

Introduction

Visitors to the 1893 World's Columbian Fair in Chicago's Jackson Park were in for a surprise. A catalogue's dry listing of "scientific teaching models in wax for use at universities and colleges" turned out to be an amazing embryological display. A photograph (fig. 1) shows the exhibit, two-and-a-half metres tall by four-and-a-half wide, of starfish, sea urchin and beetle larvae, series of trout, chick, human, frog, amphioxus and electric fish embryos, and developing hearts, brains, skulls, eyes, ears and teeth, all ingeniously modelled and cast in wax. In the very top row, across the middle columns, are the trout embryos, and immediately below them the development of the chick, a favourite object of embryological teaching and research. Complex bodies emerge from simple beginnings through series of intermediate forms. Spectators saw themselves unborn, and on the principle that we climb our evolutionary tree in the womb reviewed the history of the race at no extra charge. Hugely magnified embryos epitomised the general celebration of progress. The special attraction of these neat rows of exactly worked and multicoloured statuettes was that they showed the formation of human and animal bodies in 3-D, making structures clear that on paper were very hard to grasp. The maker, Friedrich Ziegler, won the Fair's highest prize.¹

Today the models of Friedrich and his father Adolf Ziegler comprise the majority of embryological waxes preserved in institutes and museums around the world. At the University of Cambridge, for example, collections are held in the Department of Anatomy and the Museum of Zoology. Staff in Anatomy pass the models in a glass-fronted corridor cupboard, from which in the mid-1990s some were still taken for annual demonstrations to students. In Zoology, the collection was twice rescued from the usual threats to old laboratory equipment, and since about 1970 has been kept safe but hidden in a museum store. So I first came across the models, not as a student and researcher there in the 1980s, but a few years ago when working in the Department of History and Philosophy of Science on the history of embryology. I was interested in how, since the eighteenth century, embryos have become significant, fascinating and controversial, and was astonished to discover how much wax models had to do with the answer.

In the decades around 1800 development became a watchword and embryology a central science of life. By showing the simple origins of complex structures, embryologists promised to reveal the true relations of organic forms and to

Fig. 1. Friedrich Ziegler's stand at the 1893 World's Columbian Exposition in Chicago. Colotype photograph by Römmler und Jonas of Dresden from *Prospectus über die zu Unterrichtszwecken hergestellten Embryologischen Wachsmodele von Friedrich Ziegler (vormals Dr. Adolph Ziegler)* (Freiburg, 1899). Cornell University Library, Rare and Manuscript Collections.