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XVI.—Communication respecting fossil and recent infusoria made to the British Association at Newcastle

Prof. Ehrenberg

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Lampronota fracticornis.

L. tibiis tarsisque anterioribus et femoribus rufis, *m. f.*; terebra abdomine sesquolongiore, *f.* Long. $4\frac{1}{2}$ lin.

Var.—Segmentis intermediis summo margine rufescentibus.

England and Scotland, common in woods in autumn, and particularly on the broom.

Lampronota crenicornis, B. E. 407.

L. pedibus rufis, tibiis tarsisque posticis nigris, *m. f.*; terebra abdomine brevior, *f.* Long. 4 lin.

Holywood, not uncommon, July—September.

Lampronota denticornis, C. 511. 14^a.

L. femoribus rufis, tibiis tarsisque anterioribus rufis posticis fuscis; abdomine subopaco, segmentis intermediis summo margine castaneis, *m. f.*; terebra abdomine brevior, *f.* Long. 4 lin.

Ireland, in pine woods, autumn.

The new species indicated in the families *Cyniphidæ*, *Proctotrupidæ*, *Diapriidæ* and *Ceraphronidæ* will be noticed in a separate memoir on the British species of those families.

[To be continued.]

XVI.—*Communication respecting Fossil and Recent Infusoria made to the British Association at Newcastle.* By Prof. EHRENBURG.

To the Editors of the Annals of Natural History.

Gentlemen,

You will much oblige me by inserting the subjoined notice, which has been occasioned by the erroneous report in the *Athenæum* of the statements made by me at the late Meeting of the British Association in Newcastle, in the section of botany and zoology, which statements, so far as I can recollect, were to the following import:—

For the purpose of physiological inquiries I have occupied myself with the investigation of microscopic organized beings, not only in Europe, but also upon several voyages for several years in other quarters of the globe. The results of my observations had been hitherto scattered in single memoirs, published in the Acts of the Royal Academy of Berlin. Within these few weeks, however, my large work on this subject has been com-

pleted*, which consists of a thick folio volume of text and 64 folio copper plates, in which I have endeavoured to bring together the whole of our present knowledge of microscopical beings, with their history in as complete a state as possible. This book, which I had the pleasure of laying before the section, is not (as stated) the first volume of a work, but complete and entire in itself, and is now in the booksellers' hands. It contains drawings of all the 722 species observed by me up to 1835. It is however merely a first essay on this highly interesting and at present inexhaustible subject. I then in a few words directed the attention of the section to the importance of the observation of microscopic beings, as a highly influential zoologico-botanical subject, and exhibited earths which were entirely formed of the shields of some Infusoria. I mentioned the eatable infusorial earth from Lillhaggsjön in Sweden, from Finland, and from Kliecken near Dessau, where they occur in great natural layers. I stated that the greatest layer hitherto discovered was to the height of above 28 feet near Lunebourg; that however similar layers have already been found in Africa, Asia, and the South Sea Islands. At the same time I noticed that I had succeeded in artificially preparing from still existing Infusoria very considerable quantities of earth. I exhibited a large glass full of such artificial siliceous earth, in which the microscope, however, still evidently and distinctly discovers all the forms of the Infusoria constituting it, pounds and tons of which earth may easily be prepared. I mentioned in few words the still existing controversy between botanists and zoologists, both of whom would class in their catalogues these microscopic living forms; and I briefly noticed the reasons given in detail in my work for each opinion, deciding myself in favour of their being animals.

I also said a few words on the luminosity of the sea, which subject in part stands in immediate connexion with these microscopic animals, it being regarded an act of animal life; and I invited attention to the fact that the luminosity in Infusoria and Annulata is an evident voluntary production of sparks, so that in the latter there originates a light apparently continuous or tranquil to the naked eye, from numerous micro-

* Ueber Infusionsthierchen, mit einem Atlas von vier und sechzig Kupfertafeln. Von Christian Gottfried Ehrenberg.

scopic sparks following each other in quick succession. The analogy with electrical phenomena is very close, and it is especially worthy of attention that evidently the smallest animals give the largest sparks, in proportion to the size of their body, and consequently very probably produce the greatest electrical tension.

I then mentioned the curious formation of double gems in *Closterium* and in the *Confervæ conjugatæ*, which is figured in the plates of the family of the *Closterinæ*, and I concluded with the remark on the astonishing great fertility or capacity of increase of microscopic animals, according to which an imperceptible corpuscle can become in four days 170 billions, or as many single individual animalcules as contained in 2 cubic feet of the stone from the polishing slate of Bilin. This increase takes place by voluntary division; and this is the character which separates animals from plants. It is true, that the gemmation in plants, especially in very simple cells, is at times very similar to the division in animals, but this relates to the form not the formation. A vegetable cell apparently capable of self division always became one, or contemporaneously many exterior warts (gems) without any change in its interior. An animal which is capable of division first doubles the inner organs, and subsequently decreases exteriorly in size. Self division proceeds from the interior towards the exterior, from the centre to the periphery; gemmation, which also occurs in animals, proceeds from the exterior towards the interior, and forms first a wart, which then gradually becomes organized.

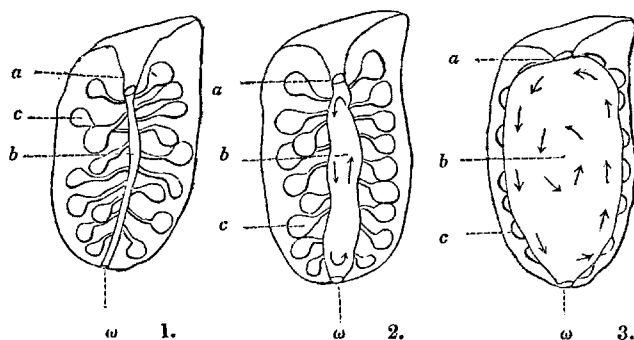
A discussion now arose between Prof. Rymer Jones and me. Prof. Jones observed, that although he had given himself great pains, yet he had never been able to see the structure described by me of the interior organization, viz. of the alimentary canal of the polygastric Infusoria, although he had found the external forms to be exactly the same. He had not been able to discover any trace of an alimentary canal, and in *Paramœcium Aurelia* and other species he had observed a circular motion of the inner cells which could not agree with the formation I had described. I answered him that such discussions then only could lead to a result when they do not merge into general but enter into special cases. The mass of relations of

organization, which after many years of observation have been gradually established, could not be brought into doubt by a single doubtful fact. The perfect organization of the wheel animalcules had been established beyond all question. With regard to *Paramæcium Aurelia*, this is one of those forms unfavourable to such observations; and it had been expressly observed by me that I myself had not been able to recognise the alimentary canal in all species of the various genera; but on the other hand it was quite evident in a very considerable number of species and genera. I stated that in my present work this subject had been treated of in detail, and that those forms in which the relations are perfectly evident have been purposely enumerated. Some of these forms I then exhibited in the drawings, and concluded with the remark that the circular motion observed by Prof. Jones had already been treated of by others (for instance, Dr. Foeke), and had naturally been frequently observed by myself. The great contractibility of the body of the animalcule was, to less practised observers, not seldom a cause of enigmatical phenomena, of which continued patient observation of the object would gradually bring the explanation. Thus, at times, the intestinal canal of the animalcule extends at the expense of the ventral sacs so far, that it occupies the whole space of the body, and then the devoured substances, very similar to the ventral sacs, circulate in the whole body.

Yours, &c.

EHRENBERG.

London, Sept. 15, 1838.



Ideal figures of *Loxodes Bursaria* in various states of the extension of the alimentary canal, and its inner circular motion, not of the ventral sacs, but of the contents of the sacs voided into the canal. *a* the mouth, *b* the alimentary canal, *c* ventral sacs, *ω* anal aperture.