

It follows, further, from the cephalized nature of an animal, that its *primary centre of force*, or the point from which concentration and the reverse are to be measured, anteriorly and posteriorly, is in the head, near the anterior extremity of the structure. In an Insect or Crustacean, its position is between the mouth and the organs of the senses—over which part the cephalic mass is located. This is sustained by embryogeny; and also by the fact, that, as the two most fundamental characteristics of an animal are its being sense-bearing and mouth-feeding, the mouth, on descending to the simplest of animals, is the last part to become obsolescent. Only in the inferior Invertebrates is the position of the mouth approximately *central* in the structure, as explained on page 328.²

1. *Methods of Cephalization.*

The methods, according to which the grades of cephalization are exhibited, may be arranged under the following heads:

A. *Size (force-measured) of life-system*: each type, between Man at one extreme and Protozoans at the other, having its special range of variation in this respect.

B. *Functional*: or variations as to the distribution of the functions *anteriorly* and *posteriorly*, and as to their condition.

C. *Incremental*: or variations as to vegetative increment, that is, as to amplitude, and multiplicative development.

D. *Structural*: or variations in the conditions of the structure, —whether (1) compacted, or, on the other hand, resolved into normal elements; (2) simple, or complex by specialization; (3) defective, or perfect; (4) animal-like, or plant-like.

E. *Postural*: or variations as to posture. (Only in Vertebrates.)

F. *Embryological*: or variations connected with the development of the young.

G. *Geographical distribution.*

For greater convenience and uniformity, the methods under these heads are mentioned beyond as they appear when viewed along the *descending* line of grade, instead of the ascending. This is, in fact, the more natural way, since the typical form in a group—the fixed point for reference—holds a position towards the top of the group. The methods, as given, are therefore more strictly methods of *decephalization* than of cephalization; but the former are simply the reverse of the latter.

A. SIZE (OR FORCE) OF LIFE-SYSTEM.

1. *Potential*.—Exhibited in less and less force and size of life-system with decline of grade (and the reverse, with rise of

² There may also be one or more *secondary* centres of force; but they are, as regards the subject before us, of comparatively small importance. The independent development of the abdomen and cephalothorax in Crustaceans is a case of the kind, as explained elsewhere by the writer. See paper on the Classification of Crustaceans referred to.