

of approximation of Reptiles and Fishes, expanded until each of its higher classes had representative species, before the inferior division of true or typical fishes—Teliosts—came into existence. Afterwards, in the Cenozoic, the true or typical Birds and Mammals had their full expansion.

The Vertebrate type, therefore, not only was not evolved along lines leading up from the lower subkingdoms, but was not, as regards its own species, brought out in lineal order from the lowest upward. The subkingdom has, therefore, most evidently a separateness and a roundness below, so to speak, or an entireness in its inferior limits, which belongs only to an independent system.

We find in the facts no support for the Darwinian hypothesis with regard to the origin of the system of life.

II. *The Classification of Animals based on the principle of Cephalization.*

NUMBER I.

As the principle of cephalization is involved in the very foundation of the diverse forms that make up the animal kingdom, we may look to it for authoritative guidance with reference to the system that prevails among those forms. Some of its bearings on zoological classification have already been pointed out.¹ I propose to take up the subject more comprehensively; and, in the present article, to bring the light of the principle to bear on the relations of the subkingdoms, classes, orders, and some of the tribes of animal life.

It is essential, first, that the methods or laws of cephalization be systematically set forth, that they may be conveniently studied and compared. The following statement of them is an extension of what has already been presented.

As an animal is a *cephalized* organism, (or one terminating anteriorly in a head,) the anterior and posterior extremities have opposite relations. The subdivision of the structure into *anterior* and *posterior* portions has therefore a special importance in this connection. As these terms are used beyond, the *anterior* portion properly includes the head, which is the seat of the senses and mouth, with whatever organs are tributary to its purposes, anterior in position to the normal locomotive organs; the *posterior* portion is the rest of the structure. The anterior is eminently the cephalic portion. The digestive viscera from the stomach backward, and the reproductive viscera, belong as characteristically to the posterior portion.

¹ Expl. Exp. Report on Crustacea, p. 1412, 1855; this Journal, [2], xxii, 14, 1856; xxxv, 67, xxxvi, 1, 1863.