

branchial sac in all, and still more the condition of the reproductive organs, show such a close resemblance to the corresponding parts in species of *Polycarpa* and *Styela*, that the two groups must be closely related, as was supposed by Giard and by Heller. But still it is impossible to regard the Polystyelidæ as Simple Ascidiæ. *Thylacium*, *Oculinaria*, and *Goodsiria* were all originally described as Social Ascidiæ allied to *Clavelina*, which produces buds. Carus and Giard both came to the conclusion that reproduction by gemmation probably took place in the genera they described, and although, like them, I have not been able to settle the matter conclusively, I think there can be very little doubt that the specimens I have examined are true colonies produced by a process of gemmation from the vascular appendages of a single Ascidiozoid.

It is well known that some species of the Styelinæ (e.g., *Styela grossularia*) under certain circumstances produce aggregations which have a superficial resemblance to colonies. When individuals are closely crowded together their tests unite to form a continuous mass, and young individuals of the same species attach themselves to the tests of the older specimens. These aggregations, however, are not colonies. There is no reproduction by gemmation, the individuals in the mass have all been produced from ova, and have no relation to one another except as near neighbours, and finally they are imbedded in a common test or investing mass.

The specimens of the Polystyelidæ in the Challenger collection are not mere aggregations of individuals, they are colonies of Ascidiozooids imbedded in a common test which is penetrated by a system of vessels—consequently they must be regarded as Compound Ascidiæ. They are not, however, closely allied to most of the other Compound Ascidiæ, but have, I am inclined to believe, been evolved separately from the Simple Ascidiæ, and not from the end of that group occupied by *Clavelina* and *Ecteinascidia*, to which some of the Compound Ascidiæ are closely allied,¹ but from near the genus *Polycarpa* amongst the Cynthiidæ. The only other family of Compound Ascidiæ to which the Polystyelidæ seem to be closely allied is the Botryllidæ. The general shape of the Ascidiozooids, the appearance and course of the alimentary canal, and the structure of the branchial sac, are so similar in the two families, that I believe the Botryllidæ to be more nearly related to the Polystyelidæ than they are to the rest of the Compound Ascidiæ.

The chief characteristics of the Polystyelidæ are the large and usually rounded Ascidiozooids, with their four-lobed apertures, and the total absence of common cloacal cavities, the possession of branching vessels like those of the Botryllidæ in the test, the presence of numerous strong internal longitudinal bars, and sometimes of folds, in the branchial sac, and the simple condition of the dorsal lamina.

The shape of the colony varies greatly. It is massive and pedunculated in *Goodsiria placenta*, massive and sessile in *Goodsiria coccinea*, incrusting in *Synstyela incrustans*, and broken up into small pieces united by irregular stolons in *Chorizocormus*.

¹ See Summary and General Remarks at the end of this Report.