

4. CEPHALOCHORDATE ANCESTRY.

The cephalochordates possess the three basic chordate features. According to Colbert, the living *Amphioxus* (=Branchiostoma) answers the logical structure of a model prevertebrate. Homer Smith's reconstruction of the hypothetical protovertebrate in his book, *From Fish to Philosopher (1953)*, also greatly resembles *Amphioxus*. But, the excretory system of cephalochordates consisting of solenocytes is different from that of vertebrates. The solenocytes are ectodermal and therefore not homologous with the mesodermal vertebrate kidneys. Further, lack of strong cephalization and sense organs, and the unique forward extension of notochord indicate that the cephalochordates may hint about the likely ancestral body plan of vertebrates, but they are not themselves ancestral. Both may represent divergent paths of evolution from a common remote ancestor.

5. BARRINGTON'S HYPOTHESIS

It is the most plausible hypothesis by E.J.W. Barrington (1965). It is based upon the deuterostomes line of chordate evolution. The common echinoderm-chordate ancestor was a lobophorate or arm feeding creature. It is fed by ciliary method, i.e. by trapping food particles in a set of waving tentacles. From this lobophorate arose early stalk of echinoderms and pogonophores.

DERIVATION OF STEM CHORDATE

The external tentacles were replaced by an internal filter-feeding apparatus in which food is entrapped inside the pharynx which develops external gill-slits and mucus secreting endostyle. *Cephalodiscus*, a living hemichordate, shows the transitional stage between the two modes of feeding because it has a single pair of gill slits besides the crown of tentacles. Pharyngotremy resulted in the evolution of free-living hemichordates, on one hand, and the sessile ancestral urochordates, on the other. Some ancestral tunicates, instead of producing ciliate larva, formed tadpole larva with all the typical somatic features of the chordates.

According to Garstang, the larva became elongated in size and the longitudinal ciliary bands shifted mid-dorsally and changed to the hollow

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nerve cord, the adoral cilia developed into the endostyle, and muscle fibres evolved in the tail. This typical chordate larva by paedogenesis suppressed the sessile adult stage, developed gonads precociously and became the ancestor of cephalochordates (Branchiostoma), vertebrates and the larvacean probably representing three cases of parallel evolution.

