

sions into the buccal membrane or the test, if these are made in the intervals between the courses of the nerves, and even after the removal of a considerable portion of the upper hemisphere of the test, containing the anus, a portion of the intestine and genital glands, the terminal nerve-cords and ambulacral vessels. All these results lead to the conviction that the cords described as forming the nervous system are the means by which harmony of movement is produced. Lastly the galvanization of an ambulacral nerve by means of the electrical forceps and induction-coil constantly causes the immediate retraction of all the ambulacral feet of the zone.

The following facts seem to be in favour of the existence of a nervous plexus in the skin which covers the outside of the test. If a certain spot in this integument be wounded or pricked, the spines and pedicellariæ within a certain radius immediately lower themselves towards the point irritated, evidently for the purpose of defence. This experiment succeeds equally well with fragments entirely detached from the animal. It is in the thickness of the external skin that the means of communication between the irritated point and the muscles moving the spines and pedicellariæ are situated; for by cutting the integument with a fine scalpel, the space that takes part in the above defensive movements may be limited. The author, however, has apparently been unsuccessful in his search for this assumed nervous plexus.—*Comptes Rendus*, Nov. 13, 1876, p. 908.

On the Motile State of Podophrya fixa. By M. E. MAUPAS.

Claparède and Lachmann were the first to recognize the real organization of the Acinetina, for which they created the order of Infusoria Suctoria. These authors regarded them as essentially fixed organisms; and the Acinetina thus became isolated among their relatives.

The observations of the above-named naturalists upon the ciliated embryos of these Infusoria, with those of Stein, Cienkowski, and others, showed, however, that this isolation was not so profound as had been supposed at first: during their youth the Acinetina are motile and furnished with vibratile cilia.

The author's observations, which he regards as fitted to bring together more closely the Suctoria and Ciliata, were made upon *Podophrya fixa*, Ehr., which can at pleasure pass from the motile to the fixed state. They were made in November 1875 and October 1876 upon *Podophryæ* obtained from the rivulets of Frais-Vallon near Algiers.

Whether free or fixed, the body of *Podophrya fixa* is always more or less globular, sometimes quite spherical. The suckers are distributed pretty regularly over the whole body, except only a small region of the periphery, always corresponding to the part of the body where the contractile vacuole is situated.

After observing some of these *Podophryæ* for from half an hour to an hour, the author saw the suckers slowly drawn into the body; and

at the same time the suckerless region became slightly depressed, forming a broad furrow which, becoming deeper, soon gave the body a reniform appearance. On the surface of this groove there appeared some approximated striæ, which, under a high power, were resolved into regular rows of little points or mamillæ, which increased rapidly, becoming elongated into short rigid points, not much thinner than the suckers. The latter continued to disappear more and more in the body. The furrowed region gradually increased on both sides until it formed a girdle round the body; and the points or mamillæ of this belt, becoming more and more elongated and slender, formed long and thin vibratile cilia which began to oscillate gently. The suckers had then almost entirely disappeared. The body then became elongated pretty rapidly, in such a fashion that the region on which the first rudiments of vibratile cilia appeared was at one of its extremities. This the author calls the *anterior* end. The body was at the same time depressed in a direction vertical to the plane of the ciliated belt, thus acquiring a more or less regular elongated form, slightly flattened, and ciliated only on its narrow periphery, the broad surfaces being quite destitute of cilia. The movements of the vibratile cilia at the same time became more distinct and caused some slight oscillation of the body. Lastly, the suckers retired completely within the body, the cilia vibrated more and more strongly, the elongation of the body was completed, and the *Podophrya* moved through the water turning upon itself, but with the *anterior* extremity always in front. In the case of stalked individuals the body was detached by a few feeble shocks or by turning two or three times upon itself. All these transformations occupied only half an hour.

The period of activity varies in length in different individuals. In becoming again immobile the *Podophrya* passes in inverse order through the stages above described: the suckers first appear; the body shortens and becomes broader; the vibratile cilia are retracted gradually; the body is gradually rounded, and in about twenty minutes resumes its globular form with its surface covered with long suckers. The same individuals were observed to pass several times through the whole series of metamorphoses. The author concludes that *Podophrya fixa* does not suit its name, as it is the most vagabond of known Acinetina; he regards it as an intermediate type uniting the Infusoria Suctoria to the true Infusoria Ciliata.—*Comptes Rendus*, November 13, 1876, p. 910.

Helix villosa, Draparnaud.

Mrs. David Robertson, of Glasgow, found four living specimens of this land shell, in August 1873, on the moors near Cardiff, Glamorganshire, while searching for Ostracoda in the ditches. It is an addition to our Mollusca. *H. villosa* inhabits Germany, the east of France, and Switzerland; and it often occurs at considerable heights above the level of the sea. The variety *alpestris* or *alpicola* of *H. arbustorum* has the same difference of habitat: this usually is an



Maupas, E. 1877. "On the motile state of *Podophrya fixa*." *The Annals and magazine of natural history; zoology, botany, and geology* 19, 198–199.

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