

spines, besides spinules, the cephalic horns more foliaceous and more sharply spined, with only one pair of spines in front of them instead of two, and that simple; male with eight only, one of the lateral pairs not being developed. Post-antennary spines reduced to minute tubercles. Vestiges of wings and tegmina larger, those of the latter overlapping one another and those of the former so as to conceal from view all but about one square millimetre of the unarmed metanotum. The tergum of the first abdominal somite with but one row of spines at its hinder end; that of the terminal somite of the female divided at its posterior margin into four spinous processes.

Colour. Body brown like rotten leaves, with the legs, antennæ, organs of flight (which have their principal nervures darker), and spines lighter.

♂. Length of body 64 millims., head 4·5, pronotum 4·5, mesonotum 14, metanotum 6, abdomen $27\cdot25 + 8\cdot5 = 35\cdot75$, tegmina 3·75, wings 7·3, fore femur 17, tibia 17, intermediate femur 12·5, tibia 13·5, posterior femur 17·5, tibia 19·5, antennæ 47.

♀. Length of body 80 millims., head 7, pronotum 6·5, mesonotum 16·5, metanotum 8, abdomen $31 + 12 = 43$, tegmina 6, wings 11, fore femur 16·6, tibia 17, intermediate femur 12·5, tibia 13·6, posterior femur 18, tibia 21, antennæ 43·5.

The fore legs and all the tibiæ in the male of this species are nearly quite simple.

Hab. One male and two females from Fianarantsoa.

XLIV.—*Monobia confluens*, a new *Moneron*.

By AIMÉ SCHNEIDER*.

[Plate XVIII.]

I NOW present the description of a new *Moneron*, which appears to me to possess some interest. The name I give it is in allusion to the community of life which is set up between the different individuals of the same group, the different members of a colony, as will be seen by-and-by.

Monobia confluens lives in fresh water, and perhaps also in moist earth. I met with it for the first time in June 1878. I have had living representatives of it for about a week in a

* Translated by W. S. Dallas, F.L.S., from the 'Archives de Zoologie expérimentale,' tom. vii. (1878) p. 585.

moist cell under my microscope ; and they have furnished me with the following observations.

In its simplest form in a state of repose *Monobia confluens* is a small nearly spherical mass of finely granular sarcode, appearing bluish by transmitted light, without a nucleus and without a vacuole (Pl. XVIII. fig. 1) From this homogeneous body radiate in all directions excessively delicate pseudopodia, so long that they are four times the length of the body, so slender and transparent that one can hardly trace them except by the aid of the small inflations, like knots, which are arranged at intervals along their course, and which refract the light more strongly. These pseudopodia are rectilinear, slow of movement, and coalescent ; and by the combination of these peculiarities they vividly recall those of the Foraminifera.

When the little creature thus formed becomes active, it abandons the spherical form and extends itself, more or less, in one direction by a general contraction of its body. The physiognomy which it then takes on varies much less than in other Protozoa ; it is usually that of a Savoy biscuit, inflated at the extremities and slightly narrowed in the middle, the inflated extremities being the seat of the emission of the pseudopodia (fig. 4).

Sometimes the body becomes triangular, with pseudopodia radiating from each of the heads ; more rarely it is quite irregular, with pseudopodia springing from all the little salient angles which are marked in its outlines (figs. 3 & 5).

It is evident that, under these aspects, *Monobia confluens* feeds and nourishes itself. I have not witnessed the prehension of food, and I cannot say what part the pseudopodia take in it. But it is certain that foreign bodies, often in considerable number, are to be seen in the mass of the body, sometimes each contained in a vacuole produced by their liquefaction, and representing the product of their digestion, not yet mixed with the general mass. The pseudopodia do not appear to me to be adapted to digest on the spot ; at least this seems to follow from the fact that I have never seen them involve foreign bodies.

I have stated above that *Monobia* is destitute of vacuoles : by this I mean contractile vacuoles ; for we have just seen that such cavities are formed in connexion with digestion, as in the *Amœbæ*.

As soon as the *Monobia* has thriven so as to double its size or thereabout, it propagates, in accordance with the immutable law that reproduction is the overflow of nutrition. We then see it elongate strongly, contracting and drawing

itself out in the middle, until it presents the appearance of two spheres united by a band of sarcode. This band may become attenuated until it is no thicker than an ordinary pseudopodium; this filament may give way in its turn; and then we have two individuals instead of one. But most commonly this is not the course of events, and the two fractions of the division, although each acts independently, continue to hold one another, as it were, by the hand, like two sisters (fig. 2). They not only do not rupture the more or less attenuated thread which is interposed between them, but, as I have often witnessed, it also happens that two of their pseudopodia meet and become fused together, so as to set up a second point of communication parallel to the former.

Whenever two pseudopodia issuing thus from two different centres meet together, there is an amalgamation of the pseudopodia. This amalgamation effected, the bond of union becomes widened by afflux of plasma, and the communication between the two sarcodic territories is widely open, so that the granules can pass from one to the other. This mechanism explains the very varied aspects, changing from day to day, which the same colony presents.

Starting from a single individual, we have just seen how we get to two, which sometimes separate and sometimes remain connected. Each of the two new individuals, behaving like the first after the lapse of a certain time, we get to four, all united to one another like the links of a chain. I have counted as many as eight thus associated; and their line extended over a considerable distance, describing a slight curve (fig. 7).

The following day this was no longer the state of affairs. Each member of the colony had pulled upon the common cord; and a new resultant had been produced from these opposite caprices. My *Monera* were now grouped as shown in fig. 8—in a square surmounted by a triangle, the latter surmounted by an arrow. A few pseudopodia stretched from one individual to another, and, soldered together, had sufficed to substitute this aspect for the former one. A little later the same cause had produced a different spectacle; and, a more lively image of society than any other, this mobile colony was never the same at the close of the day as it had been at the beginning. I shall not stop here to describe the series of these fluctuations. It will be easily understood that the number of members increased by the division of some of the colony; but certain members also separate to live apart, at least for a time. Evidently we cannot but admit that separated individuals may resume their relations with a colony, or

that two colonies may attach themselves to each other to form a larger confederation, after what has been said as to the facility with which the members of the same chapel married and divorced each other.

Here the observations close.

Is the mode of reproduction (fissiparity) which I have just described the only one possessed by this species? This is a question which I cannot venture to decide; we must not hypothecate the future; and if it is true that we do not know any other mode of propagation than the above in certain genera (*Protamæba*, *Myxodictyum*), it is not less true that our ignorance in this respect may merely be the consequence of adverse circumstances. We may, however, note that in the Monera which encyst themselves for the purpose of propagation (*Vampyrella*, *Protomyxa*, &c.) we rarely find that the species is also endowed with active fissiparity during the period of its free existence; and this consideration may lead us to assume that we have to do here with a simple organism having only the simplest and most rudimentary of all the modes of multiplication, division without any preliminaries in the free state.

After what has just been stated it can hardly be doubted that our *Monobia confluens* is a Moneron. Is it possible that we have to do with an evolutive phase of a higher organism? I see no reason to suppose any thing of the kind; and analogy is opposed to such a suspicion.

Like *Myxodictyum sociale*, this Moneron might be regarded, after the example of Claus, as a naked Foraminifer, if we did not know that the latest investigations on the Foraminifera tend to demonstrate the general existence of a nucleus in the representatives of that group. It therefore seems to me necessary to retain the order Monera as Hückel established it, until our knowledge of the mutual relations of the Protozoa shall become more complete.

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