

decephalization and a multiplicate or nearly limitless segmentation are extreme. There is no lower extreme, except in that of the compound mass of the sponge or the polyp, where a head fails entirely.

In the higher typical Worms, the Annelids, the many segments of the body have a separate nervous ganglion as an enlargement of the nervous cord, or pair of cords, that passes posteriorly from the cephalic ganglion, giving it a degree of independence. But the head has its mouth, and the body its intestine and reproductive system, so that the structure is one in system of growth and reproduction. Yet the number of body-segments varies greatly, it being not often fixed even for the species of a genus; and all of the segments behind the head participate alike essentially in the work of locomotion. The body structure in Worms is, therefore, *multiplicate*, and greatly decentralized, and locomotion is of the *diffuse* kind. Moreover, jointed limbs are wanting.

2. Crustaceans.—Crustaceans contrast strongly with the Worms, high or low. (1) The body consists of a head (which, as in other animals, includes the mouth as well as the organs of the senses), a thorax furnished with limbs, and an abdomen. (2) The number of body-segments, in typical species, is *limited*, instead of being multiplicate, it not exceeding 20; 6 of these segments pertain to the abdomen, and 14 to the thorax and head.

On differences in the arrangement and functions of the parts of the structure, exemplifying degrees in cephalization, is based the accepted system of classification in Crustaceans. This system subdivides the typical species into (1) *Decapods*, or the 10-footed, and (2) *Tetradecapods*, or the 14-footed; and each of these tribes into two subordinate groups, *Brachyurans* and *Macrurans* for the former, and *Isopods* and *Amphipods* for the latter.

Decapods and Tetradecapods.—In the Decapods (1) the head includes 9 body-segments—the 3 anterior bearing the organs of the senses, the eyes, and 2 pairs of antennæ, and the remaining 6, the jointed mouth organs; and (2) the thorax, comprising the remaining 5 segments of the cephalothorax, bearing 5 pairs of feet. In the Tetradecapods, the head corresponds to only 7 body-segments, and has, therefore, but 4 pairs of mouth organs, while the thorax includes 7 segments and bears 7 pairs of feet. In other words, *the anterior 2 pairs of feet of the Tetradecapods are pairs of mouth organs in the Decapods*. There is thus a transfer forward of legs to the mouth series on rising from the Tetradecapod tribe to the Decapod. It is a case of concentration headward in the structure, or of higher cephalization. The two tribes also differ in the mean size of the animals, Decapods having, on an average, 100 times the bulk of Tetradecapods.

We pass now to the two subdivisions of the Decapods and Tetradecapods.

Brachyuran and Macruran Decapods.—A Macruran Decapod, as exemplified in a Lobster, Prawn, or Shrimp, has (1) an elongate, loosely compacted body, with the abdomen nearly as long as the cephalothorax, and in some species several times longer; (2) the abdomen is the most powerful organ in locomotion; (3) the thoracic feet are feeble in locomotion; (4) the outer mouth organs are foot-like, free, and long; (5) the antennæ are sometimes a foot or more long.

The *Brachyuran*, as the common Crab, has, on the contrary, (1) a short body, it being seldom longer than broad; (2) the abdomen in males is very small and narrow, it doing no service in locomotion, but, instead, lying confined in a groove on the under side of the body, so that the animal is almost comprised within the first 14 of the normal 20 segments of the Crustacean; (3) the thoracic feet, or those of the posterior 5 of these 14 segments, are the sole organs of locomotion; besides (4) the mouth organs are small, and closely stowed away together within, or over, a shallow cavity, which is covered by the outer pair, as an operculum; and (5) in harmony with the general compactness of structure, the antennæ are very small, seldom exceeding an inch in length.