

In the lamelliferous corals the number of the lamellæ mostly corresponds with that of the tentacles, and as they are generally believed to be nearly constant in number in adult individuals, they afford very valuable characters for the discrimination of species. Lamellæ only exist in the two higher orders, and extend from the stomach to the outer wall; they are connected with the generative system, the broad lamellæ having usually a great convoluted spermatic vessel attached to its edge, and the sides of the others are loaded with clusters of ova; in some *Alcyonaria* (in which the lamellæ are membranous and eight in number) the same lamella is oviferous above and spermatic below, or two are spermatic and the other six are oviferous. These spermatic cords were considered biliary ducts, till the American naturalists recently found spermatozoa in them. The ova either escape through a small opening in the bottom of the stomach into the sea by the mouth, or some of them are developed inside, and bud out through the side of the parent; the buds either fall off and become separate individuals, or are retained forming branched compound animals, always according to a definite mode of growth, and the angle of branching being often so constant as to assist in defining the species.

The modes of budding, as defined by Mr Dana, are *lateral* or *terminal*. The terminal or *disk-budding* begins by the animal forming two or more new mouths to the one stomach, being the true fissiparous generation. The lateral *disk-budding* should be carefully distinguished, for in it, it is only one of the ova which grow out through the side of the disk, and the second mouth has a separate stomach of its own hanging into the ovarian cavities of the old one. *Acrogenous* growth is the upward extension of the tip of the branches; *prolate growth* is the production of lateral buds from the lower part, so that great flat expansions are produced (as in some *Caryophyllidæ*), or by extension of the upper part from disk-budding (as in the *Astreadæ*). The *spiral-budding*, or *cumulato-ramose* growth, is seen in the Madreporæ, where each branch is composed of a great central parent polyp (forming the perforated apex), surrounded by a whorl of spiral buds. In all the coral-bearing polypes there is a constant death below, leaving only the tips of the cells alive; and in certain cases those die periodically, leaving a germ to grow from the old centre, forming cup-shaped rings of growth, as seen in our figure of *Strephodes multilamellatum*. An intermittent retraction of the base of the stomach gives rise to the transverse partitions of *Cyathophyllum* and *Favosites*.

This Class contains three Orders—1st, *Hydroida*\*; 2nd, *Zoophytaria*; 3rd, *Zoantharia*.

### 1st Ord. HYDROIDA (*Johnston*.)

= Sertulariens (*M. Edw.*) = Hydrozoa (*Owen*) = Nudibrachiata (*Ferre.*) > Polypiaria (*Blainville*).

The Polypes of this Order are rarely single, locomotive, and naked (as the *Hydra*); more usually compound and inclosed in a horny, tubular sclerenchyma or sheath, which is generally branched, jointed by interruptions of growth, and fixed at the base to submarine bodies; always destitute of internal vertical striæ or lamellæ; mouth surrounded by a series of rough, rigid, filiform tentacles, without cilia; digestive cavity hollowed in the granular parenchyma of the body, without membranous walls, having but the one opening†, and no intestine. The young sprout from the side of the parent by lateral budding, or are developed in external vesicles connected with it; the former occurs in the naked *Hydra*, in which at intervals cellular male and female organs are developed, sometimes in different individuals, more commonly both in the one creature; the impregnated ova mostly escaping through the mouth, but some being retained, grow out like buds from the parent. In the compound species, with the horny, tubular integument, the young buds adhere permanently to the parent, forming branched polypidoms of a peculiar pattern for each species; but, in addition to these, peculiar ovigerous vesicles are developed at particular seasons on some definite parts of the stem containing the true

\* Although I think the recent admirable researches of Prof. Agassiz, on the living Naked-eyed *Medusæ* of the shores of Massachusetts, nearly settle the question of the Hydroid Polypes being only the larval state, or alternate generations of such free *Medusæ* as *Sarsia* and *Tiaropsis*, yet I prefer, in a work like the present, leaving them in their old systematic place till we have the whole question before us, by the publication of his observations on the first stages of the metamorphosis.

† Corda imagined a small pore near the terminal sucker to be an anus, but the food is seen to be rejected by the mouth.