

observations, especially upon *Doliolum* and *Appendicularia*. In America, Stimpson described a number of new species, both from the American coasts and from the seas of China and Japan. Dr. J. D. Macdonald now commenced his valuable series of observations upon Tunicata, both pelagic and fixed. He described many new species from different parts of the world, including some most remarkable forms, such as *Chondrostachys*, and *Diplosoma*.

Bronn's "Thierreichs" (1852) contains the most complete revision of the entire group which has yet been published. After a short history and a list of the principal works on the subject, a complete and detailed account of the anatomy and embryology as known at that time is given. This is followed by a tabular classification with diagnoses of the orders, families, and genera; the whole concluding with a section on the distribution of the group.

Grube's observations upon the Fauna of the Island Lussin, containing descriptions of some new or imperfectly known Ascidiæ, and Lacaze-Duthiers' paper upon *Chevreulius*, previously described as *Rhodosoma* by Ehrenberg in 1828, appeared a few years later.

The following year (1866) was the date of the appearance of one of the most important memoirs in the entire range of embryology, namely, Kowalevsky's "Entwicklungsgeschichte der einfachen Ascidiæ." This was the first time that the Tunicata had been treated according to modern embryological methods, and that the development of the various organs had been worked out cell by cell, and their origin traced back to particular cell masses. Up to this period all that was known of the process of development of a Simple Ascidian was from Krohn's paper in 1852, on the embryology of *Phallusia mammillata*, in which the various organs were described in the fully developed tailed larva, but their process of development in the embryo was scarcely investigated. Hence Kowalevsky worked upon comparatively fresh ground, and his remarkable memoir contained results of the greatest novelty. He was the first to demonstrate the striking similarity between the relations of the nervous system, the notochord, and the alimentary canal in the larval Ascidian, on the one hand, and the vertebrate embryo on the other. He also traced the development of the chief organs of the tailed larva from the segmented ovum, and showed, in this case also, a certain similarity to the embryonic development in a vertebrate. This pointed clearly to the fact that the Tunicata are closely allied to the Vertebrata, and that the tailed larva represents the primitive or ancestral form from which the adult Ascidian has degenerated; and this led naturally to the view usually accepted at the present day, that the group is a degenerated side branch from the lower end of the vertebrate phylum.

Kowalevsky's paper naturally drew other investigators into the same field. One of the most important of these was Kupffer, who first of all took up the subject with the view of, if possible, disproving Kowalevsky's results, but was speedily converted, and soon became one of the strongest supporters of the new views. He published several