

with the gradual emergence of the theories of heredity into fuller scientific daylight. It is only necessary to linger for a little over the preformationist hypotheses to which we have already referred (chap. x.). According to the extreme preformationists, such as Haller, the egg or the male element was supposed to contain an excessively minute micro-organism, a complete though miniature model of the adult. This was supposed to be stimulated from potential to actual life by fertilization. By the absorption of nutriment in its interstices it was supposed to unfold, expand, or "evolve" into the adult organism. The "animalculists" found this miniature model in the male element, which was believed to be nourished by the ovum, while the "ovists" held that the model lay *in nuce* within the egg, and was, so to speak, awakened by the sperm. This hypothesis was further backed up by that of "*emboîtement*", according to which the germ was not only itself a marvellous micro-organism, but contained in ever smaller proportions, after the manner of an infinite juggler's-box, the miniature models of the generations to follow. But how the germ became endowed with its marvellous supposed organization was left an unsolved riddle.

It must be allowed that, in their general proposition that the germ was a potential organism, the preformationists were correct. The germ cell *does* imply the future organism, and future generations of organisms as well. But the preformationists exaggerated this idea into a denial of individual development, and in default of any theory as to the origin of the initial organization of the germ-cell they were forced to fall back on mystical or metaphysical verbalism. The early researches of Wolff alone were quite sufficient to show that neither the extreme theory of preformation nor its consequent hypothesis of *emboîtement* had any basis of fact. For Wolff showed that there is no preformed model, but that there is a visible development of the apparently simple into the obviously complex. Yet as he also was unable to throw any light upon the inevitable question, "How does this apparently simple germ-cell come to have such

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Germ-cells.