

The actual absence of animal life in the so-called Azoic Age in this country is rendered highly probable, as Foster and Whitney show, by the fact that many of the rocks are slates and sandstones, like fossiliferous Silurian rocks, and yet have no fossils; and moreover, the beds on this continent were uplifted and folded, and to a great extent crystallized on a vast scale, before the first Silurian layers were deposited. A grand revolution is here indicated, apparently the closing event of the early physical history of the globe.*

(To be continued.)

* Foster and Whitney observe, (loc. cit. pp. 7, 26, 132,) that at Chippewa Island (in the Menomonee River, near $45\frac{1}{2}^{\circ}$ N., 88° W.,) the Potsdam sandstone lies on the up turned Azoic slates. At White Rapids, lower down the stream, the same sandstone rests on the tilted edges of the Azoic quartz rock. Near Presqu'Isle (not far from $46^{\circ} 30' - 46^{\circ} 55'$ N., $87^{\circ} 33'$ W.,) a similar contact of the nearly horizontal Potsdam and the vertical quartz rock is seen.

The Azoic of this continent was well studied and defined at a still earlier date by the distinguished geologist of Canada, Sir William E. Logan. In his Annual Report for 1816-1817, and that for 1848, he points out several examples of the Silurian covering the contorted Azoic, and his subsequent surveys have added to the facts of this kind. They occur north of the Lakes Huron and Superior, and along and to the north of the Saint Lawrence. Moreover, in the vicinity of the lakes just mentioned, he found the Azoic divided into two unconformable groups, a lower, since called by him the *Laurentian*, and an upper, the *Huronian*; the former consisting of granite, syenite, gneiss, hornblende rock, hypersthene rock, crystalline limestones, &c., the latter of diorite, slates, white and red sandstones, conglomerates, limestones, the whole much intersected by trap and metalliferous veins containing native copper, &c., and having a thickness in some places, probably of 9,000 to 12,000 feet.

Sections representing the nearly horizontal Lower Silurian overlying the Azoic, as observed by him in the vicinity of the St. Lawrence north-east of Lake Champlain, are figured in the Quarterly Journal of the Geological Society of London, for 1852, pp. 203 and 206.

In the progress of the Geological Survey of New York, commencing in 1836, the fact that the crystalline rocks of Northern New York were older than the Silurian was early shown, but good sections illustrating the superpositions of the two were not given.

At the meeting of the American Association at Cincinnati in 1851, when Foster and Whitney first presented their views on the Azoic, Prof Mather stated that he had traced the continuation of the system nearly to the sources of the Mississippi and on the waters of the St. Peters,—a region since reported on by Dr. D. D. Owen, (Geol. Survey of Wisconsin, Iowa and Minnesota, 4to, 1852); Dr. H. King contributed observations on the Azoic or iron mountain region of Missouri, (p. 191, Amer. Assoc. Rep. 1851,) indicating the inferiority in position of these rocks to the Silurian, as had been urged by Messrs. Foster and Whitney from the investigations by Mr. Mersch under their direction; and Dr. Engelmann described related rocks in Arkansas between Little Rock and the Hot Springs.

Professors W. B. and H. D. Rogers refer to Azoic Rocks as found in the Appalachians; but no instances of the superposition of the lowest Silurian in those regions on other non-conformable beds have yet been published; and it is a question whether the metamorphic rocks are all related to those of New England in age, or partly of this era of metamorphism and partly Azoic.