

semitubular or a half cylinder, forming a more or less prominent peristome or a proboscis; and always in this case the open concave side of the canal-shaped groove is directed towards the ventral side of the shell, the closed convex side towards the dorsal side. When several teeth arise from the two lateral free margins of the groove, they are also directed towards the ventral side (figs. 2, 12, 17, &c.). Often a deep ventral incision or a guttural constriction separates the base of the proboscis from the genuine shell. The structure of this proboscis or peristome is usually the same as in the diatomaceous shell-wall; but sometimes its lattice-work assumes a different shape.

The opening of the mouth itself is rarely circular, usually it is elliptical or even lanceolate, often triangular. Sometimes two prominent opposite lips may be distinguished as right and left, when the fissure of the mouth is prolonged in a sagittal or longitudinal direction; as upper and lower, when it is prolonged in a frontal or transverse direction. The upper or dorsal lip is always more developed than the lower or ventral; and the entire semitubular proboscis may be regarded as a production of the upper lip. Sometimes the latter attains an extraordinary size and development, the greatest in *Challengeria murrayi* (Pl. 99, fig. 1).

The teeth of the mouth, which arise from the upper lip, are usually hollow, at least on the base; a prolongation of the shell-cavity arising into the base of the teeth. Their form is very variable, conical, lanceolate, triangular, sabre-shaped, &c. Usually they are more or less curved, and shorter than the radius of the shell; rarely they are straight, and longer than the radius (Pl. 99, figs. 5, 6). More important is their different number, which we have employed for the distinction of subgenera; future observations may prove that they are different genera. The most important are the following cases:—(A.) a single odd dorsal tooth (figs. 5, 16); (B.) two paired lateral teeth (figs. 4, 6, 17); (C.) three teeth, an odd dorsal and two paired lateral (figs. 7, 9, 10); (D.) four paired teeth, two dorsal and two ventral (figs. 3, 13); (E.) five teeth, an odd dorsal and two pairs of lateral (figs. 2, 12); (F.) six teeth in three lateral pairs (fig. 1).

The teeth of the peristome are not the only apophyses which arise from the shell of the Challengerida. In the majority other spines appear on the sagittal margin, which separates the right and left halves of the shell. These marginal spines are characteristic of the genera *Challengeron* and *Porcupinia*; they are usually radially directed, straight, conical, sometimes solid, at other times hollow. Their number and arrangement is very variable and serves for the distinction of species; the following differences are the most important:—(A.) a single odd spine on the apical pole of the shell, in the principal axis, opposite to the centre of the mouth (Pl. 99, figs. 6, 7); (B.) two aboral spines, a dorsal and a ventral (figs. 8–10); (C.) a bunch or a crowded group of radial spines on the aboral margin of the shell, usually one larger apical spine surrounded by several smaller dorsal and ventral (figs. 11, 12, 16); (D.) numerous radial spines along the whole sagittal margin of the shell (figs. 13–15).