

38.  
"Pan-  
genesis."

speculation of Darwin's which he put forward at the end of his work on 'The Variation of Animals and Plants under Domestication' (1868)—the theory of "Pangenesiſ." "This hypothesis implies that the whole organisation, in the ſenſe of every ſeparate atom or unit, reproduces itſelf. Hence ovules and pollen-grains, the fertilised ſeed or egg as well as buds, include and conſiſt of a multitude of germs thrown off from each ſeparate atom of the organiſm."<sup>1</sup> Theſe germs he calls gemmules, and admits that they agree to ſome extent with Buffon's organic molecules, only that neither in theſe nor in Spencer's phyſiological units does it ſeem clear that each "independent or autonomous" organic unit, ſay each cell, throws off or contributes its free gemmule (or gemmules), which is capable of reproducing a ſimilar cell.<sup>2</sup>

The theory of Pangeneſiſ has not found much favour with biologiſts.<sup>3</sup> For their purpoſes it would be neces-

<sup>1</sup> *Loc. cit.*, vol. ii. p. 358.

<sup>2</sup> "Phyſiologiſts agree that the whole organiſm conſiſts of a multitude of elemental parts, which are to a great extent independent of each other" (*loc. cit.*, vol. ii. p. 368). Darwin then quotes Claude Bernard (1866) and Virchow (1860) on the doctrine of the "autonomy" of cells: "I aſſume that the gemmules in their dormant ſtate have a mutual affinity for each other, leading to their aggregation either into buds or into the ſexual elements" (p. 374). "Phyſiologiſts maintain, as we have ſeen, that each cell, though to a large extent dependent on others, is likewise, to a certain extent, independent or autonomous. I go one ſmall ſtep farther, and aſſume that each cell

caſts off a free gemmule, which is capable of reproducing a ſimilar cell" (p. 377). "As each unit, or group of ſimilar units throughout the body, caſts off its gemmules, and as all are contained within the ſmalleſt egg or ſeed, and within each ſpermatozoon or pollen-grain, their number and minuteness muſt be ſomething inconceivable" (p. 378).

<sup>3</sup> Grant Allen diſmiſſes the whole ſpeculation in the following words: "The volume on the variation of animals and plants contained alſo Darwin's one ſolitary contribution to the pure ſpeculative philoſophy of life—his 'Proviſional Hypotheſiſ of Pangeneſiſ,' by which he ſtrove to account, on philoſophical principles,