

Dr. Gill's reply was as follows :—

I recognize in the figure sent the young of *Lophius Americanus* (as I think it must be) but it seems that you have overlooked the two anterior dorsal rays and miscounted the pectorals. Have you not also observed some minute filaments or tags on the head and body?

Now, as regards the two anterior dorsal rays and the tags alluded to, I have little hesitation in saying that they are absent in this specimen, and as the fish was in a very fine state of preservation when I examined it, I do not think such processes could have been rubbed off in any way. Another feature tells against its being the young of *Lophius*, viz. the great elevation of the head which does not correspond with the dimensions of young Lophioids of similar size given in Günther's Catalogue. For the present therefore, and until my return from the Bermudas I must leave the matter unsettled, intending to include this and several other forms in a more extensive paper I hope (D. V.) to lay before the Institute next year.

I must not omit, however, while on the subject of Lophioids, to notice the fine specimen of *L. piscatorius*, or what our American friends are pleased to call *L. Americanus*, (although it has no claim whatever to be considered a distinct species from the European form), recently taken at the Dockyard, and now under process of being skeletonized at the Lumber yard for presentation to the Museum, by Capt. Tulloch, R. E.

The pectoral fins of the Lophioids are very singularly formed, as may be seen by looking at a skeleton prepared by Dr. Honeyman, serving the purpose of arms to rest upon while the fish remains stationary on the look out for prey.

ART. III. ON PRE-CARBONIFEROUS ROCKS OF THE PICTOU
COAL FIELD. BY THE REV. D. HONEYMAN, D. C. L.,
F. G. S., &c., *Director of the Provincial Museum.*

(Read Nov. 13, 1871.)

ABSTRACT.

IN the Report of Progress of the Canadian Survey, from 1866 to 1869, page 7, Sir W. G. Logan says in reference to certain pre-carboniferous rocks underlying the Pictou Coal Field, "No evidence was observed by me on McLellan's Mountain to shew to what epoch these older rocks belong; but masses somewhat similar are noticed by Mr. Hartley on the west side of the East River, in a position where they have been mentioned in his Acadian Geology

by Dr. J. W. Dawson, who considered them to be of Devonian age, and on his authority they will be so distinguished."

I presume that this language is intended to apply to the area indicated on the S. E. corner of the map which accompanies Sir W. Logan's Report, which is distinguished by the Devonian colouring. Now, this area has its N. E. corner at the Falls of Sutherland's River, and its S. E. corner at the bridge at McPherson's mills, so that in addition to the Northern part of McLellan's Mountain (range) the area in question includes also a part of Sutherland's River.

In my last paper read before the Institute, "On the Pre-Carboniferous Rocks underlying the Pictou Coal Field," I concluded thus: "It may seem strange that I have made no mention of the Devonian formation which is so often spoken of in connection with the strata underlying the Pictou Coal Field. The reason why is this—there is no Devonian to be found there."—*Transactions* 1870-71.

This language was made to apply to the supposed Devonian Rocks of Sir W. Logan's report, as well as to the others.

The evidence upon which Sir W. Logan bases his conclusion, is lithological, in the supposed absence of stratigraphical and palæontological evidence.*

The conclusion at which I had arrived was altogether based on palæontology and stratigraphy.

I had occasion to examine the area in question about a year after Sir W. Logan's examination. I had often cursorily examined the locality, and picked up Silurian fossils in it, so that I had for years been convinced that the prevailing rocks were of Silurian age. On this occasion, however, I made a careful and thorough examination, and was rewarded with many important discoveries. In the area in question we have, 1. Quartzites and argillites of the northern part of McLellan's Mountain. These are so highly metamorphic that I considered it useless labour to search for fossils in them. Besides coming upon them from the south, I had no

*NOTE—In reference to this kind of evidence, Prof. Dana well observes that in the absence of Stratigraphical and Palæontological evidence "Lithology may give us guesses but nothing more substantial." *Nature* No. Feb. 12, 1872, page 331.

difficulty whatever in ascertaining their palæontological and stratigraphical relations. I have already shown that the rocks in question lie in the northern part of Anticlinal series No. 2. This series with the rocks of the Middle and Upper, or Clinton and Lower Helderberg of the E. side of Anticlinal series No. 1, constitute the whole of McLellan's Mountain range. I have also shown that the key localities of the series are at Blanchard, known from its bed of fossiliferous iron ore, and Simon Fraser's Mountain near the southern end of McLellan's Mountain. In the former locality I discovered fossils on either side of Anticlinal axis No. 2, proving that the rocks were altogether middle Silurian, with possibly a small addition of Lower Helderberg, Upper Silurian. At Simon Fraser's Mountain the rocks on the W. side of axis No. 2 are fossiliferous, while their counterpart on the E. side, are so highly metamorphic as to render the existence of fossils doubtful, although the stratigraphical relation is sufficiently obvious.

The fossiliferous strata occurs thus,—*ascending*, a broad band of Mayhill or Medina Sandstone, quartzites of normal thickness, with abundance of characteristic *Petraia* and *Cornulites*, (trumpet shaped,) then Clinton shales which are likely to produce fossils, although I did not succeed in finding any, and then the Lower Helderberg strata of McLellan's Brook, having abundance of characteristic fossils. The rocks in the northern part of McLellan's Mountain are a continuation of the metamorphic middle Silurian of the eastern side of Fraser's Mountain. The axis and the continuation of the fossiliferous strata on the western side extend to the north and become obscure. About half a mile beyond the Presbyterian Church of the mountain, the strata of the eastern side are seen outcropping on the plateau until they seem to terminate at McLean's Brook on the side of the mountain. This proves that the supposed Devonian Rocks of McLellan's Mountain are metamorphic Middle Silurian.

I stated formerly that the northern extremity of McLellan's Mountain is Blackwood's Mountain. This mountain chiefly consists of a great mass of greenstone. This forms the base of a monoclinical series which lies to the south of the mountain. At the foot of the mountain, S. side, is an outcrop of metamorphic slate

apparently non-fossiliferous; this extends to the north east corner of the area and there terminates, forming the falls of Sutherland's River. This band is overlaid by shales having characteristic Clinton fossils in abundance, *e. g.* *Leptocoelia intermedia*, Hall. These strata are found at Cameron's Brook, and on the side of the old road, all being situated in the area in question. These supposed Devonian rocks, then, are also Middle Silurian. I would now turn to the south east corner of the area, and enter the area from that direction; we find the bridge built on strata containing *lingulae* not characteristic. These are abutted by Lower Carboniferous sandstone of the river bed. On the right side of the road at the miller's house the end of a trap dyke underlies the *lingula* strata; nearly half a mile from the bridge the same strata are seen outcropping on the right side of the road, and then passing over to the left side. On the right side we have the same greenstone dyke, and on the left abundance of orthids and other fossils characteristic of the lowest part of the A. or Medina strata of Arisaig, and then in an exposure of the same strata at the bridge of a tributary of Sutherland's River, Cameron's Brook, described by Sir W. Logan in page 6 of his report, I found several *Petraia* similar to these of Fraser's Mountain and Arisaig A strata. Following the course of this tributary towards Sutherland's River we have the same strata with *Petraia* reaching to the Falls: there they overlies the same greenstone dyke. This Medina band is overlaid and succeeded on the south by Clinton strata, in which we have the exact counterpart of the Lower Clinton B of Arisaig with its black shales, concretions and *Lingula* nodules. This shale is not included in the supposed Devonian area.

I would observe that the greenstone dykes referred to may be Devonian, as they are undoubtedly *post* Upper Silurian and *pre*-Carboniferous, so that with this possible exception the whole of Sir W. Logan's Devonian Rocks are of Middle Silurian age.

The fossils that I have referred to illustrative of the palaeontology of these rocks, are in the Museum of the Canadian Survey, Gabriel Street, Montreal, and in the Provincial Museum, Halifax, and also my maps illustrating their stratigraphy.