Cyclostigma Griffithii.

Leaves in alternate whorls, 40 in each whorl; whorls less than $\frac{1}{2}$ inch apart. Divergence = $\frac{1}{80}$. Stem 2·2 inches in diameter (flattened). The leaves of the whorls are rendered oblique to the transverse axis by distortion; and where oblique, there are 6 leaf-intervals to the inch; but where they run across the stem in their natural position, there are 9 to the inch.

I have much pleasure in naming this species after Sir Richard Griffith, in whose Yellow Sandstone territory many specimens of it occur, and, by their general analogy to the Carboniferous *Lepidodendra*, vindicate the propriety of considering, as he has done, the sandstones and conglomerates among which they are found as the natural base of the Carboniferous system of Ireland.

XLVII.—*On the Occurrence of a Sucker-like Adhesive Apparatus in the* Daphniadæ *and allied Crustacea.* By Rudolph Leuckart*.

[With a Plate.]

During my residence at Nice in the spring of 1853, I observed a small Entomostracan of the group of the *Daphniadæ*, which, notwithstanding its similarity to *Polyphemus*, Müll., belonged, from the formation of its large antennæ and of its abdomen, to the genus *Evadne*, Lov. I regarded it as new, and called it *Evadne polyphemoïdes*. (Similar species, but differing in the number of joints in the large antennæ, have been described by Dana under the name of *Polyphemus brevicaudis*, and also by Liljeborg under that of *Podon intermedius*, Kröy.) The same animal has since been seen and investigated at Heligoland by Pagenstecher and myself.

The following characters may be given to distinguish my species. The legs gradually become shorter and more closely approximated posteriorly. Instead of the long and slender terminal setæ, the two middle legs bear two short and thick hooks with the inner margin plumose. The secondary appendage of the last pair of legs is almost obsolete. The lower vitreous cones of the enormous eye are separated from the rest by a space, and are considerably shorter than the preceding ones; the last of all are also of a different, pyriform shape.

What most tended to fix my attention on this little animal was an unmistakeable, large, round sucking-disk (Pl. XVI. B. fig. 8),

* Translated by W. S. Dallas, F.L.S., from Wiegmann's Archiv, 1859, p. 262.

which it bore upon its back at some distance from the anterior end of the shell. This had the form of a plate-like pit, with a swelled margin and distinct muscular structure,—annular fibres in the periphery, and radiating fibres in the middle. Even if the structure of this organ could have left any doubt as to its function, this could not but disappear when I saw the animal attach itself to the side of the glass by means of this apparatus.

The organ in question has already been repeatedly seen by previous observers, and must occur pretty frequently in the allied animals, although perhaps rarely so perfectly developed. Nevertheless, its signification has hardly yet been recognized,—a circumstance which may perhaps partly be due to the fact that sucker-like adhesive organs usually occur only amongst parasites, and are almost wholly wanting amongst the Arthropoda.

Amongst those naturalists who observed this structure before me, I may especially mention Lovén, who describes it in *Evadne Nordmanni* as a "circular muscle" attached to a depression in the shell, and consisting of radiating fibres. Lovén regards this "muscle" as a part of the ordinary cutaneous layer of muscles, without referring further to its peculiarities or indicating its function. Liljeborg saw the same sucker in *Polyphemus* (De Crustaceis ex ordin. trib., 1853, tab. 5. fig. 3), but regarded it, singularly enough, as an organ of secretion.

The only observer who, as far as I know, had a correct notion of the organ in question is Strauss-Durckheim, who describes (Museum Senckenberg. 1837, ii. p. 126) a "head-lobe" (*Kopfzapfen*) as a characteristic organ, previously overlooked, in *Limnadia*, "by means of which these animals can adhere."

The faculty of attaching themselves by the neck to foreign objects occasionally, however, is well known to be possessed by other allied Entomostraca. Even O. F. Müller mentions, in his work upon the Entomostraca, that he has often seen *Sida crystallina* in this position, with its head hanging down; and the same thing has been stated by subsequent observers, although Zaddach (Synops. Pruss. Crustac. Prodrom. 1844, p. 26) admits that he does not know by what organ an adhesion of this kind observed by him in certain species of *Daphnia* and *Lynceus* can be effected.

When we have once made acquaintance with the sucking-disk of *Evadne*, it is not difficult to discover, even in the other animals, and especially in *Sida*, a flattened, more or less projecting tubercle in the region of the neck, and to recognize this as an adhesive apparatus, although the muscularity is much less distinct, and may perhaps differ in its arrangement from that previously described.

The existence of this dorsal sucker is, however, interesting,

not merely on its own account, but more especially because by its means we get a new relation of these animals to the Cirripedia *. Even Strauss-Durckheim remarks, with regard to the cephalic tubercle (*Kopfzapfen*) described by him, that it may be compared with the stalk of *Lepas*; and, in fact, we need only imagine it more strongly developed and constantly adherent, to develope the structure just mentioned from it, and thus to approximate our Entomostraca very considerably to the Cirripedia. The resemblance would be a perfect analogy, if the statement of Thompson (Zool. Researches, i. part 1)—the first discoverer of the metamorphosis of the Cirripedia †—should be confirmed, that the bivalve-shelled larvæ of these animals adhere by the back, and that the future point of attachment may be detected in the suture between the shells, even in specimens which are still swimming freely about.

In opposition to these statements, however, it must not be concealed that, according to other observers, the attachment of the Cirripedia is not effected by the back, but by the antennæ, which likewise bear a small sucking disk at their extremity. This is the opinion especially of the most recent and thorough investigator of the Cirripedia (Darwin), who regards the stalk of the Barnacle as the anterior part of the head, and in some forms detected two persistent antennæ at its extremity.

Of course mere arguments from analogy cannot be set in opposition to such definite statements; but we cannot suppress the observation that the morphology of the Cirripedia is not yet perfectly cleared up, even after the minute investigations of Darwin. There are gaps also in the observations, and that exactly at the most important points for the decision of the question before us.

EXPLANATION OF PLATE XVI. B.

Fig. 8. *Evadne polyphemoïdes*, Leuck., n. s.

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* It is possible that the filiform adhesive apparatus on the forehead of *Chalimus* and some species of *Caligus* should also be regarded as the analogue of the dorsal sucker in the *Daphniadæ*. Recent investigations by Hesse (Comptes Rendus, xliv. p. 1254) prove that the young *Lerneæ* also adhere for a time by a frontal filament of this nature.

† Slabber, however, had already seen and figured the larvæ of a Barnacle (Naturk. Verlust. pl. viii. fig. 3), but without recognizing their nature. He saw these little animals escape in countless numbers from the opened shell, and regarded them as parasites.