

This centralization is literally a *cephalization* of the forces. In the higher groups, the larger part of the whole structure is centred in the head, and contributes to head functions, that is, the functions of the senses and those of the mouth. As we descend, the head loses one part after another, and with every loss of this kind, there is a step down in rank. This centralization may be looked for in the nervous cords; but the facts are less intelligibly studied there, than in the members, the production and position of which measure the condition of the forces:—just as we can better measure the forces of a galvanic battery by the work done, than by the size or external appearance of the plates which constitute it.

In the Crustacea type, there are normally twenty-one segments, and correspondingly twenty-one pairs of members, as laid down by Milne Edwards, the last seven of which pertain to the abdomen, and the first fourteen to the cephalothorax. Now, we may gather from an examination of the crab, or Macroural Decapod, acknowledged to be first in rank, what condition of the system is connected with the highest centralization in Crustacea.

In these highest species, *nine* segments and nine pairs of appendages out of the *fourteen* cephalothoracic, belong to the senses and mouth, and only *five* pairs are for locomotion. Of these *nine*, three are organs of senses, six are the mandibles and maxillæ. Moreover, these organs are clustered into the smallest possible space, so that the six pairs of mouth organs hardly occupy more room than the first pair of legs. The organs are all small, the antennæ exceedingly short, the maxillæ small lamellar organs sparingly jointed. The vegetative powers of growth have had but little play. The inner antennæ are rather large as regards the basal joint, which is devoted to one of the senses, but the rest is nearly rudimentary, and the whole is snugly boxed away, to be extruded at the will of the animal. The exterior maxillæ (or outer maxillipeds) cover exactly the other pairs, and shut closely down over the mouth, like a well-fitting operculum to the buccal area.

We hence learn, that the condition of highest centralization in Crustacea, is where the cephalic part embraces the largest portion of the normal structure of the cephalothorax, and the whole is contracted within the smallest compass, with the least vegetative growth or elongation of the parts. The forces are concentrated in the more perfectly developed senses and the higher functions of the animal—not in giving size to the organs of the senses, but acuteness to the