

These facts show plainly, that there is a common plan of development in all Testudinata, however much they may differ in their full-grown state, and that

agents as far as they limit the growth of animals and plants; under artificial restraint, that imposed by man.) The next step in the development unfolds the prominent features of the branch of the animal kingdom to which the new being belongs. It marks the sphere in which it is to grow up. At this stage the plan of the development characteristic of the branch is, as it were, laid out, and its direction and tendency are defined; but the manner in which this is to be accomplished remains to be seen in the further progress. What unexpected resemblance to the moral and intellectual development of Man!

We might next expect that the mode of execution which characterizes classes should necessarily follow, but this is not so. Just as in other developments, the true character of the structure is frequently not apparent before it is completed: certain complications, which are embodied in it, become visible before their relation to the whole can be perceived; the form of the structure may also be recognizable before its constitutive elements can be analyzed; many details in the structure, the relative proportions of the parts to one another and their relations to the surrounding circumstances, may be fully or partially worked out long before the distinguishing character of the structure, as a whole, is appreciable.

This, also, is precisely the case with the development of different animals. In Turtles, which as Reptiles are cold-blooded, air-breathing, oviparous animals, none of the most prominent characters of the class are developed before they are hatched, (as, for instance, their aerial mode of breathing;) while some of these class characters are only recognizable in a much later period of life, (their oviparity, for instance.) Yet, as showing the manner in which the plan of structure of their branch is carried out, these characters are truly class characters. On the contrary, the special complication of that structure which characterizes the order as an order, — the separation of the body into distinct regions, a head, a neck, and a tail, and the presence of the shield and the four legs, which appear very early, even before the animal has

assumed its form, — shows plainly, that in Testudinata the development of the ordinal characters precedes not only that of the characters of the family, but also that of the characters of the class. Strange as it may appear, it is unquestionable that in Turtles the ordinal characters are developed before those which characterize the class. The early separation of the head from the neck; the distinctness with which the limits between the neck and trunk, and between this and the tail, may be recognized, almost as soon as the main axis is formed; and, finally, the early development of the shield and of the four legs leaves not the remotest doubt upon this point.

Next, the form is developed, so that the most prominent family character appears immediately after the ordinal characters, in all the families of Testudinata, with the exception of the Emydoidæ, and probably also of the Testudinina, though these have not yet been observed. It is particularly interesting, that this character is fully marked in the Chelonioidæ, Trionychidæ, Chelydroidæ, and Cinosternoidæ long before they are hatched; whilst in the Emydoidæ it is not apparent for a long time, even for years after their birth, at a time when they exhibit already most of their generic and specific characters. As to the successive appearance of the generic and specific characters, even limiting the inquiry to the different genera and species inhabiting North America, much more extensive investigations, than I have been able to make thus far, are still required, before it can be satisfactorily illustrated. Meanwhile I refer to my remarks, p. 290-295. The great difficulty in these investigations consists in a correct appreciation of those peculiarities which may be *embryonic* and not *specific*, though preserved through life, and enumerated by herpetologists among the specific characters. I can state, however, that I do not know a Turtle which does not exhibit marked specific peculiarities long before its generic characters are fully developed.

It is only necessary to compare the mode of development of some of the Articulata with that of the Testudinata, to perceive at once how different the suc-