

Saurocephalus albensis and *influens*, Pict. et Camp., *S. dispar*, Héb., and *S. inæqualis* and *substriatus*, Münster., are founded on isolated teeth; and their affinities are regarded by the author as doubtful. *Saurodon Leanus*, Hayes, from the Greensand of New Jersey, belongs to *Saurocephalus*, which also includes a species described by Prof. Cope under the name of *S. arapahovius*. Teeth erroneously referred by Agassiz to *Saurodon Leanus* were regarded by Dr. Leidy as representing a new genus and species, *Cimolichthys levesiensis*; and to this last-named genus the author refers *Spinax marginatus*, Reuss, and, doubtfully, *Saurocephalus striatus*, Ag.

3. "On some well-defined Life-zones in the Lower Part of the Silurian (Sedgw.) of the Lake-district." By J. E. Marr, Esq. Communicated by Prof. T. M. K. Hughes, M.A., F.G.S.

This paper treats of the zones of fossils occurring between the Coniston Limestone and Coniston Grits, with a view to establishing a boundary between the Cambrian and Silurian formations. In the lake-district beds the genus *Phacops* is very abundant, one or more species of its subgenera characterizing each fossiliferous formation. The zones thus indicated are found to hold good when the organic remains as a whole are considered. The author separates the Ashgill shales from the Coniston Limestone, giving separate lists of fossils to show the palæontological difference—from which it appears that but few (and those the very common Bala fossils) are common to both, while the most characteristic Ashgill fossils do not occur in the Coniston Limestone. They indicate that the Ashgill formation is Upper Bala. It is very irregular in thickness; and the author thinks this due to an unconformity above the Ashgill beds. Here the author agrees with Prof. Hughes in placing the base of the Silurian. He gives lists of the fossils in the basement bed and the Stockdale Shales, and points out that their facies is distinctly Silurian. Very few fossils are common to them and the Coniston Limestone or Ashgill Shales. Hence there is here both a physical and a palæontological break; so that the division between Cambrian and Silurian should be placed at this horizon. A detailed description (with lists of fossils) is given of the Coniston Flags and Coniston Grits. An appendix contains some palæontological notes on some species of the genus *Phacops*.

MISCELLANEOUS.

On the Parasitic Isopoda of the Genus Entoniscus.

By M. A. GIARD.

THE singular parasitic Isopods discovered and described by Fritz Müller under the generic name of *Entoniscus*, have hitherto been detected only on the coast of Brazil. I have to indicate the exis-

tence of some species of this genus on the shores of the Loire-Inférieure, and to make known some new peculiarities of their degraded organization.

The commonest species occurs under the carapace of *Grapsus marmoratus*, Fab. (*varius*, Lat.), a crab which is very abundant on the rocks of Pouliguen. I shall call it *Entoniscus Cavolinii*, as it seems to be very probable that Cavolini saw the female of this species and described it as a gall produced on the viscera of the *Grapsus* (*Granchio depresso*, *Granchio spirito*) by the oviposition of the *Oniscus squilliformis*, which is simply the young of the *Entoniscus* at the moment of its escape from the ovigerous sac*.

Entoniscus Cavolinii differs considerably from the two species studied by Fritz Müller. The fringed laminae, so highly developed on the ventral part of the thorax of *Entoniscus porcellanæ*†, do not exist here; nor do we find the sword-shaped abdominal feet. These two characters approximate our species to *Entoniscus cancerorum*, the parasite of *Xantho*. But while in the latter the abdomen has a continuous undulated fold only on each side of the first two segments, we find in *E. Cavolinii* five pairs of lamellar appendages, folded and undulated, corresponding to the five pairs of ramified appendages of the abdomen in *Ione*. These appendages diminish towards the extremity in such a manner that in appearance the first pair forms two large lateral tufts, and the following four a median posterior tuft, equivalent to each of the first two. The ovary presents four lateral prolongations, two anterior and two posterior, besides two or three pairs of less-visible eminences, no doubt corresponding to the thoracic feet which have disappeared; it also presents two long median dorsal prolongations. Analogous lobes are observed on the female of the *Cryptothiria balani*‡. These lobes, which are very regular and constant, were not seen by Fritz Müller. I believe that those of the dorsal parts recall morphologically certain features of the *Zoea*-form.

The embryo likewise presents very clear differential characters. The front is nearly straight, as in *Entoniscus porcellanæ*. Besides the lateral eyes, which are double and correspond to the definitive eyes of the normal Isopoda, it possesses a median eye, formed by two contiguous crystallines, some pigment, and optic nerves. It is the Nauplian eye that has persisted, with a structure identical with that which it presents in a multitude of Copepods; and it disappears afterwards, together with the secondary eyes, in the retrograde metamorphosis of the female *Entoniscus*. This fact appears to me of great importance, as indicating a trace of the *Nauplius* phase in the ontogeny of the Isopoda. Each of the first five pairs of thoracic legs terminates in a prehensile hand, the penultimate joint of which

* Cavolini, Memoria sulla generazione dei Pesci e dei Granchi. Napoli, 1787, p. 180 *et seqq.*

† See Ann. & Mag. Nat. Hist. ser. 3, vol. x. p. 87 (1862).

‡ I have been able to examine this curious parasite at Wimereux, where it is met with from time to time in *Balanus balanoides*.

is oval and bears two denticles on the side which faces the opposite tooth. The sixth pair of thoracic limbs, which is so important in characterizing the *Entonisci*, in no way resembles those of the known species. It is composed of five joints: that which corresponds to the hand of the other pairs is more elongated, and terminates at its inner margin in a small fixed tooth; its external margin is produced into a straight bacillus, as long as the joint which bears it, and furnished at its extremity with a tuft of rigid hairs.

The five pairs of abdominal limbs are all constructed in the same fashion. The terminal setigerous joint presents a straight margin which bears two rays; a third is inserted at the extremity. The heart is situated at the dorsal part of the first abdominal segment; it is found in the same place in the adult, where it never projects into a sac as in *Entoniscus porcellanæ*.

These embryos live very well in sea-water, in which they swim in the manner described by Fritz Müller,—that is to say, with the body bent towards the ventral side and the sixth pair of thoracic legs projecting on each side.

The second species that I have observed is much rarer. It lives as a parasite in *Portunus puber*; and whereas one may meet with an *Entoniscus Cavolinii* in about every thirty specimens of the *Grapsus*, the parasite of the Velvet-Crab does not occur in the proportion of more than 1 per cent. Moreover I have observed the latter only in *Portuni* collected at the island of Leven, opposite the point of Pen-Château. I have found two in the same *Portunus*. This species I name *Entoniscus Moniezii*, dedicating it to my preparator, R. Moniez.

E. Moniezii differs from *E. Cavolinii* in the colour of its ovigerous sac, which, at maturity, is of a nankeen-yellow colour, and not lead-grey as in the parasite of the *Grapsus*. The ovarian gland is yellow with a rose tinge; it is straw-yellow in *E. Cavolinii*. A female of *E. Moniezii* not yet entirely degraded has enabled me to study more thoroughly the phenomena of retrogression presented by these Isopods. The description of these phenomena will form the subject of a detailed memoir, in which I shall also indicate the taxonomic results which I have obtained by the study of the Isopoda of the family Bopyridæ.—*Comptes Rendus*, August 12, 1878, p. 299.

Note on the Saurus lucioiceps of Ayres.

By W. N. LOCKINGTON.

Saurus lucioiceps, Ayres, Proc. Cal. Acad. Sci. 1855, p. 69.

Saurus fætens?, Cuv. & Val. xxii. p. 471 (*teste* Günther).

A large specimen of the fish described by Dr. Ayres was presented to the California Academy of Sciences, August 19, 1878, and has been examined by Mr. W. G. W. Harford, the Director of the Museum, and myself.



Giard, Alfred. 1878. "On the parasitic Isopoda of the genus *Entoniscus*." *The Annals and magazine of natural history; zoology, botany, and geology* 2, 346–348.
<https://doi.org/10.1080/00222937808682433>.

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