

them, and are discussed in the following theories of transmission, are based upon pure conjecture, and are, strictly speaking, *metaphysical speculations*. We shall now examine them in the order in which they appeared:—I. Darwin's Theory of Pangenesis (1868); II. Haeckel's Theory of Perigenesis (1876); III. Naegeli's Theory of Idioplasm (1884); IV. Weismann's Theory of Germ-Plasma (1885); V. Vries' Theory of Intracellular Pangenesis (1889).

I. *The Theory of Pangenesis* was established by Darwin in 1868, in his important work on the "Variation of Animals and Plants under Domestication," and worked out further in the second edition of this work, published in 1875 (Chap. XXVII.). Darwin assumes that all the cells of the organism (as living individuals) increase and differentiate not only by division, but also that they throw off minute atoms; these immensely small atoms he calls *gemmules*; these gemmules multiply and aggregate themselves into buds and the sexual elements; their development depends on their union with other nascent cells or units, and they are capable of transmission in a dormant state to successive generations. Besides, every cell can throw off atoms throughout its entire period of development; and these atoms possess, in their dormant state, a mutual relationship which leads to their aggregation in the sexual elements.

This *provisional hypothesis* of Pangenesis, as Darwin himself cautiously terms it, appears to me the weakest and most untenable of all the numerous and far-reaching theories of the great master. I have from the outset considered it erroneous, and have carefully stated the reasons which make it impossible for me to accept it, in a work which