sea-level) a higher position than had previously been assigned to it.

II.—*Studies on Cambrian Faunas, No. 4—Fragments of the Cambrian Faunas of Newfoundland.*

In this paper Dr. Matthew discusses the succession of faunas in Newfoundland, and combats the "conclusion so universally adopted" that the Olenellus zone occurs below the Paradoxides zone. He reverts to the arrangement of the succession of strata of E. Billings in 1864. In this connection Dr. Matthew writes : "The impossibility of finding the genus Olenellus or its accompanying fauna in the strata of the Eastern Provinces of Canada, below Paradoxides (which strata were eventually found to contain a considerable fauna of trilobites) led him in 1892 to propound the view that Olenellus might be contemporaneous with Paradoxides but confined to a different habitat. This surmise was, in a sense,

confirmed by the finding of the fauna *accompanying* *Olenellus*, though not that genus itself, in company with the highest sub-zone of *Paradoxides* at Hastings Cove near St. John, in 1896."

The following fossil organic remains are described and recorded by Dr. Matthew in the text.*

LIST OF NEWFOUNDLAND FOSSILS DESCRIBED AND NOTED.

SPECIES.	LOCALITY.	HORIZON.
<i>Obolella Atlantica</i> , Walcott.	Foster's (Smith's) Pt. Smith Sound, Nfld.	Lower part of the Protolenus Zone.
<i>Raphistoma</i> (?) <i>Kelliensis</i> , Matthew.	Kelly's I., Conception Bay, Nfld.	Upper Cambrian, (Howley & Walcott)
<i>Arenicolites antiquatus</i> , Billings.	Great Bell I., Conception Bay, Nfld.	do
<i>Arenicolites brevis</i> , Matthew	do	do
<i>Ctenichnites ingens</i> (?) Matthew.	do	do
<i>Hyalithes Hathewayi</i> , Matthew.		
<i>Microdiscus bellimucronatus</i> Shaler & Foerste, mut. insularis, n. mut.	Manuel's Brook.	Protolenus Zone.
<i>Agraulos</i> (<i>Strenuella</i>) <i>strenua</i> , Billings, mut. <i>robusta</i> n. mut.	Red limestones of Brigus; calcareous shales of Manuel's Brook.	do
<i>Strenuella</i> (?) <i>Attleborensis</i> , Shaler & Foerste.	Manuel's, Conception Bay, Nfld.	do
<i>Mut. vigilans</i> , n. mut.	Manuel's, Conception Bay.	do
<i>Micmacca Walcottii</i> , Matthew	" shale No. 3, Conception Bay.	Above basal conglomerate, Protolenus Zone.
" <i>Angimargo</i> , Matthew.	do	do
<i>Avalonia plana</i> , Matthew.	do	do
<i>Protolenus Howleyi</i> , Walcott sp. (?) non P. Harveyi	Foster's Point, Smith's Sound.	Lower part of Protolenus Zone.
<i>Metadoxides magnificus</i> , Matthew.	Manuel's Station, Conception Bay, Nfld.	do
<i>Atops trilineatus</i> , Emmons.	Manuel's Brook (??)	Subzone of Paradoxides bed (?)
<i>Erinnys breviceps</i> , Angelin.	Manuel's Brook.	" Paradoxides Davidis sub-fauna.

* Italicized names being those new to science and just published (*loc. cit. supra*.)

III.. *The Etcheminian Fauna of Smith Sound, Newfoundland.* By Dr. G. F. Matthew.

The fossils described under this head "are from the Upper Limestone of the Etcheminian series at Smith, Sound an inlet of

Trinity Bay, Newfoundland (one is from the shale immediately below the limestone), and were collected in the summer of 1898."

They include the following forms :

BRACHIOPODA.

Obolella, cf. *O. chromatica*, Billings.

Kutorgina granulata, Matthew.

GASTEROPODA.

Scenella, cf. *S. reticulata*, Billings.

" cf. *retusa*, Ford.

Randomia Auroræ, Matthew.

Parmophorella (?) *paupera*, Billings, sp.

Platyeras transversum, Matthew.

" *radiatum*,^{*} Matthew.

" *cymbula*, Matthew.

LAMELLIBRANCHIATA.

Modiolopsis thecoides, Matthew.

ANNELIDA.

Urotheca pervetus, Matthew.

Helenia granulata, Matthew.

Hyalithellus micans, Billings.

(?) *flexuosus*, Matthew.

Coleoides typicalis, Walcott.

Orthotheca pugio, Matthew.

" *sica*, Matthew.

" *stiletto*, Matthew.

" *bayonet*, Matthew.

Hyalithes excellens, Billings.

" *rugosus*, Matthew.

CRUSTACEA.

Aptychopsis terranovicus, Matthew.

" " *mut. arcuata*,

These three papers are published in consecutive order in the *Trans. of the Royal Society of Canada* and form pp. 39—119 of Vol. V, second series, and contain eight plates of illustration of species described in the text. They form one of the most important additions made to our knowledge of the oldest fossils.—H. M. A.

In the Geological Magazine, Vol. 6, No. 8, August, 1899, pp. 358-361, Mr. F. R. Cowper Reed of the Woodwardian Museum, describes "*A New Trilobite from Mount Stephen, Field, B.C.*" A new species of *Oryctocephalus*, *O. Reynoldsi*, is the name given by Mr. Reed from the calcareous shales of Mount Stephen—the trilobite bed—referred to the Upper Cambrian by Dr. Matthew and the Middle Cambrian by Dr. Walcott.—H. M. A.

REPORT OF THE ENTOMOLOGICAL BRANCH, 1899.

(Presented at meeting held December 12th, 1899.)

The Leaders of the Entomological Branch are pleased to report that there has been a marked increase in the work done by this Branch during the year. A welcome addition to its ranks is Mr. Arthur Gibson, a new assistant in the Entomological Division of the Central Experimental Farm.

Considerable additions have been made to local lists, particularly of Nocturnal Lepidoptera, which have been specially collected and bred by Messrs. Fletcher, Gibson, Young and Henry Saunders. Some of the more interesting species of moths and caterpillars are shown here to-night, and will we trust be of interest to the members of the club, and an inducement to some to join the Branch and help in this interesting and useful work.

The publication of Dr. Holland's exquisite Butterfly Book is a notable addition to the literature of entomology, and provides the beginner with a most valuable aid to his studies of our most attractive insects. This beautiful work will enable anyone who wishes to study our butterflies to easily identify any species he is likely to capture in the district.

Those who may desire to study practical entomology have many aids available in the various official reports and publications issued by the several Governments in Canada, as well as by the U. S. Department of Agriculture and the numerous State Experiment Stations.

Many additions have been made to the public collections of insects at the Central Experimental Farm and the Geological Survey, as well as to the private collections of the Leaders, all of which are freely accessible to any person wishing to examine them.

LEPIDOPTERA.—Good work has been done in this order, in breeding from the egg or from larvæ collected in the field, as well as in collecting at electric lights. Some nice specimens of *Scopelosoma* were bred from eggs collected in Montreal, and sent to Dr. Fletcher, by Mr. Dwight Brainerd of that city, of these the perfect insects of *Scopelosoma tristigmata* and *S. morrisoni* as well as one of *S. sidus* taken at the Mer Bleue, are shown here to-night. *Erebiu epipsodea* was reared to maturity from eggs received by post from Banff, in the Rocky Mountains, and collected by Mr. N. B. Sanson. Mr. C. H. Young bred a large number of the beautiful Io moth, *Hyperchiria Io*, from eggs laid by a captured female taken in the month of August. A large proportion of the moths emerged last autumn, which is rather unusual. Others remained in the cocoons and will not emerge until next spring.

Among the specimens of moths shown this evening are two, *Smerinthus modestus* and *Brephos infans*, which are interesting for the reason that although reared from the egg with several others, these two specimens instead of emerging at the usual time, in the spring following pupation, remained in the pupal condition for a whole year longer and the perfect insects only appeared last spring.

The Leaders wish to call special attention to a remarkably beautiful collection of inflated caterpillars collected at Ottawa and prepared by Mr. C. H. Young. There are in this collection over 100 specimens which will serve to show the value of this method of preserving for study and exhibition a stage in the development of *Lepidoptera* which has been very much neglected by entomologists.

Of the injurious species of this order, special mention must be made of the serious attacks of the American and Forest Tent Caterpillars, which devastated forests and orchards in many places in the district, but not in exactly the same areas as in previous years. Late in the season serious injury was wrought in turnip fields and on cabbages of many varieties by the small, active caterpillars of the Diamond-backed Moth, (*Plutella cruciferarum*). The parasites which usually accompany a serious outbreak of this insect *Limneria parva* and *Phæogenes discus* were found, but not in the large numbers ordinarily occurring. Late in the season much

damage was observed upon forest trees of various kinds by the caterpillars of a small moth, not yet identified, which webbed the leaves together and consumed much of their substance. Maples and beeches were the trees most attacked.

DIPTERA.—A subject which has been of considerable interest to the Leaders is an injury to new bricks, previous to burning, brought to their notice by Mr. Walter S. Odell. The larvæ causing the injury travel up from the ground and burrow in the surface of the soft bricks, thus disfiguring them very much. On two or three previous occasions larvæ have been submitted by Mr. Odell, but it was not until the present season that the perfect insect was reared. Dr. Howard, of Washington, to whom a specimen was sent for determination, reports the species to be *Pachyrhina sodalis*, Loew. This is one of the Tipulidæ, or Crane-flies, the larvæ of which are known by agriculturists as Leather-jackets, many of which are extremely injurious to growing crops. The injuries of the above-mentioned species have been noticed in the brickyards both in autumn and spring, showing that this curious habit is manifested not merely at the time when the larvæ are seeking suitable places for pupation.

Among injurious flies one of the notable attacks of the past season has been that of root-maggots (Anthomyidæ) to all cruciferous crops. Another species of the same family has been troublesome this year by its attacks upon the young shoots of various species of cultivated Dianthus, and also of the elegant garden plant *Gypsophila paniculata*. This last attack has been observed for some years, but was first noticed this season by Mrs. M. J. Whelan, by whom specimens were sent to the Leaders.

A preliminary list of Ottawa Diptera and some notes upon these insects will be presented by Mr. Harrington this evening, illustrated by specimens of many of the species.

HEMIPTERA.—In this order some investigations have been made upon the local species of Scale-insects and Plant-lice. The most remarkable occurrence of these insects has been a severe attack upon Elm-trees, during the month of August, by a species of plant-louse, which appeared so abundantly upon shade-trees as to render sitting or walking beneath them exceedingly unpleasant.

by reason of the copious showers of honey-dew which were ejected. Sidewalks and seats beneath such trees were made both unsightly and disgusting. Later, the trees themselves took on a dirty black appearance from the copious growth of the fungus *Fumago salicina*, which always develops under similar conditions.

Another attack which requires mention was by a large and previously undescribed Aphid, the Destructive Pea-louse, which not only did considerable harm to Sweet Peas in Gardens at Ottawa, but was a most serious pest to crops of Field Peas in many parts of the Dominion as well as in the United States. This insect has been named *Nectarophora destructor* by Prof. Johnson of College Park, Md. Several species of its enemies were collected in the field or bred from Ottawa individuals. Among these the following have been identified: *Praon cerasaphis*, *Aphidius Fletcheri*, Ashmead (N. sp.); *Syrphus ribesii*, *Coccinella 9-notata*, and *C. transversoguttata*.

In conclusion, the Leaders again invite all interested in the study of insects to make the fullest use of them during the season 1900, whether they should be re-appointed as Leaders or not.

W. H. HARRINGTON, }
JAMES FLETCHER, } *Leaders.*

REVIEWS.

REPORT ON THE GEOLOGY AND NATURAL RESOURCES OF THE AREA INCLUDED BY THE NIPISSING AND TEMISCAMING MAP SHEETS, COMPRISING PORTIONS OF THE DISTRICT OF NIPISSING, ONTARIO, AND OF THE COUNTY OF PONTIAC, QUEBEC. By Alfred Ernest Barlow, M.A. Geological Survey of Canada, Pt. I, Annual Report, Vol. X, 1899, p. 302.

This report, accompanied by two well executed maps on a scale of four miles to the inch and covering an area of 6912 square miles of the northern protaxis of the Dominion of Canada, is a valuable addition to the literature of the pre-Cambrian of North America, and is a further instalment of the work which is being systematically carried forward by the Dominion Geological Survey

on these older rocks. The two maps, constituting what are known as sheets Nos. 131 and 138 of the Canadian Series, lie in the Upper Ottawa district along the border of the two provinces of Quebec and Ontario, and comprise portions of both. Lake Nipissing and Lakes Temagami, Temiscaming and Keepawa, as well as many smaller bodies of water, are included in the area, and afford along their shores especially good opportunities for the prosecution of geological work.

After presenting a general account of the early explorations in this region, some of which date back almost to the time of the earliest settlement of the country by the French, and of previous surveys, the physical features of the country are described. The area is a great uneven or gently undulating rocky plateau, sloping somewhat to the east and northeast, having a general elevation of of 900 to 1200 feet above sea-level, the level being so nearly uniform that hills 50 to 100 feet higher are conspicuous topographical features. This peneplain is traversed in a north and south direction along one line of a very deep and rocky gorge, in which lie Lake Temiscaming and the Ottawa River. The hills, or cliffs, rise to a height of 400 to 600 feet from the water on either side, while the water of the lake is 400 feet deep, the bottom of the gorge being filled with a fine silt. The depression is thus 1000 feet deep and represents a great canon similar to those which are found on the margin of the northern protaxis at so many other points. Several smaller rivers also occupy similar depressions. "The detailed examination of the region, however, amply demonstrates that the sculpturing to which the surface owes its present configuration was practically completed long before the advent of the glacial epoch, and that the main valleys, especially those of the Ottawa and Mattawa rivers, were in existence long prior to the deposition of the Palæozoic sediments." With the exception of some comparatively small areas occupied by Palæozoic outliers, ranging in age from Black River to Niagara, the district is underlain by rocks of Laurentian and Huronian age. The Laurentian, with the exception of a few small occurrences, is represented exclusively by the Fundamental Gneiss, a mass of granitic and dioritic rocks, usually possessing a foliated structure in which are many streaks, bands or inclusions of basic character, allied to

diorites or diabases in composition and representing either basic segregations from the granitic magma or portions of basic intrusions caught up in it. This Fundamental Gneiss, it is believed, probably represents the original crust of the earth which has undergone successive fusions and re-cementations before reaching its present condition. In placing these rocks at the base of the series it is not intended to assert that they stand for any distinct or prolonged period of geological time, nor to affirm that these rocks in their present condition and with the foliation which they now possess antedate those of the Huronian system. This, as is shown, is not the case in many, or even probably in most, instances.

The chemical and mineralogical composition of the gneisses, as well as the character and origin of their foliation and the genetic relation of their associated pegmatites, are considered at length and many interesting facts brought forward which cannot here be further discussed.

The Grenville Series, so extensively developed further south, is in this northern area represented only by a very small and unimportant occurrence of highly crystalline limestone and a single occurrence of gneiss. They occur isolated from one another and surrounded by Fundamental Gneiss on every side, and are referred to the Grenville Series on account of their identity in petrographical character with the areas of this formation immediately to the south.

The district also includes large tracts of country underlain by pyroclastic and epiclastic rocks, forming a northeasterly extension of the development of the "typical" Huronian area on the north shore of Lake Huron. At one place on Lake Temiscaming, these Huronian rocks are found resting upon the floor of Fundamental Gneiss on which they were originally deposited, and of whose detritus they are made up; everywhere else the Fundamental Gneiss has been re-fused or softened and penetrates the superincumbent Huronian. The total thickness of the Huronian in the area is about eighteen hundred feet, made up as follows: 1. Breccia Conglomerate, 600 feet. 2. Shales and slaty greywackes, 100 feet. 3. Quartzose grit or Arkose, 1100 feet. Associated with these Huronian sediments are numerous intrusions of

gabbro and diabase, some of which pass over gradually into flesh-red granites, representing, it is believed, portions of one and the same magma.

No attempt is made in this report to correlate the Grenville Series and the Huronian of the area, as the facts are insufficient to warrant the attempt. And it may be remarked incidentally in this connection that a statement made on page 415 of the current volume of the *Journal of Geology*, in reviewing some other recent papers on the Canadian pre-Cambrian, is scarcely correct. The statement is as follows :

“The succession and correlation proposed in the above papers by Adams and Barlow and by Ells are fundamentally different from the traditional one which has been held in Canada for many years. The first departure is in placing the Grenville and Hastings Series as equivalent to the Huronian.”

In the papers in question this correlation was not definitely made, but it was stated in reference to the Hastings Series that “Both lithologically and stratigraphically the rocks bear a striking resemblance to the rocks mapped as Huronian in the region to the north and northeast of Lake Huron, and it seems very likely that the identity of the two series may eventually be established. The two areas, however, are rather widely separated geographically and the greatest care will have to be exercised in attempting such a correlation.”*

The further statement made by the Reviewer that “Ells places with the Huronian all the sedimentary rocks of Eastern Canada” is also manifestly inaccurate, seeing that while it might terminate the controversy concerning the upward extension of the Huronian to include in that system the whole Palæozoic succession, Ells certainly did not advocate this course.

The Palæozoic outliers in this area, and especially that of the Niagara age, are of exceptional interest. Geographically this outlying patch of Niagara is so widely separated from any other locality where rocks of this age are known to exist, that it has been a question as to whether it was formerly connected with the occurrences about Hudson Bay or with those about Lake Ontario.

**American Journal of Science*, Vol. III, March, 1897, p. 177.

The strata are highly fossiliferous and the palæontological evidence presented seems to prove that the seas in which the Niagara sediments of the Winnipeg basin and of Hudson Bay were deposited were practically continuous, while both were separated from the Temiscaming basin and the region to the south west.

The Pleistocene history of the region seems to consist of a period of glaciation by a great ice sheet followed by profound submergence, during which time the ocean invaded a large portion of the Ottawa Valley forming a marine gulf rivalling in extent the similar invasions of the sea in Palæozoic times. The direction of motion of the ice varies from S. 7° W. to S. 18° W.

The report also contains much information concerning the fauna, flora and timber resources of the district, and has appendixes giving lists of elevations and catalogues of the Palæozoic fossils.

F. D. ADAMS.

CANADIAN GEOLOGICAL NOMENCLATURE. By Dr. R. W. Ells.
Trans. Roy. Soc. Can., Vol. V, 2nd Ser.; Sec. IV, pp. 3—38.

In this important contribution to the Science of Geology, Dr. Ells, as president of Section IV of the Royal Society of Canada, discusses the problems still existing in Canadian geology, the new names added to the geological nomenclature of Canada, the history and development of the present classification employed in this country, followed by a discussion of the nomenclature in "the Great Archæan Complex with its vast series of overlying palæozoic sediments reaching upward in the geological scale to the Triassic formations" included in that portion of Canada, east of the Red River of Manitoba. Dr. Ells indicates clearly the various terms used in Nova Scotia and New Brunswick as well as in Ontario and Quebec.

It may not be deemed out of place here however to point out that, for instance, such names as "Dadoxylon sandstone," "Cordaile shales" and "Mispec group," as applied to the Devonian formations, are not, in the strict acceptance of the word, for-

mational names, but indicate rather, in two cases at least, a biological zone, a life-zone. The term "Perry sandstone" is also referred to (p. 14), and as is the case also of similar nomenclature in the gold-bearing series of Nova Scotia, no true formational names are assigned. For such names as the "Perry sandstones" the "Perry formation" could be easily adopted; for "Mispec group" the term "Mispec formation" employed, whilst substitutes are decidedly necessary for such expressions as "Dadoxylon sandstone," "Cordaite shales," etc., which refer to biological characters rather than stand as names of a definite formation. Dr. Ells has given us in this interesting address the nomenclature used up to recent years. It is manifestly high time, especially in Eastern Canada, that some new and more modern classification be adopted. Formational names ought to be given to the slate and quartzite series in the gold-bearing series of Nova Scotia. If areas exist which can be mapped out over extensive tracts, why not adopt some name which will be applied for instance, one to the lower and another name for the upper division of the gold-bearing rocks of Nova Scotia. The last statement refers more particularly to the nomenclature used in the excellent reports and on the maps of Mr. E. R. Faribault, where the names "slate series" and "quartzite series" are employed as formational names but are names merely based on a description of their lithological characters. Dr. Ells's paper is full of suggestions, and deserves careful perusal.

H. M. A.

SOIRÉES.

The first soirée in the winter course was held in the assembly hall of the Normal School, November 28th, when Prof. John Macoun occupied the chair. Dr. MacCabe principal of the Normal School, in a brief and forcible address bade the club welcome. He spoke of the educational work done by the club and emphasized the necessity of field work in the study of nature. Dr. H. M. Ami, the president of the club, then delivered his inaugural address, speaking of the work accomplished by the late E. Billings, who by his energy and patient research did so much for palæon-

tology in Canada. The president then referred to the necessity of erecting some suitable tablet or memorial in Ottawa to his memory, as it was here that much of his best work was done. Reference was also made to the death of Sir J. W. Dawson. Appended to the biographical sketches of E. Billings and Sir Wm. Dawson were lists of the writings of each of these two Canadian palæontologists and geologists. Sir James Grant also referred to the work done by the late E. Billings, with whom he had been associated in his geological rambles in and about Ottawa, and hoped that a suitable memorial would be erected to commemorate his life-work.

Mr. S. B. Sinclair then gave an interesting address on nature study and modern methods in scientific research.

A short intermission was then given during which the audience examined the various interesting objects on exhibition. Microscopes under the management of Messrs. Odell, Halkett, Attwood and others, were well patronized. Among the exhibits that were much appreciated was a fine collection of recent shells, shown by Mr. Thomas Whitley, also four cases of Ontario butterflies and moths from the private collection of Mr. Arthur Gibson of the Central Experimental Farm. Mr. R. B. Whyte showed an excellent photograph of *Cypripedium pubescens*. Prof. E. E. Prince exhibited the head of the great Lake Trout, and Dr. H. M. Ami showed photographs of geological phenomena about Ottawa, fossils from the Utica and pleistocene of Ottawa, and human remains from Lighthouse Island, Aylmer, collected in 1899. Messrs. S. B. Sinclair, and D. A. Campbell then gave an exhibition of lantern views showing the Minute Structure in Flowering Plants. Mr. Campbell explained each view as it was thrown on the screen, pointing out the different kinds of cells which make up the various parts of the plant. The lantern used was that recently purchased for the use of the Normal School and through the kindness of Dr. MacCabe, was placed at the disposal of the club for this and other soirées.

The second soirée was held in the Assembly Hall of the Y. M. C. A. on December 12th. In the absence of Dr. Ami,

President of the Club, Prof. John Macoun occupied the chair and gave a short opening address in which he pointed out the educational value of natural history studies to young people. Mr. W. H. Harrington then read his paper on "Ottawa Diptera." He spoke of the different species of flies, mentioning those that were injurious to cereals, etc. He also referred to diseases, and to the habit of grocers placing fruits and berries on the sidewalks exposed to flies which only a moment before may have come from some decaying animal or vegetable matter.

Dr. James Fletcher, of the Experimental Farm, then gave a most interesting address on "The Rearing of Insects," and showed what great pleasure and profit might be obtained from watching an insect develop through all its stages. He also gave many valuable hints to beginners as to the details. Mr. Arthur Gibson, Mr. Fletcher's assistant, followed with a paper on "Some Interesting Moths Taken at Ottawa." All three papers were illustrated by suitable collections, and Master Louis Burland showed a box of minerals and fossils neatly labelled. An interesting discussion followed, in which a number in the audience took part, and further information was elicited by questions.

The thirdsoirée, was held in the Assembly Hall of the Y. M. C. A. There was a good attendance of members and strangers. Zoology, Ornithology and Geology formed the topics of the evening.

Prof. E. E. Prince, B.A.; F.L.S., gave a most interesting paper "On the Comparative Anatomy of the Ear," in which he traced the unity of structure and arrangement in that organ from the lowest organism up to the highest and the special adaptation of that box or mechanical contrivance to receive vibrations and impart them to the nerves connected therewith. By means of a beautiful series of coloured and exquisitely prepared and original slides thrown upon the screen, Prof. Prince illustrated the anatomy of the "true ear" in jelly fishes, worms, mollusks, birds, fishes, reptiles and vertebrates. An interesting discussion followed this paper in which Messrs. Kingston, Whyte, Evans and the lecturer took part.

Mr. Andrew Halkett, of the Marine and Fisheries Department, then read his paper "On Gannets and Cormorants, with Special Reference to Canadian Forms." This paper was full of interesting notes of observations made in the field and along the shores of the Atlantic and Pacific in British North America.

(1) "Note on the Occurrence of *Ranopleurides* in the Upper Trenton (Ordovician) of Parliament Hill, Ottawa, (Canada)"; (2) "On a new species of *Turrilepas* from the Trenton limestone of Governor's Bay, Ottawa, Canada," are the titles of two brief papers presented by Mr. H. Ami, in which he give descriptions of two species supposed to be new to science. The first was a trilobite from the Upper half of the limestone beds of Parliament Hill, Ottawa, whose affinities came close to *Ranopleurides Canadensis*, Billings, described from the Chazy of the Township of Clarence, some 500 feet lower down in the series of Ordovician strata in the Ottawa Valley.

The other was a 'barnacle' or cirripede from Governor's Bay, of which one of the small opercular valves was discovered on the occasion of one of the Club's Excursions last April, 1899. Its nearest ally is *Turrilepas Canadensis*, Woodward, from the Utica of Gloucester, opposite the Old Rifle Range. Mr. Ami then drew the Club's attention to Prof. W. H. Hobb's interesting paper "On the Diamond-field of the Great Lakes" and gave an abstract of its contents, illustrating his remarks on the discovery of the eight diamonds in Wisconsin, Ohio and Michigan glacial gravels by means of lantern slides in which the probable source of the glacial drift of three states was traced to Canada from the detritus brought down by the Labradorean or Keewatin glaciers or both.

"Principal Places of Geological Interest about Ottawa" was then discussed by the President and illustrated by means of lantern slides. Dr. Fletcher, Messrs. A. W. Brock, R. B. Whyte and others took part in the discussion which followed the reading of these geological papers.

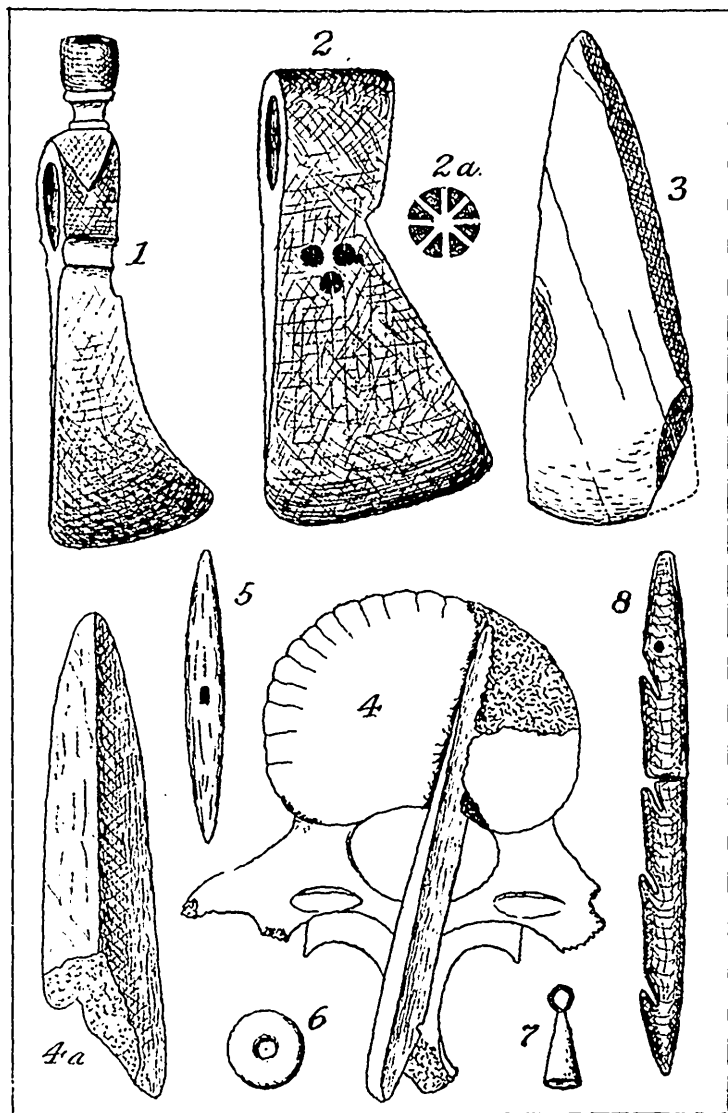
NOTES.

In a review of a paper by Prof. T. R. Jones and Dr. Henry Woodward on *Belinurus grandævus*, a new species of Palæozoic Limuloid Crustacean from the "Eo-Carboniferous" of Riversdale, N.S., it is stated on page 208 of this journal that *Belinurus* has not been found in rocks of earlier age than the Coal Measures. In Geikie's Text Book of Geology, however, this genus is mentioned as occurring with *Pterygotus*, *Bothriolepis*, *Coccosteus*, *Pterichthys*, *Glyptolepis* and other typical Lower Devonian and Silurian forms in the Kiltorcan beds of Ireland. Thus the inference drawn in the conclusion of this article that these rocks are Carboniferous does not seem to be sustained. May it not on the other hand be assumed that "The faunæ of the seas of the Lower Carboniferous, Coal formation and Permian periods, both in Europe and America, present so great similarities that they may, in a broad view of the subject, be regarded as identical;"* while for "Lower Carboniferous," according to correlations of the fossils from these strata in New Brunswick and Nova Scotia made recently by Professor Kidston and Dr. David White, as recorded by Mr. J. F. Whiteaves in his "Address on the Devonian System in Canada," must we now say "Lower Devonian"?

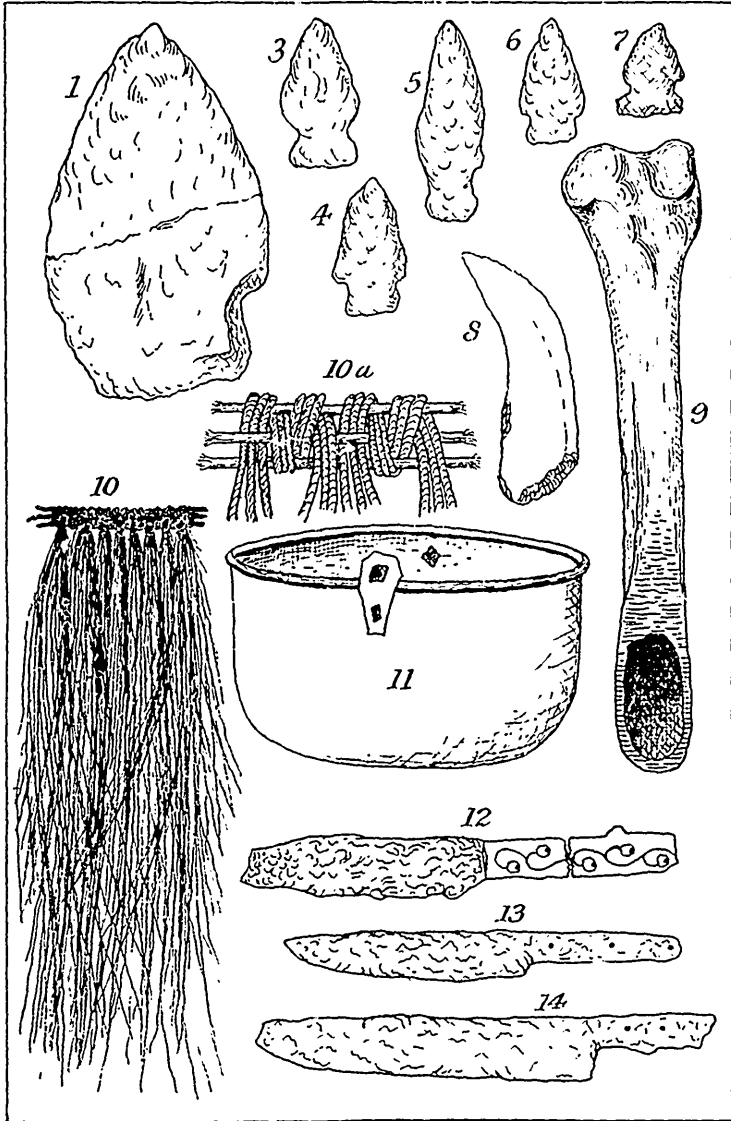
R. W. E.

Mr. Sinclair, M.A., Vice-Principal of the Normal School, has been granted leave of absence for one year. He expects to spend most of the year at Chicago University where he has recently been awarded an honorary post graduate fellowship in the Department of Pedagogy. The fellowships of which there are only two granted by the University are given in recognition of original Educational research. He also expects to spend several months observing European schools. During his six years stay in Ottawa he has been librarian of the O. F. N. C.

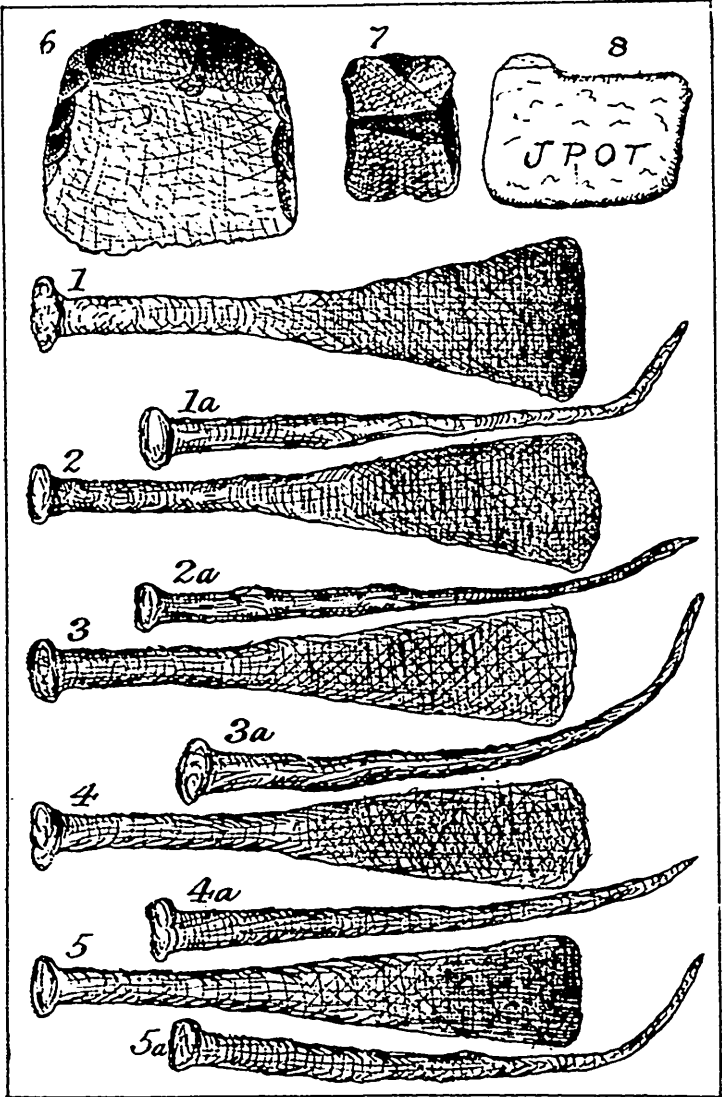
* Acadian Geology, page 283.



To illustrate Mr. T. W. E. Sowter's paper, "On the Archæology of Lake Deschênes, Aylmer, Que."



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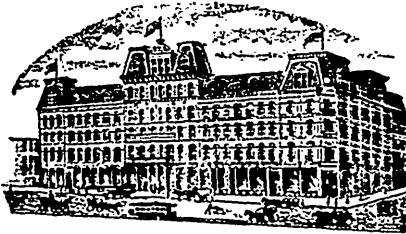
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