

Embryos in Wax, by Nick Hopwood

Embryos in Wax: Models from the Ziegler Studio, is a history of embryo wax modeling written by science historian Nick Hopwood. Published by the Whipple Museum of the History of Science University of Cambridge and the Institute of the History of Medicine University of Bern, 2002, the book, like the wax models, helps exemplify the visual and material culture of science. The first half of the book describes the modeling work of Germany's Adolf and son Friedrich Ziegler during the rise of developmental embryology from 1850 to 1920, a time when embryology's practitioners needed educational aids that could help teach students in laboratories and lay persons in public lectures. Three-dimensional wax models provided just this visual aid.

Acting as both artists and researchers, the Zieglers presented themselves as publishers rather than just model makers. Modeling took time and not every embryologist had the patience or the talent to first draw out the models and then to accurately make models from their drawings. Many embryologists, including Ernst Haeckel and Wilhelm His, looked for outside help in the form of wax modelers. Hopwood describes how Adolf Ziegler worked side by side with both of these scientists, even as Haeckel and His became more and more critical of each other's work.

After explaining how embryologists and modelers gathered embryos (usually through miscarriages and abortions), Hopwood spends several chapters outlining Adolf Ziegler's early life, his pursuit of a medical degree, a wax-modeling career beginning at the University of Freiburg with Alexander Ecker, and the establishment of Adolf Ziegler's studio, *Atelier für wissenschaftliche Unterrichtsmodelle* (Studio for Scientific Teaching Models).

A chapter titled "Plastic Publishing" explains how the Zieglers used their expertise to become self-described "plastic publishers." Hopwood details how the models were made by describing procedures and providing photographs of the Ziegler studio. Adolf Ziegler modeled all embryos free-hand while his assistants were responsible for making wax embryos from molds and painting them. Because most of this work was done in collaboration with an embryologist, the ability to affix a well-known embryologist's name to a wax model helped model makers with the merchandizing of their products. Museums, universities, and institutes saw the importance of adding models made by the Zieglers, called Ziegler models, to their collections. Exporting Ziegler models to Britain, France, and the United States provided Germany with a showcase to exhibit itself as a powerhouse in embryological research.

Hopwood gives homage to His and his refinement of the microtome, which led to changes in the art of model making. In particular, Gustav Born used the microtome in 1876 to perfect his stacked plate method of embryo modeling; Hopwood describes Born's competing modeling process in detail. Yet while Born's method aided in the mechanization of model making, Adolf Ziegler continued with his free-hand style of modeling. His son Friedrich however, used Born's technique well into the beginning of the twentieth-century.

Even with new techniques that made modeling more precise and faster, the demise of embryo modeling began in the early twentieth century as embryology changed its direction. Descriptive embryology, which wax models so effectively aided, began to give way to the experimental work of embryologists such as Wilhelm Roux and Hans Spemann, neither of whom used the Zieglers for model building. With fewer commissions for models of new species and a decrease in requests for copies of models already in production, the Ziegler studio saw its sales for embryo models steadily drop. By 1936 the Ziegler studio had shut its doors to wax embryo modeling.

The second half of the book contains twenty-seven plates of Ziegler models, some in color. The book

also has tables of models and the embryologists who collaborated with the Zieglers to shape these models. The plates include some of their most famous wax models including the development of the frog, human, chick, trout, starfish, and the vertebrate eye. *Embryos in Wax* culminates with a reprint of Friedrich Ziegler's last catalog which dates from the 1920s. Captions in German, English, and French illustrate the wide audience of the models' prospective buyers.

Sources

1. Hopwood, Nick. *Embryos in Wax: Models from the Ziegler Studio*. Cambridge and Bern: Whipple Museum of the History of Science, Univ. of Cambridge, and Institute of the History of Medicine, Univ. of Bern, 2002.