

the different positions to which the focus of the microscope is brought, the hexagonal tracery exhibits a different appearance; either a regular network of equal hexagonal frames, or a lattice with equal and equidistant circular openings, or a combination of three crossed and equidistant systems of parallel lines (crossed at angles of 120°). All the well-known and often discussed optical phenomena which are observed in the valves of the Diatomaceæ, reappear also on the shell of the Challengerida.

To recognise the true nature of this diatomaceous structure, sections and slides of the shell are required, and also fragments of broken shells, the broken margins of which are of special value for obtaining further explanation. The figures given by Dr. J. Murray (*loc. cit.*, Pl. A) have already demonstrated that the pit-like depressions are regular small cavities in the flinty shell-wall, which possess an inner and an outer opening. These intraparietal cavities are either spherical (fig. 7*b*) or cylindrical (fig. 1*d*, 4*a*) or spindle-shaped, with a constriction (fig. 2*a*). Further accurate examinations probably will show a greater variety in their shape. But each cavity constantly possesses two small openings, one on the outer, and the other on the inner surface of the shell-wall. Closer examination (especially of broken shells and slides) proves the presence of these two openings, which in the smaller species seem to be absent on the first view. I may, therefore, suppose that also in the similar valves of the Diatomaceæ, which exhibit exactly the same structure, an inner and an outer opening are always present in each hexagonal pit, and that the very small size alone prevents them from being recognised. The regular hexagonally-framed cavities in the shell-wall of the Challengerida (probably also of the Diatomaceæ) are therefore genuine pores, differing from the pores of other Radiolaria only in their smaller size and the dilatation of the middle part, which is much wider than the two openings.

The mouth of the shell, its single larger opening, exhibits in the various Challengerida a great variety in form and structure, and offers the best means for separating genera and species. According to its essential shape two different subfamilies and six genera may be distinguished in this family. In the first subfamily, Lithogromida, the mouth is a simple large opening in the wall of the shell on the oral pole of its main axis (Pl. 99, figs. 1–15). In the second subfamily, Pharyngellida, the mouth is prolonged into a cylindrical hollow tube, which is prominent into the shell-cavity, and comparable to the pharynx of the Metazoa in general form and function (Pl. 99, figs. 16–20). In this case we may distinguish an inner and an outer mouth of the tubular pharynx.

In a few forms of both subfamilies the mouth is toothless, smooth, and not armed with prominent external spines or teeth, as in *Lithogromia*, the simplest form of all (Pl. 99, fig. 22) and in *Entocannula* (figs. 19, 20). In the great majority of Challengerida, however, the outer opening of the mouth is armed with one or more teeth, usually strong prominent spines (figs. 1–18). Usually the base of these teeth is