

to Echinoderms; Crustacea and Insects are more closely allied to one another than to Worms, etc. Upon such degrees of relationship between the classes, within their respective branches, the so-called sub-types have been founded, and these differences have occasionally been exaggerated so far as to give rise to the establishment of distinct branches. Upon similar relations between the branches, sub-kingdoms have also been distinguished, but I hardly think that such far-fetched combinations can be considered as natural groups; they seem to me rather the expression of a relation arising from the weight of their whole organization, as compared with that of other groups, than the expression of a definite relationship.

SECTION VIII.

SUCCESSIVE DEVELOPMENT OF CHARACTERS.

It has been repeated, again and again, that the characters distinguishing the different types of the animal kingdom were developed in the embryo in the successive order of their importance: first the structural features of their respective branches, next the characters of the class, next those of the order, next those of the family, next those of the genus, and finally those of the species. This assertion has met with no direct opposition; on the contrary, it seems to have been approved almost without discussion, and to be generally taken for granted now. The importance of the subject requires, however, a closer scrutiny; for if Embryology is to lead to great improvements in Zoölogy, it is necessary, at the outset, to determine well what kind of information we may expect it to furnish to its sister science. Now I would ask if, at this day, zoölogists know with sufficient precision what are typical, class, ordinal, family, generic, and specific characters, to be justified in maintaining that, in the progress of embryonic growth, the features which become successively prominent correspond to these characters and in the order of their subordination? I doubt it. I will say more: I am sure there is no such understanding about it among them, for if there was, they would already have perceived that this assumed coincidence, between the subordination of natural groups among full-grown animals and the successive stages of growth during their embryonic period of life, does not exist in nature. It is true, there are certain features in the embryonic development which may suggest the idea of a progress from a more general typical organization to its ultimate specialization, but it nowhere proceeds in that stereotyped order of succession, nor indeed even in a general way, in the manner thus assumed.