

XL.—*On the Existence of Infusoria in Plants.* By CHARLES MORREN, M.D., Professor of Botany in the University of Liege*.

THE perusal of the account of Professor Røeper's Researches respecting the cells of *Sphagnum* and their pores†, brought to my recollection some facts which I witnessed while studying the natural history of our indigenous Algæ, and which I think it useful to make known at present, as they may clear up some doubts which still exist in science.

The labours of Røeper, to which I have just referred, show that the cells of *Sphagnum* are sometimes furnished with openings, which place their interior cavity in communication with the air or water in which they are immersed. This skilful observer satisfied himself, that when circumstances are favourable, the *Rotifer vulgaris*, one of the Infusoria whose organization has been explained by the researches of Ehrenberg, exists in the cells of the *Sphagnum obtusifolium*. This grew in the air in the middle of a turf-pit, but Røeper observed its leaves in water; he does not mention whether the infusorial animal came from thence, or whether it was previously contained in the cavities of the cells. The general purport of the paper seems to imply that these Rotiferi exist in the cells of that part of the plant which was exposed to the air; and in this case, the presence of an animal so complicated, living as a parasite in the cells of an utricular aërial tissue, is a phænomenon of the most curious kind in the physiology of plants, and the more so as this animal is an aquatic one.

I recollected that the last year of my residence in Flanders, I found at Everghem, near Ghent, the *Vaucheria clavata*, in which I observed something similar. M. Unger had already published the following details respecting this plant in 1828: "Beneath the emptied tubercules and at several points of the principal stalk, at different angles, rather narrower branches are produced; these branches are generally very long, and greatly exceed the principal stalk in length. At the end of ten or twelve days after their development, there are seen, towards one or other of their extremities, here and there, at different distances from the summit, protuberances of a clavate form, more or less regular, straight or slightly bent back; and others on the sides of the stalk, which have the form

* From the Bulletin of the Royal Academy of Sciences of Brussels, vol. vi. No. 4.

† Annales des Sciences Naturelles, tom. x., November 1836, p. 314; Flora, 1838, p. 17.

of a capsule or vesicle. These vesicles are at first of a uniform bright green colour, and without increase of size, which exceeds several times that of the branches, they always become of a blackish-green colour, darker towards the base, and then one or two globules of a reddish-brown may be clearly distinguished there, often surrounded by smaller granules, evidently destitute of motion, whilst the great ones move spontaneously and slowly here and there in the interior of the capsule, by unequal contractions and dilatations, whence arise remarkable changes of form. I saw these globules, at the end of eight or ten days after their appearance, still inclosed in the capsule, moving more and more slowly, receiving no very decided increase, whilst the base of the capsule became more transparent; at last I observed that, instead of their expulsion, which I was watching for, the extremity of the capsule, at the end of some days, took an angular form, and subsequently gave birth to two expansions in the form of horns; it remained in this state and became more and more pale, whilst the animalcule became darker and died, and afterwards it ended by perishing at the same time as the other parts of the conferva*."

Subsequent researches have not succeeded in informing us what this animal might be of which Unger spoke. As this author drew so much attention to the spontaneous movements of the propagula of the *Vaucheria*, and as he admitted the passage from vegetable life, characterized, according to him, by immobility, to animal life, the principal criterion of which was motion, his animalcule was confounded with the propagula, and no one, so far as I know, has returned to this very interesting subject.

When, therefore, I found the *Vaucheria clavata* at Everghem, I was as much surprised as pleased to see the mobile body noticed by Unger better than he did. With the aid of a higher magnifying power, I found it easy to ascertain the true nature of the animal, for it was not a propagulum, but a real animal, the *Rotifer vulgaris*, with its cilia imitating the wheel, its tail, &c.

The first protuberances or vesicles which I saw containing this animal, inclosed but one of them; afterwards they laid eggs and multiplied; but it seems that then they descend the tubes of the *Vaucheria* and lodge themselves in new protuberances, whose development they may possibly stimulate, as the galls and oak-apples are organic transformations attributable to the influence of parasitic beings.

* Annales des Sciences Naturelles, ancienne série, t. xiii. 1828, p. 438.

The *Rotifer vulgaris* travels quite at his ease in these protuberances; he traverses the partitions, displaces the chromule and pushes it to the two extremities of the vesicle, so that this appears darker at these parts. One day I opened a protuberance gently: I waited to see the *Rotifer* spring out and enjoy the liberty so dear to all creatures, even to infusorial animals; but no—he preferred to bury himself in his prison, descending into the tubes of the plant, and to nestle himself in the middle of a mass of green matter rather than swim about freely in the neighbourhood of his dwelling.

Some of these protuberances had greenish threads appended to their free end, and others had none: I thought at first that these threads were some *mucus* from within, escaped through some opening which might have served the *Rotifer* as an entrance; but an attentive and lengthened observation convinced me that in this there was no solution of continuity, and that the arrival of the *Rotiferi* in the *Vaucheriæ* was not at all to be explained in this way. How are these parasitic animalcules generated within them? This is what further research has some day to show. Meanwhile, I have thought that it should be made known, that the animalcule found in the *Vaucheriæ* by Unger was the *Rotifer vulgaris* of zoologists.

XLI.—*On the Natural Terraces on the Eildon Hills being formed by the Action of Ancient Glaciers.* By J. E. BOWMAN, Esq., F.L.S. & F.G.S.

SCARCELY could my communication on these terraces in the last Number of the *Annals* have been set in type, when I saw the first announcement, by Prof. Agassiz, of the evidences he had seen of the former existence of Glaciers in Scotland. A little reflection, aided by my own recollections of the Swiss glaciers, and of the general views so ably given by him at the late meeting at Glasgow, soon satisfied me that his theory would meet all the difficulties that had so much perplexed me, and explain the actual appearances exhibited on the hills in the neighbourhood of Galashiels. I regret that I was not aware of his discovery when I wrote my remarks; though it must be allowed that my ignorance of it has saved me from the imputation of any bias in applying it to the phænomena in question.

As the fact of the former existence of glaciers in Scotland is now exciting general attention, and will soon, I doubt not, be firmly established, I might have silently left it to others to consider them as the true cause of these terraces, had not a



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