

ture lay within preformed miniature in ever-increasing minuteness, as if in a conjurer's box. Thus it was computed that mother Eve must have included over 200,000 millions of homunculi, or sometimes it was Adam who was made to bear this burden. For, according to one party, the ovists, *e.g.* Malpighi, it was the ovum that contained the miniature which had to be unfolded; while according to others, the animalculists, it was the sperm which contained the preformed model.

The whole chapter is a somewhat lamentable one in the history of embryology, and yet it must be noted in fairness that the preformationist doctrine had a well-concealed kernel of truth within its thick husk of error. There is a certain sense in which the whole future organism is potentially and materially implicit in the fertilized egg-cell; there is a sense in which the germ contains not only the rudiment of the adult organism, but of successive generations as well. But in neither of these senses was preformationism understood by any of its upholders, and to say that the modern preformationists are simply returning to the views of Bonnet and Haller is to misread the history.

Caspar Friedrich Wolff (1733-1794) was the first to raise a strong protest, not only against the doctrines of the preformationists, but against their Wolff and Epigenesis. method of speculating rather than observing. At the age of twenty-six he published his doctorial thesis, *Theoria Generationis* (1759), an embryological classic. Appealing to facts, he showed that there was, in the early stages of the chick's development, no visible hint of a preformed miniature, but that the various organs made their appearance successively and gradually, and *were to be seen being formed*. He was clear that what he saw was a development, a real becoming, a gradual differentiation from apparent simplicity to obvious complexity. And as to this all are now agreed; it is a fact of observation.

Theory and difference of opinion begin when we ask how the gradual differentiation of an apparently simple germ or rudiment is to be interpreted; and here, Wolff was in no better position than his predecessors. As