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On Siredon-metamorphoses &c. By E. D. COPE.

The late observations by various writers on the metamorphoses of *Amblystoma*, especially those of Mr. Tegetmeier, indicate that some of the principal facts in the history of the subject have been overlooked by all of them.

In the first place, no one has seen any metamorphosis of true *Siredon*, *S. mexicanus*, Shaw (*S. pisciformis*, *S. axolotl*, and *S. maculatus* auctorum), which inhabits the lakes of Mexico, and of which the Smithsonian collections contain numerous specimens. Whether it undergoes a metamorphosis is entirely unknown to naturalists, though I would express the belief that it will be found to do so occasionally, under suitable circumstances. No *Amblystomata* have been brought from Mexico south of Tamaulipas and Chihuahua by any of the various naturalists collecting for the Smithsonian Institution.

In the next place, Prof. Baird was aware of the metamorphoses of all the North-American species of *Siredon* many years before the observation of it in the Jardin des Plantes, although at first he named one of them *Siredon lichenoides*, treating it as a mature animal. He regarded these creatures as larvæ in his essay on the North-American Salamanders, published in Philadelphia in 1847.

Thirdly, the important observation of Duméril* established the fact that the *Siredons* reproduced as such; and his account of the subsequent loss of larval characters by the offspring is the first of a positive character which we possess on that point.

After this, in 1867†, the writer recorded the various stages of metamorphosis in different structures to be observed in reproducing individuals of two species of *Amblystoma*, viz. *A. tigrinum* and *A. mavortium*. These embraced various *Siredon*-characters of the dental, branchial, and dermal organs, and of coloration. It was suggested that the metamorphoses observed by Duméril were those of *A. mavortium*, which was confirmed by an examination of specimens sent to the writer by Prof. Duméril a year afterward‡. At the same time the periods of metamorphosis of eight other species of the genus were stated, and the Mexican Axolotl was regarded as an *Amblystoma*, whether undergoing metamorphosis or not, owing to the irregularity of its occurrence in the most nearly allied species, *A. mavortium*, or from its *Siredon*-stage, *S. lichenoides*, Baird.

In 1868 Prof. Marsh of Yale College observed the metamorphosis of the *A. mavortium*, confirming the conclusions of previous writers. Since that time the changes have been observed by Mr. Tegetmeier and others.

The only point remaining to be determined is whether *Siredons* (i. e. *Amblystoma mexicanum*) undergo a metamorphosis or not. Among our numerous specimens I can find none that exhibit any tendency toward the change.

* Bulletin de la Société d'Acclimatation, 1865, ii. 348.

† Proceedings Acad. Nat. Sciences, Philad. 166.

‡ Origin of Genera, 1868, p. 47.

I might add here that I have had for a time, in a winter fernery, a large New-Jersey specimen of *Amblystoma tigrinum*, a foot in length. It is nocturnal in its habits, and remains during the day in its burrow. This extends through the long diameter of its prison, and has three outlets, which it keeps open. From one of them, as evening approaches, it projects its head, and watches with attention what is transpiring in the room.

In the same case are specimens of the common *Plethodon cinereus*, of both varieties. During this, as in former years, I observe that this species is nocturnal, and is a great climber. They will climb the rachis of a most slender fern or spear of grass, and lie in a coil on the end of a tall frond or other narrow support which may be sufficient to bear their weight, at a height of a foot or eighteen inches above the ground. They climb a plate of glass with great ease, by adhering closely to its smooth surface with their moist abdomen. When disturbed on some high perch among the herbage, they leap away by a sudden unbending of the coiled body, in the manner of some caterpillars.—*Silliman's American Journal*, Feb. 1871.

Note on the Infusoria flagellata and the Spongiæ ciliatæ.

By Prof. H. JAMES-CLARK, Kentucky University.

I send this note in hopes that it may be of interest to those readers of this Journal who have followed the recent discussions upon spontaneous generation and the doctrine of evolution. It is an effort to clear up the chaos of uncertainty which has reigned among the lower Protozoa for years past, and particularly in the heterogeneous group of so-called Sponges. The aim of the evolutionists is clearly, by refusing to recognize their truly organized structure, to depress these creatures to such a low level in grade that they shall appear but a step above the lifeless protoplasm which some think has been seen *almost* manufactured in the laboratory of the chemist. After hypothetically developing "organizable protoplasm" out of "inferior types of organic substances," which in the process, *per se*, under "the mutual influences" of its metamorphic forms, generates still more *sensitive* organic matter, until it finally attains to the possession of *vital* actions, the evolutionist imagines himself able "deductively to bridge the interval" between the so-called "nascent life" and the unmistakable vitalism of the slimy Rhizopod. (See Herbert Spencer, *Appleton's Journal*, Aug. 7, 1869, p. 598.)

My own researches have constantly tended in the opposite direction. In spite of the apparent physical simplicity of even the lowest of the Protozoa (*Amæba* and the like), their habits and the phenomena attendant upon their mode of locomotion, their determinate prehensile acts, so wonderfully like consciousness of an end to be accomplished, and their undeniably specialized digestive functions, all lead to the conclusion, which with me is a fact, that they possess