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On the Fore and Aft Poles, the Axial Differentiation, and a possible Anterior Sensory Apparatus of Volvox minor. By Prof. J. A. Ryder.

The Author remarked that he had recently had an opportunity of studying a very large colony of *Volvox minor*, Stein, which appeared in the aquarium jars kept in the Conservatory of the Biological Department of the University of Pennsylvania. As some of the singular features of these Algæ which he had noticed were apparently unrecorded, it was desirable that they should be described in order that others should have an opportunity of more fully investigating the facts and their bearings upon the life-history of these singular organisms.

It was noticed that there was an empty pole in every colony or cœnobium. This empty or non-spore-bearing pole was always the anterior one, or that which was directed forwards in the act of locomotion, which is effected by a rotating motion of the whole cœnobium impelled by the flagella of its cells projecting through its envelope of cellulose. The direction of the rotation of the cœnobia is not constant and may be either sinistral or dextral; but the direction of progress always coincides with an imaginary axis passing through the centre of the anterior empty pole and the posterior germ-bearing portion of the nearly spherical colony or cœnobium. These poles are sometimes differentiated before the young Volvoces leave their parent cœnobium, which they do by breaking through the wall of the latter at its hinder pole.

The diameter of a Volvox-cœnobium is slightly longer measured along the axis around which it revolves than in the direction transverse to it. It results from this that the cœnobia are somewhat smaller equatorially than axially, so that the form of the whole is that of a very slightly oblong spheroid. These characters are fairly constant and nearly always apparent, while that of the production of the spore in a little more than the posterior hemisphere of the cœnobium is invariable, as well as the uniform direction of the axis of progressive locomotion in relation thereto.

Another very extraordinary fact which was observed was that the so-called "eye-spots" found in the flagellate cells of the anterior pole of the spherical cœnobium were the largest, and invariably occupied a definite position in relation to the flagella and to the axis around which the colony rotated. The anterior cells had the brownish-red "eye-spots" largest; and as one examined row after row of the cells of the cœnobium in succession backward towards what one might term the *caudal pole*, these "eye-spots" were seen to gradually diminish in size, until in the last cells of the hinder pole they were barely distinguishable as minute reddish points, which elevated the protoplasm of the cells into a slight prominence, such as is more marked over the larger anterior "eye-spots." This remarkable fact of the "eye-spots" of the anterior pole being the largest revives in a striking way the query whether these reddish bodies are not really visual organs or sense-organs of some kind

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after all, as originally supposed by Ehrenberg. Their gradual diminution in size towards the posterior pole, where they are nearly atrophied, would seem to indicate that they were in some way related to the power of the organism to move in a definite direction, the cells of the anterior end being provided with the best developed visual, sensory apparatus, or whatever it may be. If it should prove possible to show that these "eye-spots" are really sensory organs in *Volvox*, as all the facts which have been here noted would seem to indicate, it would be one of the few instances known of a plant possessed of visual or sensory organs of any kind, unless we except some such plants as the Venus' fly-trap.

The speaker stated that he had been unable to find any notice of any of the features of *Volvox* which are here described; all of the figures to which he had had access in standard works were entirely erroneous from their authors having completely overlooked these very salient and important features of this remarkable plant. This should therefore be regarded as his apology for bringing a very common organism to the notice of the Academy and to the renewed attention of the microscopists who take pleasure in studying it. It is to be hoped that some one who is skilled in such work will be induced to take up the study of *Volvox* anew and publish a well-executed drawing of a colony in which the facts here recorded are adequately represented. This is all the more desirable in that, if *Volvox* is really a plant, its psychological history should be as much a matter of interest as its singular beauty and its intricate methods of reproduction seem to have been.—*Proc. Acad. Nat. Sci. Philad.* May 21, 1889, p. 138.

On a Gall produced in Typhlocyba rosæ, *Linn., by a Hymenopterous Larva.* By M. A. Giard.

During last October the trunks of the horse-chestnuts in the Luxembourg Garden were covered with thousands of dead specimens of *Typhlocyba rosæ*, with the wings half open, and slightly attached to the bark, as if they had been killed by an Entomophthorean. The under surface of the leaves also bore a great number of dead specimens of this insect. By microscopic examination I could not detect any trace of Cryptogams. However, as R. Thaxter has lately noted the facility with which *Typhlocyba rosæ* and *mali* when infested by *Entomophthora sphærosperma*, Fres., completely discharge their spores, I thought I must have come upon the scene too late, and left a more complete observation to the summer of the present year*. I must confess that my curiosity was much excited by the

* *Typhlocyba rosæ* lives usually upon roses, apple-trees, and other Rosaceous plants, and often causes great mischief in gardens. I do not think that it has ever been indicated upon the horse-chestnut. In spite of a careful examination I have been unable to find characters clearly separating the variety *æsculi* from the type. M. Lethierry, whose knowledge of the Hemiptera is so great, ascribes the few differences observed to the action of the parasites upon the *Typhlocyba*. However, the *Typhlocybæ* which have become adapted to the horse-chestnut seem to neglect the roses planted in the vicinity.

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