Lankester's grades

Treatise on Zoology, Part II, pp. 1–37, London (A. & C. Black), 1900. Phylogeny (phulon, race; genesis, origin) attempts to discriminate between mere gradations of type and real transitions by descent. But whatever view we may take of the relations between organisms, it is sure to be a partial one, just as when, in the course of a single dissection, we may see many anatomical parts and very few connections.

It is often an advantage to obtain a partial view of a complex field, and for this purpose we may shut out the sponges and flatworms, whose special characteristics are such as to merit separate consideration. With this reservation it is possible to discern, in the animal kingdom, three leading types of organization, irrespective of the nature of the skeletal framework, namely, the protozoic (Th. v. Siebold, 1841), the cœlenterate (R. Leuckart, 1848), and the cœlomate (E. Hæckel, 1872). They are comparable in regard to the parallel degrees of differentiation which they present in their plan of composition. In the protozoon we have a single nucleated protoplasmic unit, revealing an astonishing diversity of form, but reducible fundamentally to a surface layer of *ectoplasm* and an interior mass of more fluid *endoplasm*. The cœlenterate organism is furnished with a single body-cavity, the gastrovascular or primary digestive cavity (cœlenteron), circumscribed by a body wall consisting of two superposed cellular membranes: an outer protective envelope, the *ectoderm*, and an inner nutritive lining, the *endoderm*. The cœlomate organism has a muscular body wall, the *ectosome*, and a muscular splanchnic wall (splanchnon, entrail), the *endosome*, separated from one another by the interposition of a secondary body cavity, the cœlom, which is lined throughout by a mesodermal cœlomic epithelium. The cœlomate standard of organization is represented in a number of morphological types, e.g., in the annelid, arthropod, molluscan, echinoderm, and vertebrate phyla or lines of descent. Within these phyla the cœlom appears under various states of extension, modification, and reduction. For the justification of ectosome and endosome see K. C. Schneider's *Histologiches Praktikum der Tiere*, Jena (G. Fischer), 1908. Ectosome had been applied previously by W. J. Sollas [*Report on the Tetractinellida*, Challenger Rep. Zool. XXV., 1888] to the dermal layer of sponges and has been accepted by subsequent writers in this sense, but that need not interfere with its utilization here; on the contrary, it opens up an example of parallelism or convergence, the ectosome and choanosome (zone of flagellated chambers) of higher sponges offering a distant analogy to the ectosome and endosome of Cœlomata.

Ectosome and endosome

The terms employed above, descriptive of the twofold stratification of the body, might seem to suggest a simple evolutionary series, and a novice might get the impression that ectoplasm is alleged to have become transformed into ectoderm, and the latter into ectosome. What we have here is only one of those numerous gradations of type which so often deceptively simulate a natural course of evolution. The most that can be formulated in the interests of brevity is that in the cœlenterate phase an ectodermal epithelium is substituted for the protozoic ectoplasm,

Gradations of type