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Herwart Helmsteadt

Volume 2, Number 4, October 1966

URI: https://id.erudit.org/iderudit/ageo02_4rep04

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Publisher(s)

Maritime Sediments Editorial Board

ISSN

0843-5561 (print)

1718-7885 (digital)

[Explore this journal](#)

Cite this article

Helmsteadt, H. (1966). Upper Devonian Plant Fossils from Beaver Harbour, N.B.
Atlantic Geology, 2(4), 171–174.

Upper Devonian Plant Fossils from Beaver Harbour, N.B.*

HERWART HELMSTAEDT

Department of Geology, University of New Brunswick, Fredericton, N.B.

An assemblage of fossil plants has been found at Beaver Harbour, Charlotte County, southwestern New Brunswick, during a study of the structural geology of the area. Forms not previously reported from the area were found, as well as new fossil localities.

A distinct structural unconformity occurs in the Beaver Harbour area: relatively undeformed shales, sandstones, and conglomerates overlie sediments and volcanics of the Mascarene Group which have suffered polyphase deformation. The purpose of this paper is, on the basis of the plant assemblage, to confirm that the relatively undeformed sedimentary rocks are of Upper Devonian age. From such confirmation, it is apparent that the deformation of the Mascarene Group (Silurian) is pre-Upper Devonian.

The plant fossils were collected by the author during the 1966 summer season while carrying out field work for a structural analysis of the Coldbrook and Mascarene Groups in the Beaver Harbour region (see: Structural studies on the South Shore of New Brunswick, Maritime Sediments, 2-i 33, January 1966).

ALCOCK and PERRY (1960) correlated all non-metamorphosed strata north of the Proterozoic (?) Coldbrook Group at Beaver Harbour with the Mascarene Group, which they considered to be Silurian. Trilobites possibly of Silurian age have indeed been found recently in limestones at Buckman's Creek, Beaver Harbour. However, doubts on the Silurian age of parts of the Mascarene Group in this area have previously been expressed by ELLS (1907) on the basis of certain plant remains with Devonian aspects.

MATTHEW (1912) described two fossil plants, Himantophyton castoreense Matthew, and Arthrostigma arietense Matthew, members of the Psilophyton flora, from Beaver Harbour. It is interesting to note that he recognized the unconformable relationship between the plant bearing beds, which he thought to be of Silurian age, and the older rocks to the north.

In more recent time it was CUMMING (1963) who distinguished the plant-bearing strata from the Mascarene Group and regarded them as Devonian. He stated that "this belt of rocks extends from Deadman Head to the north-east side of Beaver Harbour..." and "... consists of dark grey plant-bearing shales which appear to grade laterally into massive conglomerate composed of water worn volcanic breccia fragments." He continued that the rocks "... may be a facies of the Perry Formation or may be an older rock unit of pre-Perry and post-Mascarene age."

The plant fossils collected by Cumming were determined by FRY (1957) who mentions the following forms:

*Manuscript received 1 November 1966

Psilophyton sp.
Hostimella-like axes
 cf. Colpodexylon sp.

The first two are indicative of an early Devonian age, but Colpodexylon would represent a younger age.

At present there are at least five known plant localities on the coast at Beaver Harbour:

- 1) South of the wharf at the west side of Beaver Harbour: black siliceous shale.
- 2) North of the mouth of Cripp's Stream at the eastern side of the harbour: light grey shale.
- 3) Two places south of Cripp's Stream: black shales and siltstones, grey-green siltstones.
- 4) About 400 yards west of Russel's Point (northwest of Ram's Rock): greenish shales and siltstones.
- 5) About 100 yards north of Russel's Point: greenish siltstones and sandstones, grading into conglomerate.

Localities 1 and 2 are those mentioned by CUMMING (1963), while locality 4 is probably the one described by MATTHEW (1912). All localities are within one mile of Beaver Harbour settlement.

Description of the Flora

Archaeopteris sp. (Figures 1 and 2)

Material: several impressions of barren pinnules.

Locality: on the shore 100 yards north of Russel's Point, Beaver Harbour.

Description: venation and shape of the pinnules are typical of the genus Archaeopteris. The margin of the leaflets is smooth, their apex rounded, and their length varies between one and two cm. Since fertile pinnae are not preserved it cannot be decided to which species the forms belong. However, close similarity to the group A. gaspiensis Dawson, A. rogersi Dawson, and A. jacksoni Dawson exists (DAWSON, 1871, 1882).

Cyclostigma sp. (Figures 3 and 4)

Material: one stem impression and one piece of a stem cast.

Locality: on the shore 80 to 100 yards north of Russel's Point, Beaver Harbour.

Description: the somewhat obscurely preserved leaf scars of the stem impression are aligned in steep diagonal rows. They are more or less circular and have a diameter of 3 mm. No definite leaf cushions can be recognized. The stem diameter is about 7.5 cm. The second specimen is preserved as "Knorria", a name formerly given to decorticated trunks of Lycopsidea. It represents probably a sub-epidermal surface of the same species described above. The irregular longitudinal ribbing can be seen in Figure 4. The greatest stem diameter is 6 cm. Both specimens resemble Cyclostigma hercynicum Weiss closely.

Remarks: The use of Cyclostigma Houghton, 1859, as a distinct genus is common by many paleobotanists, although its exact position within the Lycopsidea is not certain. The absence of a ligule pit distinguishes it from Bothrodendron and Archaeosigillaria. Also Colpodexylon possesses low leaf cushions and can be identified safely only if its typical trifurcate leaves are present.

Numerous other plant fragments consist of cf. Aneurophyton sp. and Hostimella-like axes. One fragment resembles Arthrostigma (= Drepanophycus) arietense Matthew.

Age of the Flora

Archaeopteris and Cyclostigma are typical members of the Upper Devonian flora. While Archaeopteris has been reported to occur also in the upper Middle Devonian of New York, the latter genus has not been described in older rocks. Especially in the Hercynian of Middle Europe, Cyclostigma is used as a typical index fossil of the Upper Devonian (REMY and REMY, 1959). The fragments described as cf. Aneurophyton sp. and Hostimella-like axes may include other genera, perhaps even Psilophyton. That such archaic floral elements are co-existent with Upper Devonian plants is known from nearby Perry, Maine (SMITH and WHITE, 1905) and several other localities. Aneurophyton extends in New York into the lower Upper Devonian. It is thus concluded that the plant bearing strata of Beaver Harbour are lower Upper Devonian and can be correlated with the Upper Devonian.

The relationship of these rocks to the redbeds occurring west of Beaver Harbour, which at present are considered to be the equivalent of the Perry Formation, will be discussed in a later communication.

Acknowledgements

The writer is indebted for advice to DR. R.L. BROWN of the UNIVERSITY OF NEW BRUNSWICK, who initiated and is supervising the research program on the south shore of New Brunswick. The study was carried out with the aid of grants from NATIONAL RESEARCH COUNCIL and the GEOLOGICAL SURVEY OF CANADA.

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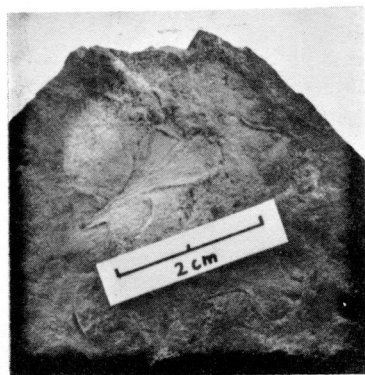


Figure 1. Barren pinnules of Archaeopteris sp.

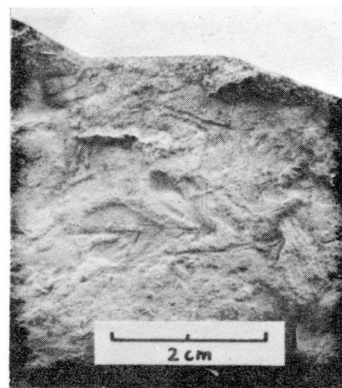


Figure 2. Barren pinnules of Archaeopteris sp.

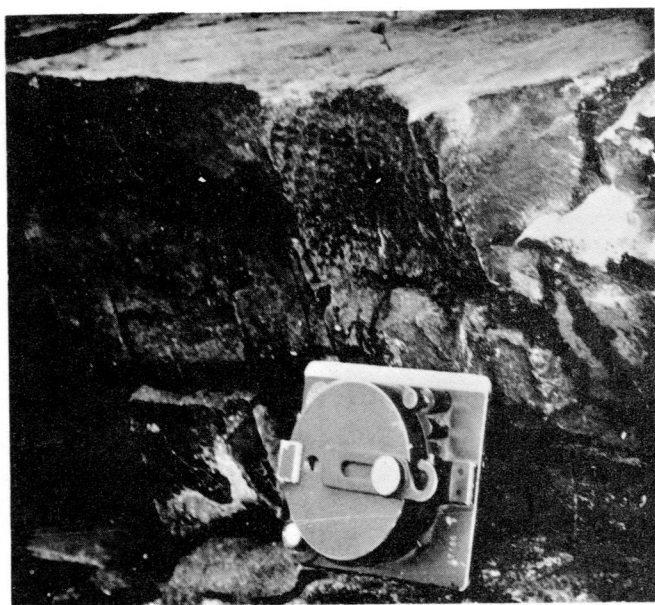


Figure 3. Stem impression of Cyclostigma sp., in situ near Russel's Point, Beaver Harbour. The edge of the compass is 10 cm long.



Figure 4. Decorticated trunk of Cyclostigma sp. One half natural size.