

detachment of gemmules, or imperfectly formed portions of their soft substance. These gemmules require to undergo the same kind of metamorphosis in order to bring them to their perfect state; and when newly detached from the parent, they exhibit the same singular spontaneous motions, buoying themselves in the water, and swimming in various directions, by the rapid vibrations of their cilia, till they find a place favourable to their growth. On becoming fixed, they spread out to form a base for the future superstructure; and, after the foundation has thus been laid, they proceed in their upward growth, depositing a calcareous or horny axis in successive layers, until it has acquired the requisite thickness; and they then gradually assume the forms characteristic of the particular species to which they belong. The materials thus deposited are permanent structures, not capable of modification or removal, and not possessing any vital properties; for these properties belong exclusively to the animated flesh with which these structures are associated. The polypes themselves are not developed till after the formation of the root and stem; their growth being in this respect analogous to that of the leaves and flowers of a plant.

The gemmules of the *Flustra carbacea* may be selected in illustration of these phenomena. These have been observed by Dr. Grant,* to swim about in the water as soon as they have escaped from the cells of the parent; each moving with its narrow end foremost, while the opposite broad end, which is covered with cilia, expands into a flat circular zone. These gemmules are very irritable, and are frequently seen to contract the circular margin of their broad extremity; and, while swimming, to stop suddenly in their course. They swim with a gentle gliding motion: at other times they appear stationary, all the while revolving rapidly round their longer axis, with their broad end uppermost: they often bound forwards, either in straight lines, or describing circles, with no other apparent object than to keep themselves afloat, until they shall arrive at a favourable spot for

* Edinburgh Philosophical Journal, XVII. 107 and 337.