

The next question would then be: Does the animal kingdom constitute several, or any number of graduated series? In attempting to ascertain the value of the less comprehensive groups, when compared to one another, the difficulties seem to be gradually less and less. It is already possible to mark out with tolerable precision, the relative standing between the classes, though even here we do not yet perceive in all the types the same relations. Among Vertebrata, there can be little if any doubt, that the Fishes are lower than the Reptiles, these lower than Birds, and that Mammalia stand highest; it seems equally evident, that in the main, Insects and Crustacea are superior to Worms, Cephalopods to Gasteropods and Acephala and Echinoderms to Acalephs and Polypi. But there are genuine Insects, the superiority of which over many Crustacea, would be difficult to prove; there are Worms which in every respect appear superior to certain Crustacea; the structure of the highest Acephala seems more perfect than that of some Gasteropods, and that of the Halcyonoid Polyps more perfect than that of many Hydroids. Classes do, therefore, not seem to be so limited in the range of their characters, as to justify in every type a complete serial arrangement among them. But when we come to the orders, it can hardly be doubted that the gradation of these natural divisions among themselves in each class, constitutes the very essence of this kind of groups. As a special paragraph is devoted to the consideration of the character of orders in my next chapter, I need not dwell longer upon this point here.<sup>1</sup> It will be sufficient for me to remark now, that the difficulties geologists have met with, in their attempts to compare the rank of the different types of animals and plants with the order of their succession in different geological periods, has chiefly arisen from the circumstance, that they have expected to find a serial gradation, not only among the classes of the same type, where it is only incomplete, but even among the types themselves, between which such a gradation cannot be traced. Had they limited their comparisons to the orders which are really founded upon gradation, the result would have been quite different; but to do this requires more familiarity with Comparative Anatomy, with Embryology and with Zoölogy proper, than can naturally be expected of those, the studies of which are chiefly devoted to the investigation of the structure of our globe.

To appreciate fully the importance of this question of the gradation of animals, and to comprehend the whole extent of the difficulties involved in it, a superficial acquaintance with the perplexing question of the order of succession of animals in past geological ages, is by no means sufficient; a complete familiarity with the many attempts which have been made to establish a correspondence between the two, and with all the crudities which have been published upon this subject, might dispel

<sup>1</sup> See Chap. II.