

substances of the body. But besides this means of increase I assume that the units throw off minute granules which are dispersed throughout the whole system; that these, when supplied with proper nutriment, multiply by self-division, and are ultimately developed into units like those from which they were originally derived. These granules may be called gemmules. They are collected from all parts of the system to constitute the sexual elements, and their development in the next generation forms a new being; but they are likewise capable of transmission in a dormant state to future generations and may then be developed. Their development depends on their union with other partially developed or nascent cells which precede them in the regular course of growth. Why I use the term union, will be seen when we discuss the direct action of pollen on the tissues of the mother-plant. Gemmules are supposed to be thrown off by every unit, not only during the adult state, but during each stage of development of every organism; but not necessarily during the continued existence of the same unit. Lastly, I assume that the gemmules in their dormant state have a mutual affinity for each other, leading to their aggregation into buds or into the sexual elements. Hence, it is not the reproductive organs or buds which generate new organisms, but the units of which each individual is composed. These assumptions constitute the provisional hypothesis which I have called Pangenesis. Views in many respects similar have been propounded by various authors.<sup>42</sup>

<sup>42</sup> Mr. G. H. Lewes ('Fortnightly Review,' Nov. 1, 1868, p. 506) remarks on the number of writers who have advanced nearly similar views. More than two thousand years ago Aristotle combated a view of this kind, which, as I hear from Dr. W. Ogle, was held by Hippocrates and others. Ray, in his 'Wisdom of God' (2nd edit., 1692, p. 68), says that "every part of the body seems to club and contribute to the seed." The "organic molecules" of Buffon ('Hist. Nat. Gen.,' edit. of 1749, tom. ii. pp. 54, 62, 329, 333, 420, 425) appear at first sight to be the same as the gemmules of my hypothesis, but they are essen-

tially different. Bonnet ('Œuvres d'Hist. Nat.,' tom. v., part i., 1781, 4to edit., p. 334) speaks of the limbs having germs adapted for the reparation of all possible losses; but whether these germs are supposed to be the same with those within buds and the sexual organs is not clear. Prof. Owen says ('Anatomy of Vertebrates,' vol. iii., 1868, p. 813) that he fails to see any fundamental difference between the views which he propounded in his 'Parthenogenesis' (1849, pp. 5-8), and which he now considers as erroneous, and my hypothesis of pangenesis: but a reviewer ('Journal of Anat. and Phys.,' May, 1869,