STRUCTURAL ABNORMALITIES IN COPEPODA.

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With Plate X, figs. 1-6.

Abnormal or freak structures in the genera of Cyclops and Diaptomus are remarkably rare. While there is great variability in the species of Cyclops, unusual structures seldom occur. In Diaptomus, which shows hardly any variability within species limits, freak organs are still more rare.

Very few references to such structures are made in the copepod literature.

Schauss,¹ 1908, p. 195, figures a shortened furcal ramus of Cyclops vernalis Fischer, evidently a case of regeneration after injury.

A similar case in Cyclops serrulatus Fischer is mentioned by Vosseler² in 1889.

Wolf,³ 1905, pp. 203, and 204, discusses “Regenerationserscheinungen,” and mentions finding two specimens of Cyclops serrulatus with one furcal ramus shortened. His case of regeneration in the furcal setae of Cyclops fimbriatus seems rather one of the instances of telescoping of portions of the setae which has been discussed by Schmeil and others, and probably is not the result of injury and regeneration.

Because of the rarity of abnormal structures it seems best to

² Ueber einen Cyclops mit verkrüppelter Furka. Archiv. für Naturgeschichte, 55, p. 123, Taf. VI, fig. 16.
put on record a few that have been seen in the course of the author's systematic work on Copepoda.

Plate X, figure 1 is a seta on the endopodite of the fourth foot of a specimen of *Cyclops phaleratus* Koch. It is evident that the seta was injured and the lateral which has grown out is the result of a regenerative process. Likewise plate X, figure 2, may be explained as defective regeneration after an injury; this is the second segment of the exopodite of the fourth foot of *Cyclops serrulatus* Fiecher. Normally there should be a single spine on the external margin instead of two.

So, too, the abnormal terminal seta of *Cyclops viridis* var. *americanus* Marsh in plate X, figure 3, can be explained as the result of traumatism.

In plate X, figure 4, however, we have a real monstrosity. This is the fifth foot of a specimen of *Cyclops viridis* Jur. collected in Pennsylvania. The second segment is normally armed with a short spine and a single long seta. Here we have a spine and two setae. This was not the result of injury and regeneration, for both fifth feet were of the same form. In all other respects the animal had the usual structure of *Cyclops viridis*. If there were any question of hybridization, it seems probable that other structures would have been affected.

Plate X, figure 5, is the second segment of the exopodite of the right fifth foot of a male *Diaptomus pallidus* Herrick. Normally the lateral spine is on the outside of the segment. In this case it is on the inside. There is nothing to indicate that this is the result of injury.

Plate X, figure 6, is the second segment of the exopodite of the right fifth foot of a male *Diaptomus sicilis* Forbes. This has two terminal hooks instead of one. This specimen was from Green Lake, Wisconsin, and is the only one of the kind that has been seen, although great numbers of this species have been examined from many different localities.

Another unique abnormality was seen in a specimen of *Diaptomus minutus* Lillj. found in Stone Lake, Wisconsin. This was a female with nothing unusual about its structure except its antennae which were those of a male, the right one being geniculated like the typical male antenna.
MARSH: COPEPODA