

a tap-cinder from Londonderry Iron Mines. The multitude of Crystals thus formed are considered to be *Olivine*.

D. H.

ART. IV.—NOVA SCOTIAN GEOLOGY. BY THE REV. D. HONEYMAN, D. C. L., *Fellow of the University of Halifax, Curator of the Provincial Museum, Professor of Geology in Dalhousie College and University, and Lecturer on Geology in the Technological Institute.*

(Read Dec. 9, 1878.)

I HAVE received from the Rev. D. Sutherland, of Gabarus, (near Louisburg,) Cape Breton, an interesting specimen of fossiliferous sandstone. The locality where he found it is described as "At a fine spring of water that boils up out of the rock, at the roadside, on A. Walker's farm, Big Ridge, on the road from Marion Bridge, (Mira River,) to Gabarus, at about $1\frac{1}{4}$ miles, as laid down on Church's map, direct south from Marion Bridge." I have referred to Marion Bridge in my "Retrospect" of last session as the locality where Mr. H. Fletcher, of the Dominion Geological Survey, discovered interesting fossiliferous strata, which I referred to the horizon of the *Upper Lingula Flags of Wales*, on account of the occurrence of the Trilobite *Olenus alatus*, associated with *Agnostus*. Mr. Sutherland's specimen of fossiliferous sandstone indicates the width of a fossiliferous band $1\frac{1}{4}$ miles. If the series descends towards Gabarus, we may now have reached the horizon of the *Lower Lingula Flags*. The specimen of sandstone before me measures $2\frac{1}{4} \times 3$ inches; its thickness is from 5 to 4 tenths of an inch; it is metamorphic and subcrystalline. One of the sides is weathered; the other is fresh; both are covered with fossils. On the fresh side they are very beautiful. The forms are *Lingulellæ*. They are acuminate and subcircular. The acuminate forms range from a length $\frac{1}{10}$ and a width $\frac{3}{40}$ to $\frac{10}{40}$ in length and $\frac{7}{40}$ in width. The subcircular are in the proportion of $\frac{6}{40}$ to $\frac{5}{40}$; one appears to be circular, $\frac{3}{40}$ in diameter.

*Mr. Sutherland has sent to me, two other specimens. One is a

* May 10, 1879.

piece of sandstone from the same strata as the preceding. This has on one side *impressions* of *Lingulellæ*, which might be questioned as such if not associated with those I have already described. The rock itself is interesting; its edges are coated with microscopic crystals of quartz, and the whole might be designated a *quartzite*. The second specimen is a piece of argillite having *four* fossils of larger dimensions than those just described.

Mr. Sutherland found this specimen in the rock, on the same Ridge, (Mira,) a mile nearer Gabarus, than the *Lingulella* sandstone. One of the specimens has fine concentric lines, which another shows to be lines of growth. They are inequilateral. Their length exceeds their width in the proportion of 4 to 3. The length of two of the specimens is $\frac{6}{10}$; of another, $\frac{4}{10}$. There are no muscular or pallial impressions. We have thus evidence of the existence of a fossiliferous band of $2\frac{1}{4}$ miles in width extending from Marion Bridge, southwards, towards Gabarus, and intervening between the carboniferous of Mira and the crystalline and subcrystalline rocks of Gabarus.

Mr. Sutherland has also sent a specimen from Gabarus, in which are forms, which might be mistaken for fossils.

These discoveries of Mr. Sutherland's are very interesting, in consequence of their approach to the Louisburg and Gabarus rocks. Some of which have been referred by the Geological Survey of Canada to "Snowdon and Cader Idris, volcanic accumulations," and to the Huronian age of Canada. I have elsewhere referred them to my "Middle Arisaig Series," *i. e.* Cambrian.

My investigations in Annapolis and King's Counties, vide papers *last* Session and *this* (next paper), have directed my attention to a specimen in the "Webster Collection," of the Provincial Museum.

When I received and arranged this collection some years ago, I found in it a slab of sandstone thickly studded with *Lingulellæ*. I then considered it as a Potsdam Sandstone rock and placed it in the lowest position in the collection, as "Acadian Geology" led me to infer nothing lower in the collection than Niagara Limestones. I also concluded that the specimen was *not Nova*

Scotian. My own investigations and conclusions regarding the Geology of King's and Annapolis in connection with the discoveries of Mr. Fletcher, of the Geological Survey of Canada, and the Rev. D. Sutherland in Cape Breton, just noticed, have led me to suspect that the specimen after all is Nova Scotian, and that possibly it belongs to King's County, and is indicative of the existence of rocks of the Potsdam formation in this region. An examination of the specimen seems to indicate; 1st. That it was not found *in situ* but was a section of a boulder. 2nd. That it came from a region where granites or gnessoid rocks exist. The side of the specimen with fewest fossils is rather micaceous. In this it differs from the Mira specimen. It is also less hardened, the Mira specimen being subcrystalline.

The *Lingulellae* of both are identical, even the proportions are nearly the same. The *Lingulellae* of the Webster specimen measure from $\frac{4}{10}$ to $\frac{11}{40}$ of an inch. Their forms are generally acuminate.

A NEW TRILOBITE.

Asaphus ditmarsiae (N. Sp.)

The specimen is a pygidium. Width 5.8 inches; the length about 5.4 inches. It is semi-oval and gibbous.

The mesial lobe is rounded and tapering. It is fragmentary and partly indistinct. Its apex is semi-oval. $4\frac{3}{4}$ inches of the lobe remains. At the top it is two inches wide; $3\frac{1}{2}$ inches from the top the width is $1\frac{1}{4}$ inches; there is one almost entire ridge at the top and two parts succeeding, having portions of two intermediate furrows, the apical part is in length $1\frac{3}{4}$ inches.

Side lobes. The left is lengthened *one inch* by *distortion*. The right appears to be unchanged. Each lobe has 8 ribs with deep intermediate furrows. The ribs when regular are strong and rounded, and extend the whole width of the lobes as far as the margin. The upper one of the left lobe is bevelled, and has a flat *pleuron* of the thorax attached, its surface is also granulated. This lobe has a short and narrow supplementary rib next the apex, the corresponding one is obscure. On the right lobe four of the ribs are widened and flattened. A smooth and slightly convex margin, 4-10 of an inch in width, is round the left

lobe. It partially remains on the right. It is wanting, having been broken off the apex. The whole trilobite, if proportioned like the *Isotelus gigas* must have been 1 foot 3 inches in length. There accompanies, the cheek of a smaller individual, nearly resembling that of *Asaphus gigas*. The fragment of rock in which it is imbedded is heavy in proportion to its size, in consequence of the iron which it contains. It is *Magnetite*. Dr. J. B. Gilpin, to whose kindness I am indebted for the specimen, informs me that it was found in the Iron Mines of Clements, Annapolis Co. At his suggestion I have named it after Mrs. Laura Ditmars, who secured it from the collection. This is by far the largest member of the trilobite family that has yet been discovered in Nova Scotia. It is one of the *Anakim* of the Silurian period. I shall quote authorities to show the distribution and range in time of the *Family Asaphidae*.

ENGLAND.—*Murchison*.

“The genera *Trinucleus*, *Asaphus* and *Ogygia*, are never detected, even in the lowest part, of the Wenlock group, therefore being essentially characteristic of the Lower Silurian rocks.”
—*Siluria*, 1872, page 114.

Salter.

Asaphidae, a large unwieldy group of great trilobites, which are characteristic *strictly* of Lower Silurian rocks. The exceptions to this geological position are *very rare*. Except *Ilænus*: it does not rise out of the Lower Silurian, and it is *very rare* even in Llandovery or *Middle Silurian rocks*: *Niobe*, *Priloccephalus*, *Asaphus*, *Ogygia* and their *sub-genera*; one or other of these *genera* are characteristic of every locality where Tremadoc, Llandeilo, or Caradoc strata are found.

Asaphus or *Isotelus* is the largest, excepting of course *Paradoxides*, among the *Olenidae*: Ramsay's *Geology of North Wales*, page 310.

BOHEMIA.—*Barrande*.

Trilobites.

“*Fannes Siluriennes*—Distribution verticale des *Trilobites* en Boheme.

Groupe II. D. *Asaphus*, d 1, 3, d 2, 1, d 3, 1, d 4, 1, d 5, 1.
Asaphus ingens Carr., d 2.

Asaphus nobilis, Barrande, d 1, d 3, d 4, d 5, totaux, 7 especes."

The genus does not appear at all in Groupe II. Divs. E. F. G.
 H. They are all Lower Silurian forms in Bohemia.

AMERICA—HALL.

"We have a sufficient number of Trilobites identical with those of the Silurian rocks of Europe to institute a comparison of the correlation of the ancient ocean in both hemispheres.

That remarkable and characteristic Lower Silurian form, Trinucleus, is among the most common, while *Illænus* and *Isotelus* or *Asaphus*, no less characteristic, are obtained in the earliest limestone."

Palæontology of New York, Vol. I., page 21.

Isotelus gigas. DeKay. Chazy Limestone. Trenton Limestone. Utica Slate. Hudson River group (all Lower Silurian).
 Table of Species, page 529.

Meek.

Asaphus (Isotelus), megistus?

Palæontology of Ohio.

Fossils of Cincinnati Group, page 139.

Miller.

Asaphus (Isotelus gigas).

DeKay, 1825. Ann. Lic. Nat. Hist. N. G., Vol. 1. Trenton and Hudson River Gr.

Isotelus megistus, Locke, 1841. Proc. Am. Assoc. Trenton and Hudson River Gr.

Miller's American Palæozoic Fossils.

(Cincinnati, Ohio, 1817.

Canada—Billings.

Geology of Canada, 1863.

Catalogue of Lower Silurian Fossils of Canada.

Asaphus megistus. Black River. Bird's Eye. Trenton, Hudson River (Lower Silurian) and *Middle Silurian*.

Asaphus platycephalus. Chazy. Black River. Bird's Eye. Trenton. Utica. Hudson River. (Lower Silurian.)

In England and Canada the genus *Asaphus* rises into the *Middle Silurian*.

It is not known to appear higher, not even in the Upper Silurian, *much less in the Devonian*.

The *pygidium* of a small *asaphus* occurs in the Wentworth, I. C. R., strata. *Museum Collection*.

ART. V.—NOVA SCOTIAN GEOLOGY—KING'S COUNTY.—BY THE
REV. D. HONEYMAN, D. C. L., *Curator of the Provincial Museum, &c.*

(Read January 3, 1879.)

INTRODUCTION.

One morning in June, 1877, I left Halifax with the determination of making an intimate acquaintance with the rocks of King's County. Arriving by the train at the Wolfville station, I took the direct road, past Acadia College, to the high land, with the expectation of meeting with rock exposures. I took a passing look at the amygdaloid boulders in the drain, regarding them as the possible fellow travellers of our Halifax drift acquaintances. Reaching the height above Wolfville, I was gratified to find a good exposure of solid strata. Standing on these rocks, I deferred operations until I had admired the interesting scenery in view. Below lies old Acadia College, the beautiful Town of Wolfville, and *Grand Pre*, of Evangeline fame, with its brilliant garb of summer green. Beyond stretches Cornwallis, with its serpentine streams, its fertile fields, and numerous villages. Towering on the north is North mountain, with Blomidon looming and advancing into the Minas Basin, hiding the Minas Channel, Cape D'Or, and Cape Chignecto. This fine sheet of water, bounding *Grand Pre* and Cornwallis, extends to the distant north as Minas Basin and Cobequid Bay. The Cobequid range of Cumberland and Colchester rising to the dim distance beyond.

Having thus indicated the sphere of our operations, and our first starting point, I shall arrange my remarks on these operations under three comprehensive divisions:—