

The siliceous cell of the Diatom is filled with finely granular *protoplasm*, as may be seen after treatment with water slightly acidulated with hydrochloric acid. This causes the protoplasm to contract so that a vacant space appears along the sides of the frustule. The protoplasm encloses a coloured substance called *endochrome*, as well as a few round granules of an oily nature which dissolve under the action of ether or carbon bisulphide.

The endochrome is composed of chlorophyll and diatomine or phycoxanthine,<sup>1</sup> but of these the former is the more interesting, as it is capable, under the influence of light, of decomposing carbonic acid and evolving oxygen. The endochrome is of a greenish-yellow colour, and occurs in the form of bands, granules, or rounded masses which may be arranged irregularly or in radiating lines.

The appearance which this endochrome assumes in the same species is not always identical, and frequently, when it occurs as an amorphous mass, it becomes subsequently divided into numerous granules of equal size and definite outline. That these are to be regarded as so many perfect embryonal cells which are destined to reproduce the parent form cannot be doubted (see pp. 7, 8).

In addition to the endochrome and oleaginous substance, there is, in the centre of the cells, a protoplasmic mass distinguishable by its density from the protoplasm which occupies the rest of the interior of the Diatom. This is called the *Cytoblast* or *Nucleus*, and in its turn encloses the *Nucleolus* in its inactive condition, as may be demonstrated by the action of a very weak solution of chloride of gold.

The cytoblast and the nucleolus certainly exist in all Diatoms, but it is not very easy to distinguish them in small forms. In large species, however, such as *Striatella unipunctata* and a few *Amphoræ*, these structures may be readily seen, and in these the cytoblast may be observed to possess a stellate form having filaments resembling the pseudopodia of *Diffugia* or other Infusoria which sometimes extend to the extremities of the frustule.

Diatoms are solitary or gregarious, free or fixed. The fixed forms are attached by means of a peduncle which may be simple or branched, or they may be enclosed in a cyst, fastened on a small cushion, or embedded in a gelatinous substance which forms a frond either in the form of a simple or compound tube, of a flattened plate, or globular mass. In seriate species the frustules may be arranged either in a lineal or lateral manner. They are also often met with in the form of zigzag chains, adhering to each other by means of small angular cushions, as in *Tabellaria*.

The substance which exists in the form of a definite frond resembling a higher alga, being either ramified, ulvaceous, tubular, saccate, or mucilaginous and amorphous, and

<sup>1</sup> Sachs' Text-Book of Botany; Millardet and Kraus, *Compt. Rend.*, vol. lxxvi. p. 505; Askenasy, *Botan. Zeit.*, 1869, p. 799; Pfitzer in Heft, ii. *Botan. Abhandl.*, edited by Hanstein, Bonn, 1871; *Quart. Jour. Micr. Sci.*, 1872-73.