

which encloses a greater or less number of regularly or irregularly disposed diatomaceous frustules, was designated by Brebisson by the name of "Coleoderma." It is to be noted, moreover, that solitary and free Diatoms are not completely devoid of external mucus, but, on the contrary, are surrounded by a thin stratum of this substance. This becomes manifest when their movements in water coloured with indigo are observed under the microscope, inasmuch as the granules of coloured matter do not come into immediate contact with the Diatom, but leave a thin translucent area surrounding the frustule.

But the most singular and curious phenomenon observable in some species, and one which misled their first observers so far that they considered these organisms to be of an animal nature, is the rectilinear motion with which, among others, the *Naviculæ*, the *Cymbellæ*, &c., are seen to advance in the direction of their long axis and to return along the same line. The strongest magnifying power, the most accurate and careful application of the most perfect microscope, and the most skilful methods of observation, have failed to discover the existence of any special organs of locomotion. This being so, the most probable and generally accepted hypothesis suggested in explanation of the movement is that the Diatom, in order to obtain the silex which constitutes its walls, must continually absorb and reject the water which has in solution imperceptible traces of the siliceous substance, and that the consequent action and reaction thus exerted upon the light frustule suspended in the watery medium, determines its alternate forward and backward movement.

Besides this phenomenon of motion another circumstance connected with these interesting organisms early attracted the attention of naturalists, namely, the extreme delicacy of the details with which their valves are ornamented. There is probably not a single Diatom which, when examined by the best microscopes, does not show the surface of its valves to be adorned by exceedingly minute granules, generally arranged in lines which are usually spoken of as "striæ," although properly they are lines or rows of points.

That these striæ, however, are sometimes perfectly continuous cannot be denied, although some naturalists assert that the appearance of a continuous streak is purely illusory, the so-called streak being but the expression of confluent granules. In this connection it is to be noted that the phenomenon of diffraction produced by the obliquity and intensity of the illumination has occasioned a belief in the confluence of the granules of pinnulæ, &c., for example in *Pinnularia major*, Raben., as such a result can be obtained at pleasure in that and other frustules. This consideration, moreover, has led some to deny that there is any value in the division of the Naviculaceæ made by Ehrenberg when he instituted the genus *Pinnularia* for navicular forms having pinnulæ or coarse continuous striæ, and limited the idea of *Navicula* exclusively to navicular forms adorned by rows of granules.

Like the quality and delicacy of the ornamental details, the forms of the valves of