

the Plovers, the Gulls, the Ducks, the Pelicans; among Reptiles, the Crocodiles, the different families of Chelonians, of Lizards, of Snakes, the Frogs proper, the Toads, etc.; among Fishes, the Sharks and Skates, the Herrings, the Codfishes, the Cyprinodonts, the Chætodonts, the Lophobranchii, the Ostracions, etc.; among Insects, the Sphingoidæ or the Tineina, the Longicorns or the Coccinellina, the Bomboidæ or the Brachionidæ; among Crustacea, the Cancroidæ or the Pinnotheroidæ, the Limuloidæ or the Cypridoidæ, and the Rotifera;<sup>1</sup> among Worms, the Dorsibranchiata or the Naïoidæ; among Mollusks, the Stromboidæ or the Buccinoidæ, the Helicinoidæ or the Limnæoidæ, the Chamacea or the Cycladoidæ; among Radiata, the Asterioidæ and the Ophiuroidæ, the Hydroids and the Discophoræ, the Astræoidæ and the Actinoidæ.

Having thus recalled some facts which go to show what are the limits within which size and structure are more directly connected,<sup>2</sup> it is natural to infer, that since size is such an important character of species, and extends distinctly its cycle of relationship to the families or even further, it can as little be supposed to be determined by physical agents as the structure itself with which it is so closely connected, both bearing similar relations to these agents.

Life is regulated by a quantitative element in the structure of all organized beings, which is as fixed and as precisely determined as every other feature depending more upon the quality of the organs or their parts. This shows the more distinctly the presence of a specific, immaterial principle in each kind of animals and plants, as all begin their existence in the condition of ovules of a microscopic size, exhibiting in all a wonderful similarity of structure. And yet these primitive ovules, so identical at first in their physical constitution, never produce any thing different from the parents; all reach respectively, through a succession of unvarying changes, the same final result, the reproduction of a new being identical with the parents. How does it then happen, that, if physical agents have such a powerful influence in shaping the character of organized beings, we see no trace of it in the innumerable instances in which these ovules are discharged in the elements in which they undergo their further development, at a period when the germ they contain,

<sup>1</sup> See DANA'S Crustacea, p. 1409 and 1411.

<sup>2</sup> These remarks about the average size of animals in relation to their structure, cannot fail to meet with some objections, as it is well known, that under certain circumstances, man may modify the normal size of a variety of plants and of domesticated animals, and that even in their natural state occasional instances of extraordinary sizes occur. But this neither modifies the characteristic average, nor is it a case which has the

least bearing upon the question of origin or even the maintenance of any species, but only upon individuals, respecting which more will be found in Sect. 16. Moreover, it should not be overlooked that there are limits to these variations, and that though animals and plants may be placed under influences conducive to a more or less voluminous growth, yet it is chiefly under the agency of man, that such changes reach their extremes. (See also Sect. 15.)