

transfer of members. The statement would be wholly at variance with the very idea of cephalization. What I have asserted is this: that variation in grade of cephalization is *manifested* in the structure by the transfer referred to, and by this as only *one among many methods*.

I have argued that since animals have a head as their grand characteristic feature, and a cephalic nervous mass as the fundamental element of the head and the prime center of force in the organism, exaltation and concentration anteriorly of the life-forces mark a high grade of cephalization; and relaxation or decentralization, and an enfeebling of the same, with a consequent spreading posteriorly or away from the cephalic extremity, indicate a low grade of cephalization. I have also said that these conditions of the life-forces of the individual, that is, of the organizing and working forces, should necessarily be apparent, and are in fact apparent, in the structure of the organism, the resultant of the forces. I have shown that concentration anteriorly, with exaltation of the cephalic extremity, is manifested not merely in the transfer of members to the cephalic series (thereby enlarging the sphere of the head), but also in the form and structure of the head,—in the form and condition of the organs of the senses—of the organs of the mouth—of the successive pairs of legs—of the abdomen—of the abdominal appendages; and in my later memoirs I have still more widely extended the list of characteristics that indicate grade of cephalization.

The laws of cephalization act conjointly with another principle in animal life:—that of the *oppositeness subsisting between the cephalic or anterior and the posterior extremities of the animal structure*, which is a kind of antero-posterior or fore-and-aft polarity. This oppositeness or polarity is *up-and-down* in the plant, and *fore-and-aft* in the animal. The fore-and-aft becomes strictly up-and-down *in position* in one animal alone—Man; and this by elevating heavenward the cephalic extremity, not by a change of the axis of symmetry to that of the plant. (See this Jour., xxxvi, 351.)

In view of the total misapprehension of this subject by our entomological critic, I may be excused for citing additional explanations from an article written for a popular magazine, even if they are essentially a repetition of what is contained in my former papers.

“As the head is the seat of power in an animal, it is natural that among species rank should be marked by means of variations in the structure of the head; and not only by variations in its structure, but also in the extent to which the rest of the body directly contributes, by its members, to the uses or purposes of the head. *Cephalization* is, then, simply domination of the head—cephalic domination—in an animal, as manifested in the structure; and any *degree* of it depends on the grade of power of the