Haeckel’s Embryos: Two Reviews


Flip through biology textbooks, old or new, and chances are that you will find an illustration of vertebrate embryos arranged in rows and columns (see cover). This particular image, an embryo grid, is traced back to the work of Ernst Haeckel (1834–1919) and remains the single most published illustration in biology texts; no other diagram has proved so prevalent and resilient. Nick Hopwood’s Haeckel’s Embryos: Images, Evolution, and Fraud takes us on a journey of rich historical insight surrounding the origin and evolution of Haeckel’s embryo grid.

Hopwood is a professor at the University of Cambridge, where he studies embryonic development, the history of biology, and the visual culture of science. Having written a variety of scholarly articles about the history of embryology, Hopwood is no stranger to Haeckel’s intriguing story, and Haeckel’s Embryos presents a culmination (but not simply a repeat) of his previous publications.

Hopwood provides the context for us to understand how Haeckel designed his drawings to mediate between a general theory and concrete data. For those not familiar with Haeckel’s work, he believed that the comparison of different vertebrate embryos was paramount for the understanding of evolution. By integrating two processes – development of an embryo (ontogeny) and the embryo’s evolution from its ancestors (phylogeny) – Haeckel formulated the Biogenetic Law in the 1860s. The law stated that the evolution of an organism was traceable by following the organism’s embryonic development.

Haeckel’s Biogenetic Law operated by the process of recapitulation, whereby a particular organism passed through the adult stages of lower organisms during embryogenesis. Haeckel used his famous lithographic plates, comparing embryos of different phyla, to illustrate his idea of recapitulation, but embryologists such as Ludwig Rütmeyer and Wilhelm His publicly criticized Haeckel for mislabeling and for drawing his embryos too schematically. They charged Haeckel with scientific inaccuracy and fraud. The complicated scientific, religious, and political history of Haeckel’s work is traced through the early chapters of Hopwood’s book. While Haeckel’s scientific appeal suffered from condemnation by scientific and religious communities, Haeckel’s embryo grid weathered the storm and found its way into what has developed into a “contestable space” in many high school and college biology texts.

Labeling anyone’s work as “fraudulent” is a serious accusation. In the late 1800s, supporters and critics of Haeckel at least knew of the vast amount of work that the embryologist had done in finding new species, writing monographs, and defending evolution. Today, generations removed from Haeckel probably have little, if any, knowledge of the man. But Haeckel’s drawings have never gone away; nor has the notion, held by some, that the drawing represents such an appalling degree of fraudulence that anyone or any idea even associated with Haeckel is fraudulent too. Why do Haeckel’s embryos cause such rage and criticism?

Certainly, there were many drawings of embryos around at the time that Haeckel worked, but Haeckel used his drawings to serve notice of and support evolution, and not everyone agreed with evolution. This is what’s behind many current criticisms of the use of Haeckel’s embryo drawings in biology textbooks.

Haeckel’s Embryos is richly illustrated with diagrams and photos. The book is not quite coffee-table size, but neither is it the routine size that many university press books are. The large size, the thick high-quality paper used, and the publisher’s attention to layout greatly contribute to the crispness and details of the illustrations. I have a few quibbles, though. The final chapters deal with textbook illustrations and have direct appeal to science educators. For the biology teacher who is keen to read about textbooks and embryo grids, these chapters leave one a bit disoriented. Hopwood switches from American to English to German books and jockeys between high school, college, and embryology texts quickly. This chapter might be easier to read if a few more headings were used to identify which type of text is being discussed and where it was used.

My other concern is with Hopwood’s choice of the term “fraud” in the book’s title. While Haeckel certainly took liberties with his schematic drawings, was he really committing a fraud? Hopwood provides evidence for why Haeckel was considered overzealous in his illustrations to support Darwin’s theory, but labeling his work a fraud is an overreach – you have to give the book serious attention to understand this. When simply glancing at the title, one might jump to the conclusion that the evidence against Haeckel continues (as happened with M. K. Richardson et al’s [1997] article in Anatomy and Embryology, “There is no highly conserved embryonic stage in the vertebrates”). But for anyone already familiar with life science history, this book is a refreshing overview, and I