EXTRACTED FROM THE OTTAWA NATURALIST, VOL. XI, NO. 1, PP. 20-26,
OTTAWA, APRIL, 1897.

CONTRIBUTION

TO THE

PALÆONTOLOGY OF THE POST-PLIOCENE DEPOSITS

OF THE

OTTAWA VALLEY

—BY—

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CONTRIBUTION TO THE PALÆONTOLOGY OF THE POST-PLIOCENE DEPOSITS OF THE OTTAWA VALLEY.

By HENRY M. AMI, M.A., D.Sc.

In connection with the Pleistocene fossils of the Ottawa district, the writer has brought together a few notes which may be deemed of service to those who wish to carry on further investigations in this promising field. Most of the evidences of fossil marine organisms in the sands, clays and gravels about Ottawa will be found in the accompanying lists which include the result of the investigations and identifications of species by Sir William Dawson, by Prof. Penhallow and by the writer. To these are added determinations of specimens from two shell-made deposits which may be taken as typical or representative of similar deposits elsewhere in the Ottawa Valley.

MARINE DEPOSITS.

(1) In his "*Geological History of Plants*"* Sir William Dawson has recorded the following species of fossil plants from the nodules found at Green's Creek by himself and other collectors:

1. Potentilla Canadensis.
2. Drosera rotundifolia.
3. Acer spicatum.
4. Gaylussaccia resinosa.
5. Populus balsamifera.
6. Thuja occidentalis.
7. Potamogeton perfoliatus.
8. " pusillus.
9. Equisetum scirpoides.
10. Fontinalis, sp.
11. Fucus or Ulva, sp.
12. Carices and Gramineæ, several species.

Regarding these plants, Sir William argues (p. 232): "I regard the plants above-mentioned as probably belonging to the period of greatest refrigeration of which we have any evidence," and then goes on to say: "of course, not including that mythical period of universal incasement in ice of which I have elsewhere endeavoured to show in so far as Canada is concerned, there is no evidence whatever."

(2) In his "*Contributions to the Pleistocene flora of Canada*"† Prof. D. P. Penhallow has noted the occurrence of many species

*Intern. Scientific Series, Vol. LVI, 1892.

†Trans, Royal Soc. Canada, Vol. II, New Series, Sect. IV, pp. 59-77, Ottawa, 1896.

of trees and plants in the concretionary nodules found in the marine clays of Green's Creek, Besserers, &c., in the Leda Clay formation (Pleistocene) of the Ottawa Valley. From the collections of nodules recently made at Besserer's Grove and sent to Prof. Penhallow for examination by the writer he has recognised the following interesting flora as may be gathered from a letter recently received from Dr. Penhallow.

1. Betula lutea.
2. Cyperaceæ.
3. Equisetum limosum.
4. Fucus digitatus.
5. Hypnum fluitans.
6. Populus balsamifera.
7. " grandidentata.
8. Potamogeton perfoliatus.
9. " pusillus.
10. " rutilans.
11. Potentilla Anserina.
12. Vallisneria sp.
13. Typha latifolia (?).

(3) From Green's Creek Prof. Penhallow records the following species of fossil plants (pp. 74 and 76, loc. cit. supra.)

1. Acer saccharinum.
2. Algæ sp.
3. Brasenia peltata.
4. Bromus ciliatus.
5. Cyperaceæ.
6. Carex Magellanica.
7. Drosera rotundifolia.
8. Equisetum limosum.
9. Equisetum scirpoides.
10. Equisetum sylvaticum.
11. Fontinalis? sp.
12. Fucus digitatus.
13. Gaylussaccea resinosa.
14. Gramineæ, sp.
15. Oryzopsis asperifolia.
16. Populus balsamifera.
17. Populus grandidentata.
18. Potamogeton pectinatus.
19. Potamogeton perfoliatus.
20. Potamogeton pusillus.
21. Potamogeton rutilans.
22. Potentilla Anserina.

Taking the first lists and putting them together we have altogether a series of not less than twenty-six species of fossil plants from the calcareous nodules of Green's Creek and Besserers, a few miles below Ottawa City.

We are confident in stating that this number will probably be doubled before many years if the members of the Geological section of the Club make it a point to visit the localities in question and obtain more material. We have a number of other collections which have afforded the following species.

(4) STEWART COLLECTIONS—A.--Collected along the banks

of Green's Creek, near the bridge at Cyrville, Russell, Ontario by John Stewart, 1893.

1. Saxicava rugosa, L.
2. Leda (Portlandia) arctica, Gray.
3. Balanus crenatus, Bruguière.
4. Mallotus villosus, Cuvier.

B.—Collected along the banks of Green's Creek and the Ottawa River near the mouth of the Creek, Gloucester, Russell County, Ont. John Stewart, 1893.

1. Macoma fragilis, Fabricius.
2. Saxicava rugosa Linn.
3. Leda (Portlandia) arctica gray.
4. Cylichna alba or C. minuta.
5. Balanus crenatus, Bruguière.
6. Mallotus villosus, Cuvier.
7. Cottus uncinatus, Reinhardt.

(5) *Graham's Brickyard, Ottawa East*, collected by H. M. Ami, 1893.

1. Macoma fragilis, Fabricius.
2. Macoma calcarea? Chemnitz.
3. Leda (Portlandia) arctica, Gray.
4. Cylichna alba, Brown.
5. Balanus crenatus, Bruguière.
6. Natica affinis, Gmelin.

(6) Nepean, Ont. right bank of the Rideau River and Canal, Manotick Road. Collected by R. H. Campbell, 1891-92.

1. Macoma fragilis, Fabricius.
2. Saxicava rugosa, Linnæus.
3. Saxicava rugosa, var.
4. Mytilus edulis, Linn. (very abundant).
5. Balanus crenatus, Bruguière. A large variety of this species or a form intermediate between B. crenatus and B. Hameri.

(7) About two miles from Metcalfe, Ontario, collected by G. H. Wilson, Ottawa, August 20th, 1895.

1. Macoma fragilis, Fabricius.
2. Mytilus edulis, Linn.
3. Balanus crenatus, Bruguière.

(8) MacGregor's Lake, two miles north of Perkin's Mills, Que. 450 above sea level, collected by Dr. R. W. Ells, 1893.

1. Saxicava rugosa, Linn.—In great numbers, and with a remarkably thick test.

(9) Near Cantley, Que.: collected by Dr. R. W. Ells, 1893.

1. Macoma fragilis, Fabricius.
2. Saxicava rugosa, Liun.
3. Leda (Portlandia) arctica, Gray.

(10) *Besserer's Grove, shore of Ottawa River, Ontario side, in calcareous nodules.* Collected by Dr. R. W. Ells, 1893.

1. Mallotus villosus, Cuvier.
2. Leda (Portlandia) arctica, Gray.
3. Saxicava rugosa, Linnæus.
4. Populus balsamifera.

Also a large number of fossil plants which are no doubt similar to these described by Prof. Penhallow from the same locality.

(11) *Chelsea, Que., about 1500 paces north of Chelsea Station along the Ottawa and Gatineau Valley Railway*, May 26th, 1894. Collected by members of the Ottawa Field-Naturalists' Club.

1. Macoma fragilis, Fabricius.
2. Saxicava rugosa, Linnæus.
3. Balanus crenatus, Bruguière.
4. Leda (Portlandia) arctica, Gray.

(12) *Carp Station, Ottawa, Arnprior & Parry Sound Railway, Carp Village, Ontario.* In a coarse, stratified gravel deposit. Collected by H. M. Ami, 1894.

1. Saxicava rugosa, Linnæus.
2. Macoma fragilis, Fabricius.
3. Balanus crenatus, Bruguière.

(13) *Odell's brickyard, Ottawa East, in the Leda clay formation.* Collected by W. S. Odell, Esq., H. M. Ami etc. 1889-1896.

1. Craniella Logani, Dawson sp.
2. Thuja occidentalis.—Branches of cedar tree fairly well preserved.
3. Macoma fragilis, Fabricius.
4. Saxicava rugosa. Linnæus.
5. Polystomella crispa.
6. Dentalina sp.
7. Nonionina sp.
8. Discorbina sp., and other species of foraminifera.
9. Leda (Portlandia) arctica, Gray.
10. Phoca, sp.
11. Eschara elegantula, d'Orbigny.

In the Geology of Canada 1863, the chapter on "Superficial Geology" contains interesting remarks upon the post-tertiary formations of the Ottawa Valley, and amongst the species of fossil organisms recorded on pp. 916-917, from Green's Creek* are the following: †

(14) *Green's Creek, Ottawa River*, collected by Sir William Dawson and members of the Geol. Survey Staff.

1. Cyclopterus lumpus.
2. Cottus sp.
3. Tellina Grœnlandica (Macoma fragilis)
4. Saxicava rugosa, L.
5. Drosera rotundifolia.
6. Trifolium repens.
7. Potentilla Norvegica.
8. Potentilla tridentata.
9. Potentilla Canadensis.
10. Arctostaphylos uva-ursi.
11. Populus balsamifera.
12. Potamogeton perfoliatus.
13. Potamogeton natans.
14. Mallotus villosus.**

* Green's Creek enters the Ottawa River at 118 feet above sea-level.

† Many of which were recorded from observations made by Principal (now Sir Wm.) Dawson. To these may be added a species of Gasterosteus, sp. indt.

** Also found at Lake Chaudiere, 183 ft. above tide; on the Madawaska, 206 ft. above tide, and at Fort Coulonge, 365 ft. above tide.

(15) *At Grenville, on the Lower Ottawa*, 120 feet above the level of the sea, the following species were found and are recorded on p. 917 of the "Geology of Canada," 1863:

1. Saxicava rugosa,
2. Tellina Grœnlandica (Macoma fragilis).
3. Balanus Hameri.
4. Balanus crenatus.

(16) Amongst the earliest records of discoveries of fossils in the Ottawa Valley is that of a species *Phoca*, bones of which were found by the late Mr. E. Billings and sent to Prof. Leidy, of Philadelphia, who described the same and illustrated them in the Proceedings of the Academy of Sciences for 1856.* The bones of the posterior extremeties discovered were also figured in Vol. 1 of the Canadian Naturalist and Geologist, by Mr. Billings. There is also a portion of the pelvice arch of a *Phoca* in the collections of the Geological Survey.

Fossil Feather of Bird.—Several feathers of birds have been found during the past sixteen years.

In 1881, the Marquis of Lorne, presented to the Geological Museum at Ottawa a magnificent specimen of fossil feather, but the genus and species of the bird to which the feather belonged is still unknown. Since that time several specimens were collected and recorded by the writer from the nodules of the clays both at Green's Creek or along the Ottawa River at Besserer's, and are deposited in the Museum of the Geological Survey on Sussex st., Ottawa.

An interesting discovery of a portion of the limb-bone of a bird was made some years ago by Mr. Howell Bigger in one of the calcareous nodules imbedded in the marine clays of the Ottawa Valley, near Besserers, and presented to the writer. This specimen is now in the hands of Prof. O. C. Marsh, of the Peabody Museum of Yale College, New Haven, the most eminent authority on extinct birds in America, and he has kindly undertaken to report upon it in the near future.

(17) Wright's brick-clay pits, north of Moore's property,

* See also Can. Nat. & Geol. 1858, paper by Principal J. Wm. Dawson "On the newer Pliocene and post-pliocene deposits of the vicinity of Montreal, with notices of fossils recently discovered in them."

Aylmer Road, Tétreauville, Que., collected by H. M. Ami and Ruggles Wright, 1889.

In a sandy layer below some 30 feet of clay in the hill side:

1. Saxicava rugosa.
2. Phoca sp. probably young of Phoca vitulina.

Amongst the specimens recently acquired by the Peter Redpath Museum from the Pleistocene of the Ottawa Valley is that of a portion of the lower jaw of a young seal, *Pagophilus Grœnlandicus*. This species was recorded in the Report of the Geol. Branch for 1893-94,* and formed part of the collection of fossil organic remains which Sir James Grant had in his possession.

(18) *Dundas Co., Ont.*—Found in the front part of lot 9, concession V., township of Matilda. Collected by members of the Iroquois High School Natural Science Association, 1895-1896:

1. Macoma fragilis, Fabricius.
2. Saxicava rugosa, Linnæus.

This record from Dundas is, as far as we know, the most westerly one made of the occurrence of marine shells from raised beaches along the valley of the St. Lawrence between Montreal and Kingston; but bones of the *Beluga Vermontana* (a white whale) have been recorded from near Cornwall and in the Rivière Beaudette gravel beds.

(19) *Riviere Beaudette, Soulanges Co., Que.*—In this locality the late Mr. N. J. Giroux obtained the following species of marine organisms:

1. Macoma fragilis, Fabricius.
2. Macoma calcarea, Chemnitz.
3. Saxicava rugosa, Linnæus.
4. Leda (Portlandia) arctica, Gray.
5. Balanus crenatus, Burguière.
6. Balanus Hameri, very large and fine individuals in a beautiful state of preservation.
7. Beluga Vermontana

(20) *Fossil Insects.*—Green's Creek and Besserer's Grove, Ottawa River, in calcareous nodules:

1. Tenebrio calculensis, Scudder.
2. Byrrhus Ottawaensis, Scudder.
3. Fonax ledensis, Scudder.
4. Phryganea ejecta, Scudder.

Of these, No. 3 was collected at Green's Creek by Sir Wm. Dawson, and Nos. 1, 2, and 4 were obtained in nodules from the same locality by the writer.

Further researches will no doubt reveal an interesting insect fauna. So far, all our fossil insects from Green's Creek are forms which are not known as existing species to-day.

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* Ottawa Naturalist, Vol. VIII., No. 7, pp. 103-104, Ottawa, October, 1894.

(21) *Moose Creek.*—In the Pleistocene deposits of Moose Creek, Stormont Co., Ontario. Collected by H. M. Ami, 1890 and 1891.

The following species were obtained in the fine and coarse stratified sands and gravels north of the C.A.R. track :—

1. Tamias striatus, Linn.
2. Mytilus edulis, Linn.
3. Macoma fragilis, Fabricius.
4. Macoma calcarea, Chemnitz.
5. Saxicava rugosa, Linn.
6. Balanus crenatus, Bruguiere.

(22) *Ottawa City.*—Corner of Bank and Cooper streets, in the bluish gray plastic and somewhat arenaceous clays of the "Leda clay" formation :—

1. Mytilus edulis, Luinæns.
2. Macoma fragilis, Fabricius.
3. Leda (Portlandia) arctica, Gray.

The foregoing species were found in the marine beds of the Ottawa or St. Lawrence valleys ; but amongst the newer overlying deposits—of fresh water and estuarine origin,—marl deposits form a conspicuous and interesting group, and hold fossil shells, &c. Additional records from the Ottawa Valley have been prepared, and will, it is hoped, form the subject of a further contribution.

FRESH WATER DEPOSITS.

Among the interesting species recorded from shell-marl deposits in the Ottawa Valley are the following :

(23) Lake Clear, near Eganville,* Ontario.

1. Physa heterostropha.
2. Planorbis campanulatus.
3. Planorbis bicarinatus.
4. Paludina decisa.
5. Cyclas orbicularis.
6. Unio complanatus.
7. Anodonta fluviatilis.

(24) Hemlock Lake, New Edinburgh, east of Ottawa, Ontario. Collected by H. M. Ami, 1881 :

1. Valvata tricarinata.
2. Amnicola porata.
3. Physa heterostropha.
4. Planorbis campanulatus.
5. Planorbis bicarinatus.
6. Planorbis parvus.
7. Limnæa galbana, Binney. An extinct species.
8. Limnæa stagnalis.
9. Limnæa desidiosa.
10. Mesodon albolabris.
11. Mesodon albolabris var dentifera.
12. Mesodon Sayi.
13. Patula alternata.
14. Hyalina indentata.
15. Hyalina arborea.
16. Conulus fulvus.
17. Pisidium abditum.

These shells are found imbedded in a soft white calcareo-argillaceous matrix which has been utilized in the manufacture of white brick in the Ottawa Valley.

* Report of Progress, Geol. Surv. Can., p. 149, Montreal, 1857.