

may be fully stamped upon an animal before its ordinal characters are developed. Even specific characters, as far as they depend upon the proportions of parts and have on that ground an influence in modifying the form, may be recognized long before the ordinal characters are fully developed. The Snapping-Turtle, for instance, exhibits its small crosslike sternum, its long tail, its ferocious habits even before it leaves the egg, before it breathes through lungs, before its derm is ossified to form a bony shield, etc.; nay, it snaps with its gaping jaws at any thing brought near, though it be still surrounded by its amnios and allantois, and its yolk still exceeds in bulk its whole body.¹ The calf assumes the form of the bull before it bears the characteristics of the hollow-horned Ruminants; the fawn exhibits all the peculiarities of its species before those of its family are unfolded.

With reference to generic characters, it may be said that they are scarcely ever developed in any type of the animal kingdom, before the specific features are for the most part fully sketched out, if not completely developed. Can there be any doubt that the human embryo belongs to the genus *Homo*, even before it has cut a tooth? Is not a kitten, or a puppy distinguishable as a cat or a dog, before the claws and teeth tell their genus? Is this not true also of the Lamb, the Kid, the Colt, the Rabbits, and the Mice, of most Birds, most Reptiles, most Fishes, most Insects, Mollusks and Radiates? And why should this be? Simply, because the proportions of parts, which constitute specific characters, are recognizable before their ultimate structural development, which characterizes genera, is completed.

It seems to me that these facts are likely to influence the future progress of Zoölogy, in enabling us gradually to unravel more and more distinctly, the features which characterize the different subordinate groups of the animal kingdom. The views I have expressed above of the respective value and the prominent characteristics of these different groups, have stood so completely the test in this analysis of their successive appearance, that I consider this circumstance as adding to the probability of their correctness.

But this has another very important bearing, to which I have already alluded in the beginning of these remarks. Before Embryology can furnish the means of settling some of the most perplexing problems in Zoölogy, it is indispensable to ascertain first what are typical, classic, ordinal, family, generic, and specific characters; and as long as it could be supposed that these characters appear necessarily

¹ PR. M. v. NEU-WIED quotes as a remarkable fact, that the *Chelomara serpentina* bites as soon as it is hatched. I have seen it snapping in the same fierce manner as it does when full-grown, at a time

it was still a pale, almost colorless embryo, wrapped up in its fetal envelopes, with a yolk larger than itself hanging from its sternum, three months before hatching.