

have all passed up from the abdomen—and if the incubatory pouch is then formed in such a way that the ova which have been fertilized last pass in first, and so reach the far end of the pouch, then the observed arrangement would be brought about. But I have no reason to believe that this is the actual process, as no Ascidiozooids were found with the peribranchial cavity full of ova and embryos for the reception of which an incubatory pouch had not yet been formed.

*The Process of Budding.*—As this account is taken from the observation of some chance sections of buds occurring in a few preparations of sliced stems, many gaps of course exist, and many points remain undetermined on account of sections in the proper direction, and at the proper stage of development, not being obtainable. Further study with more abundant material will be required to unite the various links and supply all details.

It has been already seen that from the abdominal region of each Ascidiozoid in the colony a long appendage extends downwards towards the base of the peduncle, that this appendage consists of a blood sinus in direct communication with the posterior extremity of the heart, and of a covering derived from the mantle or body-wall, and that in the peduncle these appendages lie in tunnels bored through, and separated from each other by, the investing mass (Pl. VIII. fig. 9).

These vascular appendages, as might be expected from their nature, contain blood-corpuscles; in the preserved specimens, however, the corpuscles are never very abundant. Throughout the greater part of an appendage they are scattered singly and sparingly; here and there, however, at or below the middle of the stalk, clusters of them may be seen adhering to the walls of the tube. These clusters vary in size from two or three corpuscles up to a dozen or so; in the latter case it may be generally observed that the wall beside them bulges a little outwards, so that they occupy a slight recess (Pl. IX. fig. 2). Probably the corpuscles now begin to divide, at any rate their number increases rapidly, so as to form a more or less spherical cellular mass placed in a diverticulum of the appendage. This is the beginning of the formation of a bud. This mass of cells increases in size and becomes ellipsoidal or almond-shaped (Pl. IX. fig. 3). The cavity in which it lies also enlarges, works its way into the adjacent investing mass, and finally becomes entirely shut off from the tube of which it originally formed a part (see Pl. IX. figs. 4, 5).

Before this migration has taken place the cells of the bud have come to be arranged in two concentric layers (see Pl. IX. figs. 3, 4, 6). How this takes place I was unable to determine. Probably the outer layer is formed from the wall of the vascular appendage (which is covered by an extension of the ectoderm) and the inner by a rearrangement of the blood-corpuscles (usually regarded as mesoderm cells). Two layers, however, are produced, an outer or ectodermic and an inner or endodermic, the latter enclosing a cavity, the archenteron.