CHAP. I. RANK AND DEVELOPMENT OF ANIMALS.

further mention here. It has also been shown above (Sect. VIII.) that animals do not form such a simple series as would result from a successive development. There remains, therefore, only for us to show now within what limits the natural gradation which may be traced in the different types of the animal kingdom,¹ corresponds to the changes they undergo during their growth, having already considered the relations which exist between these metamorphoses and the successive appearance of animals upon earth, and between the latter and the structural gradation or relative standing of their living representatives. Our knowledge of the complication of structure of all animals is sufficiently advanced to enable us to select, almost at random, our examples of the correspondence between the structural gradation of animals and their embryonic growth, in all those classes the embryologic development of which has been sufficiently investigated. Yet, in order to show more distinctly how closely all the leading features of the animal kingdom are combined, whether we consider the complication of their structure, or their succession in time, or their embryonic development, I shall refer by preference to the same types which I have chosen before for the illustration of the other relations.

Among Echinoderms, we find in the order of Crinoids the pedunculated types standing lowest,² Comatulæ highest, and it is well known that the young Comatula is a pedunculated Crinoid, which only becomes free in later life.³ J. Müller has shown that among the Echinoids, even the highest representatives, the Spatangoids, differ but slightly in early youth from the Echinoids, and no zoölogist can doubt that these are inferior to the former. Among Crustacea, Dana⁴ has insisted particularly upon the serial gradation which may be traced between the different types of Decapods, their order being naturally from the highest Bruchyoura, through the Anomoura, the Macroura, the Tetradecapods, etc., to the Entomostraca; the Macrouran character of the embryo of our Crabs has been fully illustrated by Rathke,⁵ in his beautiful investigations upon the embryology of Crustacea. Ι have further shown that the young of Macroura represents even Entomostraca forms, some of these young having been described as representatives of that order.6 The correspondence between the gradation of Insects and their embryonic growth, I have illustrated fully in a special paper.⁷ Similar comparisons have been made in the class of Fishes;⁸ among Reptiles, we find the most striking examples

¹ See the works quoted from p. 67-87, also MILNE-EDWARDS, q. a., p. 112. — THOMPSON, Crinoids, q. a.

² MÜLLER, (J.,) Ueber Pentuerinus Caput-Medusw, Berlin, 1833, 4to., Ak. d. Wiss.

^a FORDES, (ED.,) History of British Startishes, London, 1851, 1 vol. 8vo., p. 10. ⁴ DANA, q. ш, p. 32. — BURMEISTER, Cirripeds, q. a., p. 79. — Тиомизон, q. a., p. 79.

- ^в Клтпке, q. п., р. 79.
- * Twelve Lectures, etc., p. 67.
- 7 Classification of Insects, q. a.
- Poissons fossiles, q. a.