

blood-corpuscles, may possibly be regarded as supplying the endodermal element to the bud.

*The Formation of the Colony.*—It has already been stated that buds advanced in development are only met with in the upper part of the stalk, while at the very top the buds are almost in the condition of young Ascidiozooids (such as Pl. IX. fig. 12). These last form a perfectly graduated series with the young Ascidiozooids placed at the base of the head, showing very plainly that the latter are derived from stalk buds. All the middle part of the head is occupied by adult Ascidiozooids in full vigour, no young ones being found amongst them. In the upper part, on the other hand, it is evident that the colony is in a state of decay, gaps being found, and Ascidiozooids in a semi-decomposed condition occurring here and there, while at the very summit of the colony all is dead, no Ascidiozooids are present, and the investing mass is ragged and evidently wasting away (Pl. V. fig. 2).

All this suggests that the following is the probable method of increase and maintenance of the colony. After having been once established, by the development of a tailed larva, it grows from the lower part of the future stalk where the test substance or investing mass alone is produced. As this gets pushed up by the formation of more below it the end of a vascular appendage from the single Ascidiozooid in the head above penetrates down into it and in course of time produces one or more buds. These become imbedded in the investing mass around the vascular appendage, and proceed to develop, occupying, as they advance in age and size, successively higher and higher positions in the young stalk on account of the constant growth at the base of the colony. In this way, when fully developed, they reach the top of the stalk ready to take their places as young Ascidiozooids at the base of the head.

In the fully developed colony the buds are produced near the centre of the stalk, while, when they reach the base of the head, they occupy the outer layer. This change in position is caused by their being pushed outwards as they advance towards the head by the new vascular appendages which are constantly growing downwards from the young Ascidiozooids above them and which occupy the centre of the stalk. Thus the buds are gradually forced into their peripheral position.

After entering the head the young Ascidiozooids continue to grow and soon reach maturity, sending down their vascular appendages through the stalk to form new buds, and producing also tailed larvæ from true ova fertilized by the spermatozoa of the older Ascidiozooids. Still they are constantly being pushed upwards, and finally, after having developed and lived through the entire length of the colony, they reach the summit as old Ascidiozooids, die, and drop off.

In this way it is obvious that the colony when once established may be maintained; while if, as must be the case at first, the production of buds is in excess of the death and decay at the summit, the colony will increase in size.