

account of their connection with ancestral Chordata, (2) because of the well-marked degeneration which they exhibit, and (3) because of the curious course which the group has apparently followed in its evolution, one result of which is that one of the largest and most important sections, that of the Compound Ascidiæ, is, as I shall show farther on,¹ polyphyletic in origin, and is consequently an unnatural group.

Assuming the protochordate relations of the group, our conception of the ancestral form² from which the primitive Tunicata were derived would take the form of an elongated bilaterally-symmetrical free-swimming animal with a metamericly segmented body, terminating anteriorly in a præoral lobe. The mouth would be ventral and the anus posterior, and the anterior portion of the alimentary canal would be provided with a series of laterally-placed respiratory slits putting paired diverticula of the cavity of the fore-gut in communication with the exterior of the body. On the dorsal surface of the alimentary canal would be placed a median hypoblastic rod, the notochord, and above that again the dorsally-placed nervous system, possibly still in connection with the epiblast over it, and forming a longitudinal median tract probably produced by the union of two lateral nerve cords, and provided with an anterior enlargement in the præoral lobe, and possibly with a ganglionic thickening in each metamere. The cœlom, formed by the union of outgrowths from the archenteron, would have paired nephridia of the typical form, placing it in connection with the exterior of the body, and probably one or more such pairs were present in the præoral lobe in close relation with the ventral surface of the large nerve mass.

From such a form as this the primitive Tunicata might be evolved with a slight amount of degeneration. Nearly all the existing groups of Tunicata pass through a free-swimming larval stage, which probably represents very closely the structure of a common ancestor not far removed from the existing *Appendicularia*. Such a hypothetical form would differ mainly from its protochordate ancestors in having the notochord limited to the posterior part of the body, and not extending forwards into the region occupied by the chief parts of the nervous system and alimentary canal; and in having the anus ventral in place of posterior. It may readily be imagined that some group of the free-swimming Protochordates would find it an advantageous modification that the alimentary canal, which performed both nutritive and respiratory functions, and the main part of the nervous system, in connection with which sense organs had become developed, should be as much as possible concentrated in the anterior part of the body so as to leave the posterior part free to become modified into an efficient locomotory organ. Under such circumstances it would be natural that the notochord, the sole internal skeleton, should become restricted to the posterior,

¹ See also this Report, Part II. p. 387.

² See Herdman, *Phylogen. Classif. of Animals*, p. 57, 1885; and Van Beneden and Julin, *Morph. d. Tuniciers*, p. 415, 1887.