

THE RIDDLE OF THE UNIVERSE

ever, only familiar with their details since 1875, when Oscar Hertwig, my pupil and fellow-traveller at that time, began his researches into the impregnation of the egg of the sea-urchin at Ajaccio, in Corsica. The beautiful capital of the island in which Napoleon the Great was born, in 1769, was also the spot in which the mysteries of animal conception were carefully studied for the first time in their most important aspects. Hertwig found that the one essential element in conception is the coalescence of the two sexual cells and their nuclei. Only one out of the millions of male ciliated cells which press round the ovum penetrates to its nucleus. The nuclei of both cells, of the spermatozoon and of the ovum, drawn together by a mysterious force, which we take to be a chemical sense-activity, related to smell, approach each other and melt into one. Thus, by the sensitive perception of the sexual nuclei, following upon a kind of "erotic chemiotropism," a new cell is formed, which unites in itself the inherited qualities of both parents; the nucleus of the spermatozoon conveys the paternal features, the nucleus of the ovum those of the mother, to the stem cell, from which the child is to be developed. That applies both to the bodily and to the mental characteristics.

The formation of the germinal layers by the repeated division of the stem cell, the growth of the gastrula and of the later germ structures which succeed it, take place in man in just the same manner as in the other higher mammals, under the peculiar conditions which differentiate this group from the lower vertebrates. In the earlier stages of development these special characters of the placentalia are not to be detected. The significant embryonic or larval form of the chordula, which succeeds the gastrula, has substantially the