

living *Ceratodus* to survive in the muddy pools of dried-up streams in Australia. The pectoral fins are a pair of slender filaments in *Lepidosiren*; thickened paddle-shaped fins with a jointed axis in *Ceratodus*, and have a thickened axis in *Phaneropleuron* and other ancient genera.

TELEOSTS.—The Teleosts include nearly all of the modern fishes except the Sharks and Rays and the few existing Ganoids. They are closely allied to the Ganoids, through the existing *Amia* and related forms. They have a bony skeleton, as implied in the name (from *τέλειος*, *perfect*, *ὀστέον*, *bone*); and the gills are free. In the absence of a valve between the intestine and stomach they are unlike the Ganoids and Sharks and inferior to them in type of structure. The body usually has scales, which are either cycloid (Fig. 369), or ctenoid (Fig. 370), the latter term referring to the toothed or spinous margin, and coming from the Greek for *comb*; but in some kinds there are bony plates.

CYCLOSTOMES (Marsipobranchs) or Lampreys, etc., having a simple cartilaginous notochord; no jaws; mouth a circular opening for suction, usually with conical teeth on its inner surface; gills pouch-like; no fins.

6. *Leptocardians.*

AMPHIOXUS (or *Branchiostoma*): embryonic forms having a simple fibrous notochord in place of a vertebral column; cranium and distinct brain lacking; heart tubular; gill a saccular dilation of the œsophagus; no jaws; the organs of the senses partly wanting. The species are all small.

Relation of Vertebrates to Invertebrates.—The Invertebrates are widely separated in character from the Vertebrates. The nearest group to Fishes among them is that of the Ascidians or Tunicates, formerly referred to the class of Mollusks and regarded as not higher among species than the Oyster, all special organs of locomotion being absent, and little to be seen in an outside view but a bag with two holes for the passage of water—inward at one hole and outward at the other. But the animals are little like Mollusks structurally, and have certain peculiarities in their embryonic development which manifest a relationship to the Vertebrates. In the young stage some of them have a resemblance in form and somewhat in organs to the tadpole of a Frog and the embryo-like fish, *Amphioxus*. The Ascidians are consequently regarded as related either to a prototype form of Vertebrate, or else to a degenerate form in the Vertebrate series. The relation is briefly presented in a well-illustrated article by Lankester entitled *Vertebrata*, contained in the 24th volume of the *Encyclopædia Britannica*.

INVERTEBRATES.

The old subdivisions of the Invertebrates are: **PROTOZOANS**; **RADIATES**, including Polyps, Hydrozoans, and Echinoderms; **MOLLUSKS**, including Mollusks, Bryozoans, and Brachiopods; **ARTICULATES**, including Worms, Crustaceans, and the terrestrial kinds, Myriapods, Arachnids, and Insects. Through embryological study it has been proved that true Protozoans are one-celled in all stages, the embryo cell undergoing no subdivision (that is, segmentation) in the development. In Sponges, on the contrary, while there is much external resemblance to Protozoans, the germ-cell undergoes segmentation as in higher species, and hence there is a nearer relation to Polyps than to the simple Protozoans. It has also been found that Brachiopods are about as nearly related to Worms as to Mollusks; that Echinoderms are more nearly related to Worms than to Polyps and Hydrozoans, notwithstanding the radiate arrangement of the external parts; that Polyps and Hydrozoans (*Medusæ*) are closely related, and as they have the common character of a single opening to the interior cavity, they now are called *Cœlenterates*, from *κοίλος*, *hollow*, and *έντερον*, *intestine*.