

Dissertation: Lessons from Embryos: Haeckel's Embryo Drawings, Evolution, and Secondary Biology Textbooks

Editor's note:

Karen Linette Wellner defended her dissertation titled "Lessons from Embryos: Haeckel's Embryo Drawings, Evolution, and Secondary Biology Textbooks" in April 2014 in front of committee members Jane Maienschein, Richard Creath, Karin Ellison, Manfred Laubichler, and Jason Robert, earning her a Doctor of Philosophy degree. <https://repository.asu.edu/items/24948>

Abstract:

In 1997, developmental biologist Michael Richardson compared his research team's embryo photographs to Ernst Haeckel's 1874 embryo drawings and called Haeckel's work "noncredible." The journal *Science* soon published "Haeckel's Embryos: Fraud Rediscovered," and Richardson's comments further reinvigorated criticism of Haeckel by others with articles in *The American Biology Teacher*, "Haeckel's Embryos and Evolution: Setting the Record Straight" and the *New York Times*, "Biology Text Illustrations more Fiction than Fact." Meanwhile, others emphatically stated that the goal of comparative embryology was not to resurrect Haeckel's work. At the center of the controversy was Haeckel's no-longer-accepted idea of recapitulation.

Haeckel believed that the development of an embryo revealed the adult stages of the organism's ancestors. Haeckel represented this idea with drawings of vertebrate embryos at similar developmental stages. This is Haeckel's embryo grid, the most common of all illustrations in biology textbooks. Yet, Haeckel's embryo grids are much more complex than any textbook explanation. I examined 240 high school biology textbooks, from 1907 to 2010, for embryo grids. I coded and categorized the grids according to accompanying discussion of (a) embryonic similarities (b) recapitulation, (c) common ancestors, and (d) evolution. The textbooks show changing narratives. Embryo grids gained prominence in the 1940s, and the trend continued until criticisms of Haeckel reemerged in the late 1990s, resulting in (a) grids with fewer organisms and developmental stages or (b) no grid at all. Discussion about embryos and evolution dropped significantly.